Challenges of E-Governance at the District Level A Case Study

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The governments, especially in developing countries like India, perhaps more than any other organization, can benefit from the efficiencies and improved services stemming from digital processes. While the developed nations have already led the way towards benefitting from ICT solutions to reduce bureaucratic red tape, the developing and underdeveloped nations are yet to capitalize on this opportunity. As India gets global recognition as an emerging economy and its information technology industry is growing phenomenally in recent times, it is imperative that e-governance should be a focal area in effective administration at all levels in the country. India will be able to provide new services without ever having to deal with cumbersome paper intensive methods by adopting appropriate methods of reengineering administrative solutions through implementation of e-governance. However, except for some sporadic attempts and experiments, this possibility is yet to be completely explored.

India lives in more than 6 lakh villages, grouped into more than 600 districts. Indian administrative setup revolves around the institution of district collectors/ deputy commissioners. Every state is divided into districts for administrative convenience. The state of Karnataka, located in Southern India, has 28 such districts. Each district is headed by a Deputy Commissioner cum District Magistrate. All the departments operating within the district come under the overall supervision and guidance of the Deputy Commissioner (DC). The DC is head of the Law and Order administration in the district and the Police machinery works under the overall supervision of the DC. Apart from the Law and Order administration, the DC is also in charge of land and record administration, revenue recovery, rural development administration, welfare administration and calamity relief management.

The office of the DC has two major divisions – the Revenue Department and Rural Development Department. Both these departments work directly under the control of the DC. The Revenue Department is in charge of land record administration, law and order administration, issue of various certificates such as community/income/solvency/nativity certificates, land conversion certificates etc, administration of social welfare schemes such as old age pension schemes, Distress Relief Scheme, Accident Relief Scheme etc. Taluk and Village level revenue offices come under the Revenue Department administration. Udupi district has three taluk Revenue offices and 248 village Revenue wings

The Rural Development Department is in charge of rural development administration. This includes rural infrastructure creation such as construction of rural roads, school buildings, mid-day meal programmes, non-conventional energy promotion schemes, Calamity Relief Fund, SC/ST welfare schemes, poverty alleviation programmes and other rural development interventions. Most of these programmes are either Central Government or State Government sponsored rural development programmes. Though, some of

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these development schemes are implemented by Zilla Panchayat Office, the DC has overall supervision responsibility to monitor their implementation. The Udupi District has a Zilla Panchayat Office and 146 Grama Panchayats.

The DC's Office, is thus a focal point and every citizen looks up to this office for getting their needs satisfied and for their well being. It has to rise to the growing aspirations of the citizens and provide an accessible face to meet their needs. However, a typical DC's Office, today, is saddled with many responsibilities with overlapping functions, multiple objectives, too much of paper work, bureaucratic setup and lethargic bureaucracy with colonial legacy. Like any other government offices, it is filled with loads of manual files scattered everywhere with hardly any clue of the date on which the file entered the section or the date it was disposed off. A citizen has to fill multiple forms or go to multiple places to get information, travel long distance to and fro, and stand for long time in queue to submit forms, without any clue on its fate. The DC's Office of Udupi district was not exception to this state of affairs till recently.

Good governance is all about providing an administration that is efficient, transparent, user friendly and accountable to the people. To realize these objectives, the Udupi DC's Office took an innovative initiative in 2005 to introduce the concept of paperless office by using the ICT solutions and generating files in digital form. The project was officially launched on 18th May, 2007 and is now fully operational. Since the project was operational during the last three years, there was a need-felt for an independent evaluation. Against this background, the district administration has requested the research wing of Justice K.S. Hegde Institute of Management to evaluate the project with an emphasis on highlighting its sustainable and replicable dimensions.

