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Implementation of web based platform independent DSS for electricity department

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Abstract
DSS aims at helping a non technical decision maker to analyze, manipulate and evaluate the complex factors of a problem before arriving at a decision. It supports decision makers in evaluating various alternatives and selecting the most optimum alternative. Web based DSS is an enterprise wide DSS that supports large group of managers in a networked ennvironment. A fast expansion of low cost Internet access and related services has certainly been the main driver of web based type of applications. Many DBMS vendors shifted their focus on web based applications because web applications are appreciated by considering the difficulties that user firm would have in installing, maintaing and applying DSS tools, and purchasing the original software. Now web enabled DSS is free from all the difficulties given above. In this paper a prototype of web based DSS is proposed for providing the online application for electricity conncection and related work. After implementation of this system, the paper work and manual work could be reduced. This application could be used as guide to the management. Through different reports, manager could know where the the task was stopped and why.

Keywords: Web based DSS, DBMS, TCP/IP

Introduction

During the past three decades, the importance of computer based information systems is recognized and innumerable systems have been computerized to improve efficiency in accounting and operational activities. That is applicable for private sectors as well as public sectors. Now-a-days public sectors also have to face tough market competition, where the customer finds the higher satisfaction with better services.

That is why, DSS has flourished in many public and private organizations. With the advent of the personal computer, computer-based assistance for all functions of the business becomes widespread in a number of corporations. The movement of information systems hardware and software capabilities from merely facilitating the automation of clerical tasks to providing direct on-line support for decision making and other management processes have opened up new ways for top executives to view their information needs. Currently, information technology gives managers opportunity to improve and increase their effectiveness and productivity in managing the organizations.

There were no significant differences between the public and private sectors in terms of experience, affect of use, attitudes towards DSS software products, satisfaction with DSS, problems with DSS use and implementation strategies. But there is a significant difference between the public sector and private sector in terms of the frequency of using DSS. The public sectors tended to irregularly use DSS in their decision making whereas private sectors use DSS systematically.

Decision making can be a complicated process, but few organizations employ a robust, consistent decision-making method. Corporations can bolster their decision making, by avoiding a number of critical errors and omissions. A standard method of quantifying and comparing factors can result in effective decision making, providing workers with better tools to improve their productivity. In DSS, ‘Decision’ emphasizes the primary focus on decision making in problematic situations. ‘Support’ clarifies the computer' s role in aiding rather than replacing the decision maker, thus including those decision situations with sufficient 'structure' to permit computer support, but in which managerial judgment is still an essential element. The ‘system’ highlights the integrated nature of the overall approach, suggesting the wider context of user, machine and decision environment.

The current social context and economy urge to improve services provided to the population and to reduce cost in public sectors too. They can improve the decision making activities by new service design and new delivery processes. Service delivery is one of the most important function of governments Information and Communication Technology (ICT).

Although there is a room for effective DSS exploitation in the public sector, but their usage is very low. The public sector is

a very complex system, which can be described by the services that organization deliver to citizens. Public sectors are not profit driven. Profit maximization is not their primary goal, but it does not mean that these are not concerned with financial matters [1]. They also have to fight for funding, power and cost saving. Public sectors have to operate in a political environment. Public sectors organizations have to meet objectives with service delivery like productivity, efficiency and quality of service.

Public organizations have their political boundary, being in this boundary they have allocated revenues [1]. Often public sectors activities contents and scopes are far from being fully understood by citizens. Their funds are not specified in details. Political goals are influenced by decision making processes which are conditioned by available information and knowledge. Knowledge is essential to support decision making activities and to deliver better services. In the context of services decision-making process activities are strongly based on knowledge sharing and involve different actors, the service users being the most important. Decision-making is identifying and choosing alternatives based on the values and preferences of the decision maker. Making a decision implies that several alternative choices have to be considered. In other words, decision-making is a process with the aim of reducing uncertainty [2]. This statement stresses the information-gathering needs of decision making. It means that uncertainty is reduced rather than eliminated. Very few decisions are made with absolute certainty because complete knowledge about all the alternatives and their effects is seldom available. Thus, every decision involves a certain amount of risk. Some internal and external factors influence the decision making process. All the decisions influenced by information and knowledge available. The more information and knowledge are available about the problem, less the risk involved in it.

Citizens demand for better services from public administrations too. So cost reduction and service improvement are the main attention for the public administrations. Service improvement could achieve by modifying service processes, improving service quality and to carry out strategic knowledge [1]. Competition, consumer demands, speed of delivery, technology inputs, government regulation, etc. are the factors those affect any application of the DSS [3].