1. Objectives of the Study

The study focuses on the following aspects:

1. Rationale for introducing the paperless office system for governance of district administration.
2. The efficacy of the software and operational aspects of the paperless office system introduced.
3. The benefit cost analysis of the paperless office system from the stakeholders' point of view.
4. The adaptability, scalability and sustainability of the system.
5. The replicable dimensions of the system.
6. Suggestions/recommendations.

The evaluation study was conducted on rapid appraisal basis with consultative and participatory approach. The research team interacted with all the stakeholders, including the district administration and the technical support staff. The relevant data on software development, infrastructure, capacity building, technical support, user interface and beneficiary responses were collected and analyzed.

2. District Profile

Udupi is one of the twenty eight districts in Karnataka state. It was formed on 24th August, 1997 by carving out of erstwhile Dakshina Kannada (South Kanara) district. The district comprises of three taluks, namely, Udupi, Karkala and Kundapura. Udupi city is the District Head Quarters. Administratively, the district has 248 villages, 146 Grama Panchayats (GPs), one city municipality (Udupi city), two town municipalities (Karkala and Kundapura cities) and one town panchayat (Saligrama town).

Located between the foothills of Western Ghats in the east and Arabian Sea in the west, Udupi district is one

of the three coastal districts of the state. Along its southern border lies Dakshina Kannada district; Uttara Kannada is to the north and Shimoga and Chikamagalore to the east, while Arabian Sea forms its western boundary. The total geographical area of the district is 3575 square kms. The district has three distinct natural regions; coastal belt of about 98 kms, midland plain terrain covering 75 percent of the district and malnad region near the Western Ghat with hills and thick forest cover accounting for 25 percent of total geographical area. The district is blessed with good rainfall from the south-west monsoon. Normal rainfall is about 4302 mm during the rainy season. Many rivers take birth in the foothills of Western Ghats, flowing westwards and joining the Arabian Sea.

As per 2001 census, the total population of Udupi district was 11.12 lakh, of which 5.22 lakh were males and 5.90 lakh females. Sex ratio of 1000:1130 is one of the highest in the state. Out of 11.12 lakh population, rural population was 9.06 lakh (82 percent) and urban 2.06 lakh (18 percent). Udupi district has recorded the lowest population growth rate in the state. The last decadal population growth in the district was only 7.14 percent. The district has literacy rate of 81.25 percent, ranking third in the state. The literacy rate among males was 88.23 percent and among females 75.19 percent. In rural areas, the literacy rate was 79.35 percent and urban areas 89.47 percent.

Agriculture is the main stay of the district's economy. Total area under cultivation is 0.99 lakh ha during kharif season and 0.23 ha during rabi season. Main crops grown are paddy (0.62 lakh ha), pulses (0.08 lakh ha) and oilseeds (0.02 lakh ha). Climatic condition in the district is well suited for plantation and horticultural crops such as coconut, arecanut, cashew and rubber. In recent years, they have emerged as an important commercial agricultural activity. The district is also known for the production of variety of fruit crops such as mango, pineapple, sapota and banana and vegetables. Jasmine is one of the important flower crops grown in the district, which has recently witnessed high growth.

Animal husbandry is developed in the district only as supplementary to crop production. Recently, the district witnessed white revolution and small and marginal farmers and other weaker sections of the rural community have taken up dairy farming as a viable option for improving their livelihood. Forestry also plays an important role in the district's economy as 25 percent of geographical area is under forestry. In the coastal belts of Udupi and Kundapura taluks, fishing is an important economic activity. More than 5000 families depend on fishing for their livelihood. Fish catch of the district accounts for about one-third of the total fish production in the state.

The district has 1.83 lakh farmers. Most of them (90 percent) are small and marginal farmers with land holdings of less than 2 hectares. Land holding pattern in the district indicates that the marginal farmers with less than one hactare account for 77 percent of total farmers and own 29 percent of the land area. The medium and large farmers with more than 2 hectares constitute 10 percent of farming community and own 48 percent of the land area cultivated. The average size of land holding works out to 0.83hectares.

Udupi district has very few large and medium scale industrial units. They include mainly cashew-nut processing, rice mills, coconut powder units and fish canning and processing. Suzlon Wind International Ltd. and Lanco's Udupi Power Corporation Ltd. commissioned recently are expected to give fillip to industrial growth in the district. There are three industrial estates and about 7,398 registered small scale units, mainly in automobiles, chemicals, electrical

and electronics, ferrous and non-ferrous, food and intoxicants, leather, mechanical engineering, paper and printing, textiles, wood and other sectors.

The district has good potential for eco-friendly tourism. It is known for its temples, beaches and 'Udupi restaurants'. It is also considered the cultural and spiritual capital of Karnataka. Bound by lush green mountains on the east and palm-fringed beaches on the west, the district is studded with numerous tourist spots of great scenic beauty in its entire expanse. The district is also well known for its pilgrim centers and vividity of diverse cultural heritage. Historical places include Barkur, Udyavar and Karkala.

Infrastructure-wise, the district has well - knit and connected motorable roads and transport network within and to outside the district, which is one of the best in the country. The villages are connected by all weather motorable roads. The State Highways are well linked to major urban centers. National Highway-17 and 13 pass through the district. The broad gauge Konkan Railway passes through Udupi and Kundapura taluks and connects Kerala in the south, Goa and Mumbai in the north. The nearest airport Bajpe is 50kms away. Panambur port in Mangalore is only 50kms from Udupi. The district has minor ports at Malpe, Gangolli and Maravante. All the villages in the district are electrified.

The district can also boast of well-connected telecommunication facilities. Every village has post office and telephone exchanges. Education infrastructure in the district is the cynosure of many and one of the best in the country. Manipal University in Manipal and Nitte education institutions are known education centers of excellence in the country. Udupi district is unique in the nation's banking map with the highest concentration of bank branches and birth place of two nationalized banks. The district is declared as the one having attained 100 percent financial inclusion. Udupi district is considered as one of the most progressive districts in human development in the state; it ranks first in literacy and education, second in health, fifth in per capita income and third in Human Development Index.

3. Paperless Office Initiatives in Udupi District

3.1 Genesis of the Initiative

The paperless office system adopted in Udupi district was initiated by the then Deputy Commissioner of the district during 2005. When he took charge, he observed that the DC's Office was a typical bureaucratic government office saddled with the issues of inefficiency, non-transparency, non-accountability, undue delay in delivery of public services and rent seeking behavior. There were loads of manual files scattered everywhere with hardly any clue of the disposal process. The files had to move physically from table to table causing undue delay, providing scope for manipulation, tampering of records, missing of files and inability to track the movement of the files. The government worked under the cloud of secrecy; not by design but by the system default. The public did not have access to any information unless they come from long distance to DC's office personally and even then, they were not sure whether they will get the access due to bureaucratic red tape. The DC was deluged with petitioners and petitions. Moreover, all these caused ultimately hardships to the stakeholders.

With the widening of the scope of work and ever increasing work load, it was realized that the existing method of administration can hardly come upto the expectations and address the felt needs. With the ICT revolution, switching over to a new system with e-governance solution for all the problems faced in taking the government service closer to the people was found an inevitable process. Since the DC was conversant

with ICT devices and innovations, he first decided to develop a file movement system using the latest tools of digital technology so that the file movement becomes digital and a transparent process. The objective was mainly to replace completely the manual files by digitized files through development of appropriate softwares that could generate electronic files. For this purpose, the help of National Informatics Centre (NIC) was sought, which ultimately led to conceptualize and adopt Paper Less Office (PLO) System for good governance.

The concept of Paper Less Office initiated by the DC was reengineered and implemented by who took charge as the DC in 2008. Her association with the project right from the beginning as the CEO of the Udupi Zilla Panchayat came in handy in addressing the nuances of the Paper Less Office system in later years successfully.