The outcome of public services depends not only on inputs and outputs, but also on institutional, behavioral and regulatory issues. Public sectors should introduce innovations, i.e. technological innovations and innovations are mainly driven by the need to improve governance and service performance including efficiency and effectiveness of service delivery.

Therefore, we proposed a web based model for the case company, to use this as DSS in their internal working and as well as for their external working i.e. to communicate with their customers for their product which is providing an electricity connection. This adoption could provide effective results.

Proposed Model for Customer Oriented Connection Process (COCP):

This COCP comes with the whole electricity connection process which includes New Connection, Disconnection and Re-Connection. By using this process consumers can now apply for the connections online. After taking a print out of the application consumer can submit it along with the required documents, to the office. The consumer now can check the status of the form from anywhere and can proceed further by using their Transaction ID which will be given to him at the time of application submission. If the application has an error, consumer can reapply after completing the formalities. This will help with the internal staff also. They also can check their routine assignment online and their site work. Different type of reports will be generated, this will be helpful for managing people. This DSS will be helpful in taking decisions related to work. In this model every employee involved in the process, need to update the status of his daily task, management can check their routine work status by daily reports. The work is streamed line in this manner that one employee will complete his task then the other can proceed. This will give them a force to work on time. These some controlling effects will improve the face of the government organizations. This will work in two manners- First, it will improve the working manner of the employees, their technology knowledge and data handling. Second consumers' technology knowledge will improve and consumers will more aware about their rights.

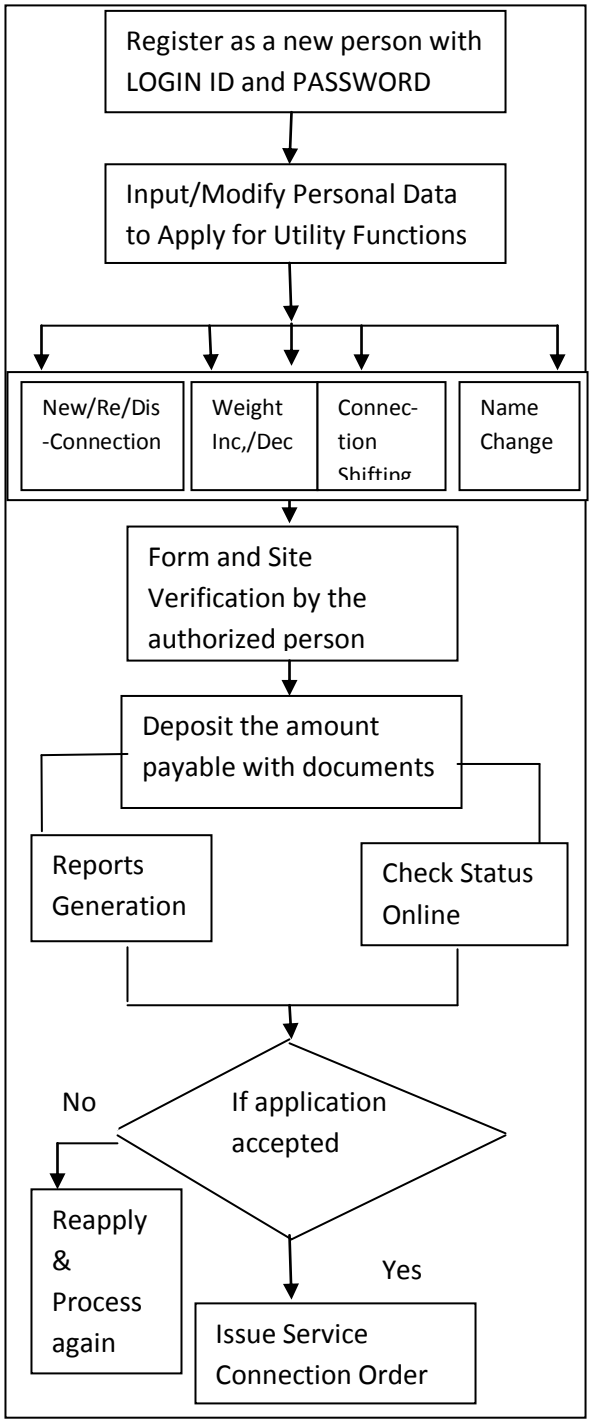

Figure 1

Environment of the Model:-

In the environment of this model, we could find that user could be interacting with Data Base Management System (DBMS) and the defined and recommended functions through user interface. Through DBMS user could store and extract data or information according to the requirement. These could be done through queries.