3.2 Strategies Adopted

The conceptualization of Paper Less Office required standardization and rationalization of office procedures in the form of checklists and digitization of the processing and quick disposal of files. As per the conceptual framework, the entire file movement was made transparent and file-tracking and monitoring of files became possible. Besides providing an accessible face to governance through internet interface, it provided 'anytime and anywhere' access to every citizen. The public now have access to the files through internet, thereby allowing them to know the status of their files online, without visiting the DC's Office. While conceptualizing the PLO system the following objectives were also taken into consideration:

- Provision of easy, transparent and round the clock access to every citizen.
- Efficient and effective citizen centric public services to the people.
- Provision of complete paperless solution to improve efficiency by reducing the work load of government staff and enabling them to maximize their productivity.
- To help the DC in managing the district affairs without much paperwork.
- To improve governance with transparency and accountability
- To facilitate the district administration in getting the upto date status of files movement for setting priority in file disposal.
- To initially reduce and eventually eliminate rent seeking behavior among staff through effective e-governance.

The Paper Less Office at DC's office thus is expected to set a new standard of citizen-centric service delivery system through its transparent working mechanism by use of e-governance tools. To achieve these objectives, the following strategy was adopted:

- ★ Development of appropriate user-friendly software for computerization of all the processes of the DC's office Viz. revenue recovery, land related issues, law and order issues, licensing of arms and entertainment places, temple administration, social welfare schemes, programme implementation like MPLAD, public grievance, natural calamities management and election sections.
- ★ Effective internal supervisory framework through digital system
- ★ Citizen monitoring mechanism through website enabled information dissemination information system.
- ★ Efficient processing methods through using checklist methods
- ★ Complete transparency by web hosting the extracted database.

- ★ Better storage and recovery methods
- ★ Office work at anywhere and everywhere on 24x7 basis.
- ★ Mobilization of resources for acquisition of required hardware
- ★ Capacity building through motivation and on-the-job training of the staff.
- ★ Education campaign to the citizens about the use of e-services.

In a nutshell, the concept of paperless office involved total automation of functioning of all the areas of work at DC's Office. The project aimed at changing the way the government worked by switching over to new system by using the total e-governance solution. Technical assistance of NIC was sought for development of software for generating electronic files and for file movement. To overcome the usual initial reluctance among the staff, regular meetings and consultations with officers, staff and other stakeholders were held. The user requirements were discussed in every fortnightly meeting to get more clarity and refinement of the process. The DC also held interactive sessions with the public and sought feedback on the new system. Mr. Manjunath, the District Informatics Officer was instrumental for developing the software required for this project.

3.3 Software Development and Hardware Acquisition

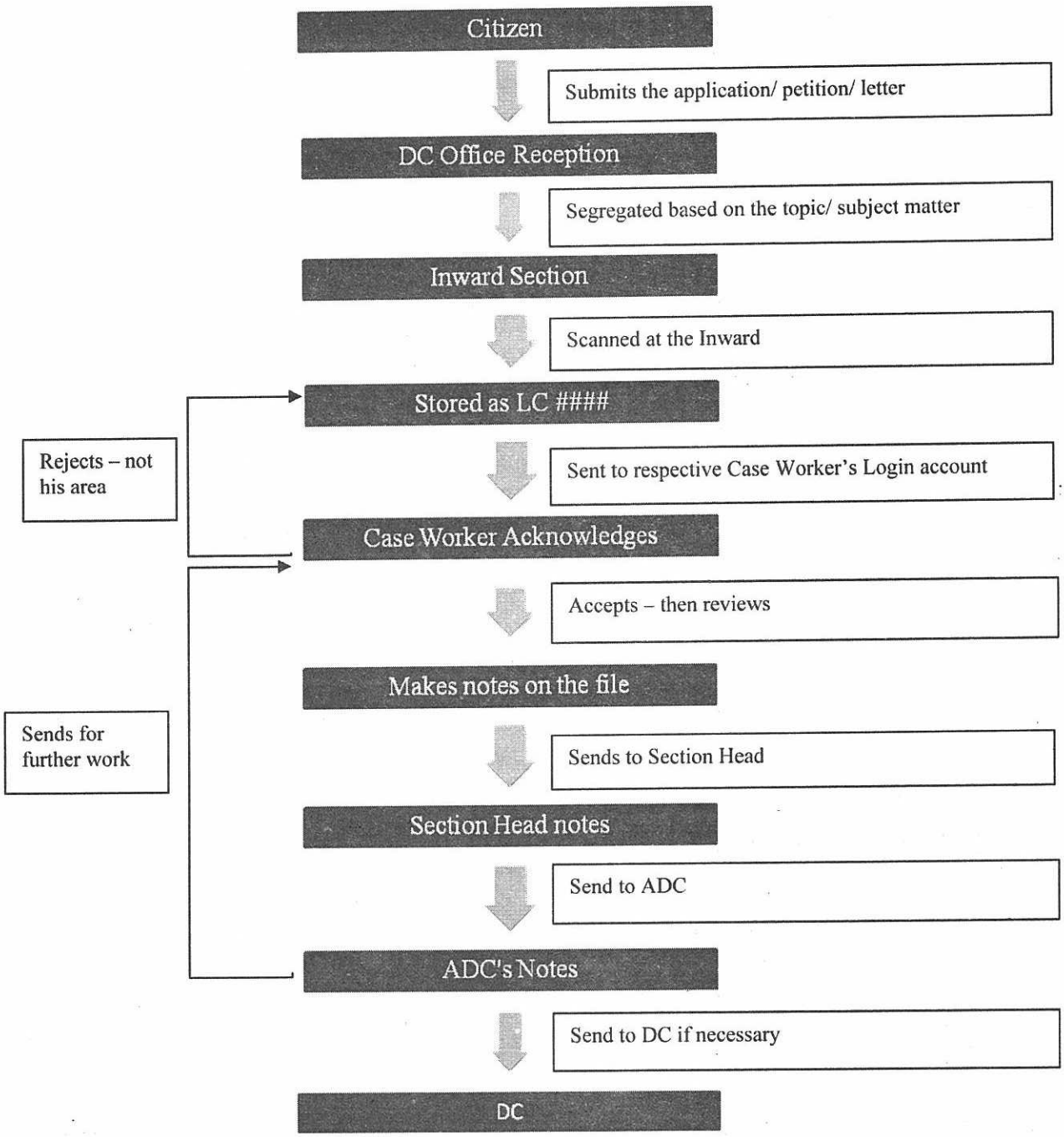
The kernel software on PLO, developed by NIC, was customized to suit administrative needs of Udupi district at free of cost. The DC collaborated with the technical team involved in the software development at every stage. The development of the software package and infrastructure establishment, training, backlog digitization, user acceptance of the software etc. was done over a short period of three months. Software systems were structured into three networked tiers or layers; client presentation layer, the government processing logic layer and the data storage layer. PCs provided the client presentation layer, PC-servers middle tier coordinating interactions between the client and back-end data tier. The Hardware required included 70 PC's with UPS, laser and dot matrix printers, 2 servers with back up, LCD projector. Emails and counters for public for interactions and power backup generators. LAN was established with a total cost of Rs.35 lakh. Automated audit trail was also incorporated in the system by default.

3.4 E-Governance and Software Administration

In the traditional *modus operandi* of handling files in any government office, files moved physically from table to table. The location of a certain file was known only by the person holding it. It was difficult to track the file at a given point of time and know the status of file pendency and clearance of file at various levels. There are also issues like missing files, tampering of the documents, degeneration of the records etc. Public had no easy access to the files and file disposal related information. Even higher authorities found it difficult to track files lying unattended at different stages.