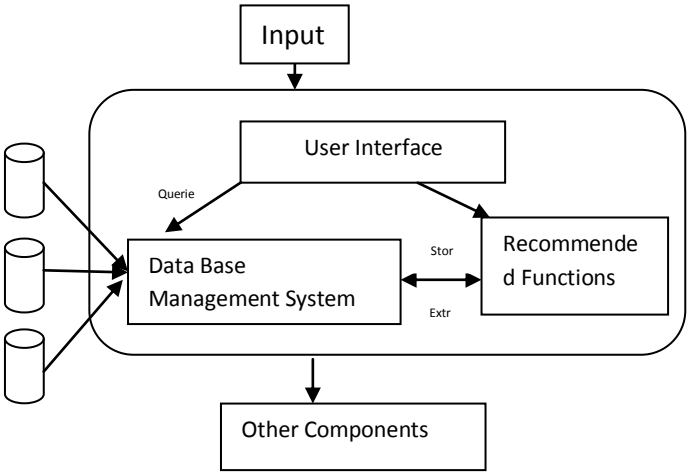

Figure 2

Conventionally, decision makers tend to make decisions based on blend of their intuitions, past experiences or emotions. This does not guarantee consistent decision. In complex environment, undetermined & insufficient external information could trigger to unfair, incomplete and poorly constructed result. Adoption of ICT help in making fair and structured decisions [4].

Framework of the application:-

DSS has many relevant areas those help better understand and unique contribution in research and practice. Three main issues, which provide guidelines in developing relevant DSS for their organizations, they also help in identifying new ways of making efficient process of decision making through computer. These are- 1) Conceptual DSS focus, in which the nature of individual and organizational decision making process will be addressed. 2) Methodological DSS focus, in which integration of existing computer based tools and techniques with human decision making will be focused. 3) Application oriented DSS focus, in which the real organizational needs will be focused [5].

The web based application described in Chapter-3 for the case company, basically addressed three areas- 1) It supports human decision making processes, 2) Integrated DSS into the organizational context and 3) Identifying new application domains. This framework would support decision makers and civil servants to identify the benefits of the DSS applications and to evaluate ICT based services on the aspect of cost savings, knowledge, improved decision making processes and data and information integration. This paper provides an overview of the opportunities and pitfalls associated with the use of such systems in organizations, covering the main phases of DSS/CRM design and implementation. When developing such system more promising application areas are also considered.

World Wide Web technologies have rapidly transformed the process of design, developing and implementing all types of DSS. Web technologies provide new means of delivering decision support services. Web base DSS is a computerized system that delivers decision support information to the

managers using web browser like Netscape Navigator or Internet Explorer. This works like Client-Server application, where server will be hosting the DSS application and user's computer behaves like client. It works by using TCP/IP protocol. This application could be accessible by anyone through Internet connection. It works in a networked environment where team based working or group working would be possible. This facility allow people to avoid geographical problems, like manager could check the reports or manage the regular working by sitting at home too and this will enable the remote and platform independent access of DSS. While there is a significant promise in having web base decision support system, but there are some important challenges like-technological, behavioral, social and economic. To reach the goals of the organization, they should face the challenges and resolve them at time.

Implementation of the application:-

Implementation step is the most important step for any software application, because at that time the developer or researcher could find the problems and the level of acceptance of his application. A successful implementation requires support from top level management and evaluation and assessment should be done at the time of implementation [6]. The impact of the application could be justified. Implementation needs proper infrastructure for the application and all the top, middle and low level management should be ready to find the benefits from this DSS. As we discussed the framework of the application in section 4.3, this web based DSS was implemented in the case company. The system developed from the point of view of ease of use, usage, adaptability and cost to operate. The system design has been carried out with ease of use being one of the highest criteria in the design of the software. It has an extremely user-friendly Graphic User Interface (GUI).

User interface is a vehicle for both the end user and the manager for finding results. GUI provides a understanding of the system to the end user. Even if the model is very good and its results are correct, this would not be followed if it is not understood. Without understanding a system could be accepted or rejected because of not reason. However, the quality and the reliability of the system is important, but the most crucial part of DSS is GUI. Systems with user interfaces that are cumbersome or require special ability, are rarely acceptable generally [7].

This system is made to provide efficient and effective decisions by using a proper decision making process. As suggested in paper [7], that uncertainty is the most important factor in the decision making process, due to this uncertainty there is no guarantee that the result of the action will be one that was intended. One can only hope for the best outcomes which could be maximizing the gain. Good decisions and good outcomes, both are different things. As because of good luck one can get a good outcome after taking a bad decision, similarly because of bad luck, it could lead to poor outcomes after taking a good decision. We only can expect better outcomes from better decisions.