The paperless office is the idealized office in which information is entirely stored, manipulated and transferred digitally. It was designed to remove all the physical file movement problems faced in the traditional mode of working and assist the higher officers as "office tool". It helps the higher officials to know pendency of files, caseworker-wise. In addition to this the new system allows the DC and the ADC's to access the files from their home office at their convenience without any physical files movement. Government to Citizen access is now possible through Internet. The stakeholders can logon to www.dcofficeudupi.org to know the exact status of their files in the DC office.

The Process Flowchart of File Movement is shown in the following page.



As indicated in the flowchart, the modus operandi of the Paperless Office system is as under:

The public submit their applications at the reception and they get acknowledgement for the same. The applications so received are transferred to the Inwards Section (Tapal Office). The 'tapal office'also receives all type of letters from Government/post/parallel department/subordinate department. Here, classification of all these papers is done on the basis of subject matter and are sent to the respective officer in charge, who scans and uploads all the documents with a specific number denoted as LC####. The hard copy is retained by the case worker for the purpose of record room and never sent upwards to any officers. There are 176 subject matters dealt in the DC's Office, which have been included under 7 sections: Revenue Recovery, Arms License, Public Grievance, Natural Calamity, Pension Monitoring, Finance Monitoring and also DUDC, FOOD and Nirmiti Kendra. All the 176 subjects dealt by the DC's office were brought into the PLO by standardizing the process.

The e-file is then transferred to the account of the respective case worker as advised by the Inward section head. The case worker has to check the documents and in case the given subject is not under his authority, has the option to reject the case. In case of rejection, the entire set of that particular file will go back to Inwards section, which is then redirected to the person concerned. On the other hand, if the person gets a file which is of his area, he has to acknowledge the same. He also generates a Computer Number for the file. This number can be used by the public on the internet to monitor the file movement.

The case worker then reviews the file, makes notes relating to the file and then sends to the Section Head. For repetitive activities, procedures are standardized and check lists have been designed to verify required documents based on the subject such as land conversion, tender bulletin, arms licensing etc. The caseworker will verify all points as mentioned in the check list, before putting up the file to his higher authority.

The notes that the case worker makes in the file can be viewed by all including the public at any point of time. These notes may even include the documents necessary to complete the procedure but not submitted. Hence, the applicant can immediately submit the necessary documents. Also, since the documents are in the e-form, the date on which it was received or disposed cannot be tampered with. Also, each case worker is provided with a virtual dashboard which consists of all the cases that are pending on the basis of date, priority etc. A case worker has the liberty to work on any case at any point of time. The dashboard that is provided to case workers can also be viewed by any official in the DC office. Hence, at any point of time, excessive pendency of cases may be addressed.

When the section head gets the file, he would review it and may add his own notes. Depending on the nature of the file it will be forwarded to either the ADC or could be sent back to the case worker concerned. The ADC may review the file and dispose the file within his powers. The cases requiring DC's attention would be forwarded to the DC.

Any interested party can have access to the files through the internet. With the help of the file number assigned, one can trace the movement of files in the DC office. A person has to log on to the website www.dcofficeudupi.org and then click on "ಮುಂದಕ್ಕೆ". He can then use either the computer number or his name or other identifications of the file to search for it. The display contains all the details regarding the status of the file. It will also show details of the number of days for which the file was kept in a particular case worker's dashboard and the notes relating to the same. The user is also provided with help for typing (with the help of Google) as it accepts Kannada script too.

In addition to this, a public grievance system is also incorporated wherein all public grievance applications

received by the DC's Office are sent to the departments concerned by way of software created for this purpose. Login user names and passwords are created for various departments and the applications received are scanned and sent to these departments who in turn report the action taken on the applications through this software. This information in turn is communicated to the public through SMS.

The system uses ASP.Net/C# for the front end and Microsoft windows & SQL server for the back end. The system uses the 3 tier client server architecture which works as follows:

- When a person (client) opens the website, he/she is directed to a staging server which is located in NIC, Bangalore.
- This will in turn get the required information from the server located in the DC Office Udupi. The Udupi office sends the information on a periodic basis to a server stored separately which may be used in case of any disaster.
- The data centre at the DC's Office, Udupi has a complete copy of the data. From here, once an hour, the data is sent to another data centre in the same office but located elsewhere. There is a web server too, located at the Udupi Office. The data stored in the Udupi office is sent to NIC once in a day, using a 34 Mbps leased line connectivity made available.

3.5 Motivation, Training and Capacity Building

Training and capacity building are integral part of the successful e-governance exercise. Unless every government official becomes a knowledge worker, the implementation of the PLO system cannot be implemented. The switch over from the traditional method of working to new system usually has to confront with the resistance of the staff as the majority of them may not be well-conversant with new technology adopted. The DC's office was not exception to this. As most of the staff was not computer literate, initially they were reluctant and had many misapprehensions about the smooth working of the PLO system. In order to resolve this problem, the DC held meetings and consultations with the staff and the general public at regular intervals during the implementation stage. This has helped in sensitizing and motivating the officials about the need and the benefits of the new system.

The technical support of NIC was sought for on-the-job training in computer skills. The software professionals in charge of development and application of softwares were made the nodal officers for training. Training modules were prepared to suit the needs of staff of DC's Office. Staff training was undertaken on a continuous basis. Caseworkers of all age groups including the senior officials of the district administration were trained repeatedly during the course of three months to get accustomed to working with the computers and other machines. Trainees were given hands on experience during the sessions. The user feedback was obtained in each session and based on that, necessary modifications were carried out to make the training more practical oriented. The DC's Office became the centralized training centre.

4. Evaluation of Costs and Benefits

4.1 Project cost and funding

The total cost incurred for acquisition of hardware, software and other infrastructure including capacity building was Rs. 35 lakh. In addition to this, Rs.1.5 lakh was spent to hire a technical consultant to support the operational aspects of the PLO system for a period of one year. NIC trained all the end-users free of cost. The required resources were mobilized from the budgetary allocation granted to the DC's Office. Out of the 72 computers installed, in the DC's Office, 60 PCs were donated by SBI, local temples, trusts and other organizations. No external funding was involved in financing the entire e-governance operations.

4.2 Evaluation of Benefits

PLO system revolutionized the governance process at

the district level. It has been operating successfully for almost three years by now. The benefits of the PLO system are manifold; both direct and indirect. Important benefits derived as a result of the PLO system of governance can be summarized as under:

- Cost Effectiveness and Productivity enhancement: The PLO system of governance has significantly reduced the cost of stationary and related expenditure and postal and phone bills. With the expanding role of the DC's office, the savings as a result of paperless work would be immense. The paperless solution improved staff productivity by reducing the work load of staff, removing delay in movement of the papers and enabling them to contribute more with lesser efforts and time. The system enabled the users to handle 60 percent more number of files compared to manual system. The DC also could manage district administration on user friendly basis without much paperwork and with only a few people seeking personal interviews for grievance redressal.People also save time, energy and money since they need not travel to DC's Office anymore.
- User-friendliness and Comfortabilty: In the past, the government officials were saddled with heaps of files to physically handle. Once they become knowledge workers under the PLO system, their work through computer becomes easier, more comfortable and more interesting. The users can view both files and correspondence on the screen at the same time. They are enabled to use the system in vernacular language. The graphical representation for knowing the pendency level, different colour reporting for easy escalation and processing using checklist method are other advantages for the end users.
- Efficient and Cost effective Citizen-Centric Service Delivery: An online approach did more than simply reduced paper expenses. Web technology made it possible for government to provide a single point of contact for the public. It has taken the government to people and provided easy access to every citizen. Public need not wait for the officer concerned to know the fate of his application. The information is available for public on 24x7 basis.
- Transparency and accountability: The PLO system ensures complete transparency by web hosting the contents of the e-files. With digital system, manipulations of records, missing of files or tampering of documents are not possible. With the citizen monitored administration, it is possible to track the file movement at various stages and learn about the status of his file, when his file is attended and the final decision on his file. He/she can complain to the DC if there was a delay or not satisfied with the decision merely by logging on to the website without visiting the DC's office.
- Better Management of District Administration: In the ultimate analysis, the PLO system has enabled the DC to manage the district administration more efficiently with better transparency and acceptability. With the removal of paper work, the digital system has become an effective management tool. It has also enabled the higher officials to perform their duty in office less environment without handling physical files. The DC/ADC can easily monitor the performance of all the staff working under their supervision.

5. Uniqueness of the Project

Though several experiments of e-governance have been undertaken in other parts of the country, their sustainability and replicability still remain a matter of concern. Systems adopted so far have mostly been of ad hoc in nature involving the computerization of a few functions of district administration. As against this, the Udupi district PLO system of governance is more integrated and exhaustive in coverage of the district administrative functions. The system has now become completely paperless. Following are some of the unique features of the Udupi district's PLO system of governance:

- Complete computerization of all the processes at one go rather than on adhoc basis.
- Fool proof e-file system with back up database to ensure no file missing or manipulation/tampering of records.
- Website in regional language made user-friendly through Google translator.
- Processing methods made easier and efficient by standardizing all 176 subject matters and preparing checklists.
- Citizen friendly website administration and digital tracking system ensuring transparency and accountability
- Grievance addressal system without referring to caseworkers or section heads through website with local language.
- The system accessible to all users on 24x7 basis.
- Introduction of FIT, DSC and Scanner for users authentication, authorization and convenient usage of the system
- Web based data dissemination system for the benefit of the public.

6. Sustainability and Replication

6.1 Sustainability

The success of a project is dependent on the sustainability of the experiments over a period of time. Sustainability of the PLO System depends on availability of technology, manpower, technical support and commitment of the staff. Udupi is one of the most progressive and literate districts in Karnataka state. Availability of literate and computer savvy manpower may not pose a problem. In fact NIC has trained all the end users and already enabled the Udupi DC's Office to use the PLO system of governance very effectively. Even if NIC withdraws technical support, the DC's office staff can manage the system efficiently as they have already developed the required expertise. The software developed was simple based on Microsoft Windows, SQL server as back end, ASP.Net/C# as the front end tools that in itself ensures the sustainability of the system. The role based authentication and authorization for each and every transactions using SQL RDBMS features in addition to FIT for audit trails is another advantageous feature contributing to the security and sustainability of the system.

6.2 Adaptability and Scalability

Udupi district is in the forefront in computerization of public services. All Taluk Revenue offices, 146 Grama Panchayats and urban municipalities are equipped with computers. The district being progressive in terms of socio-economic indicators has also done well in running the panchayat institutions. The entire land records registration and transactions are already online. This background makes it feasible and plausible the extension of the PLO system of governance to the government offices at the grassroot levels. With the networking of available computer infrastructure, all the local, state and central level government organizations can effectively utilize this user friendly system of administration. The lessons learnt through the DC Office level should be used to expand the reach of e-governance to the taluk and panchayat levels in a meaningful manner.

6.3 Replicability of the Model

As India makes its mark as an emerging knowledge economy, empowering the public administration by taming technology for the benefit of the common man is not just a possibility but a necessity. The availability of techno-savvy manpower, improved IT and telecom infrastructure and a changing mindset of the people even at the bottom of the pyramid provides a perfect setting for the introduction of e-governance initiatives at every level of public administration. Considering the simplicity of the technology involved, small amount of investment required, cost effectiveness and immense benefits of the PLO system of governanceat Udupi district, appears to be a replicable experiment. The system can and should be replicated in other districts for the benefit of all the stakeholders.