A. System Requirement:-

This application is fully compatible for any environment. To implement this DSS application the office should be networked. Internet connection is must to run this software. This is an application which is based on web. So to work on web one needs browser i.e. Internet Explorer or Netscape Navigator. It will work like client-server architecture, in which database would be stored in the server computer and all the client computers would see the GUI according to their work. Everybody will have their unique user-id and passwords. Employees are assigned their user-id and password by the administrator. Customers who want to interact with the organization to get a new connection / disconnection, etc. they would have created their own unique user-id and passwords by their own. After log in, they could submit their application. It will work in the organization and anywhere in this world. So the internal staff can do their work from anywhere and they can update the status too. Manager or top management can control the task being at home too. The hardware or software requirement for this application is-:

Hard Disk	As per requirement (According to the secondary memory requirement)
RAM (Random Access Memory)	Minimum 1 GB
Processor	Minimum P4
Operating System	Windows 2000 or upper version
Back End (DBMS)	MySQL
Front End (GUI)	PHP

B. Barriers to Implementation:-

At the time of implementation, we found some barriers which occurred in front of the process. Issues regarding computer literacy and hardware requirements were identified as initial barriers. We classified barriers into two categories-

i) Internal Barriers-

(i) Lack of awareness- People do not know or understand the benefits of the new system. They are not literate enough to compare the old system with the new one. This lack of awareness makes them against to implement the DSS. They would not interest in the new manner of working. If they understand the benefits, then only they could accept that software. People must aware about the software, its working, its benefits, etc. (ii) Agreement or perceived self efficacy to adapt new manner- Employees do not want to learn a new system. They generally do not agree to accept that they have to improve their efficiency at that age level. They do not adopt the new mannerism. (iii) Less expectation from the new system- When people are not aware and they do not want to know more about it, then their expectations could not be fulfilled by the new system. They would always find the problems in that system. (iv) An inertia associated with faith in existing system- Some employees got used to of the old system and its working, then they do not want to make change in their routine life. However, their working manner has many problems in it like redundancy, incorrectness, inconsistency etc. Only because they used to of it, they have resistance to

change. They are afraid to learn new things and adopt in their routine life. They have not faith in their ability to learn.

ii) External Barriers-

As there are some internal barriers to implement a application of DSS, some external barriers are also affect the implementation process.

(i) Lack of time- It affects a lot to implementation, because we could not give plenty of time in implementation. Employees could not understand the process properly and they would not be able to work properly and they against the system.

(ii) Inefficient employees- In public organizations, employees at the end user level are not very efficient.

They are not computer literate and they do not want to learn new technology. So they do not support implementation process.

Results:-

DSS is playing more and more a key role in management initiatives because it allows managers to easily access up to date information and provide a comprehensive view of what is happening in their area of responsibility. It helps decision makers monitoring and managing service performances. This DSS will provide up to date information or indicators and scorecards to track the performances of the employees. It helps in making budgets too. Managers could find how to control cost and how to improve or increase benefits.

This DSS strategies technologies and solutions lead to better outcomes. Through collecting and analyzing data, DSS creates detailed reports those have manifolds- they provide better managing organization, improve performance and lower the cost of service delivery and transparency. DSS is a potential solution. Having faith in the new system will help this system successful in the organization. There could be a setting of trigger alerts when they are exceeded or some specific event occurred.

Initially employee reported negatively for duplication during the transition from paper to electronic system. They were seemed this task as overhead. In a public organization, performance and intelligent data are often missing and hard to collect. Therefore, strategic decisions are made with less data support, which limits knowledge about useful alternatives [nutt]. Consequently, potentialities of decision making process affected. The cost of implementation was affordable to the organization.

DSS is an application, which improves efficiency and performance. After implementation of the new system performance increased, but because of some barriers (internal/external) sometimes efficiency and performance decreased. It is applied to 200 employees. Efficiency and the performance were maximally 80 percent increased for some employees. This is in an increasing manner of performance. Some employee's performance increased by only 20 percent, some by 40 percent and so on. According to the employee to employee and their learning skill, they increased their performance. Some employees had good learning skill and literacy to computers; they did very well with the system and increased their performance with more than 60 percent. This DSS system will surely increased the performance of the employees; some employees may take some more time to get used to of it. A DSS tool is computer software that accepts digital inputs of a large number of facts converts them into meaningful comparisons, graphs, and trends that can facilitate and help decision-making processes and outcomes. This tool can assist users in processing, assessing, categorizing, and organizing information in a useful fashion such that it can be easily retrieved in different forms and reports [8]. In this manner DSS tool helps in improving efficiency and so performance. Proper implementation of DSS tool can increase effectiveness and allows visualization of different alternatives. Main users of this DSS application are the customers and the internal staff who are directly associated with the task of electricity connection. Similarly, time efficiency also will increase simultaneously. Initially, it may take time to learn and work on that system; gradually they will improve their efficiency as practice will grow.

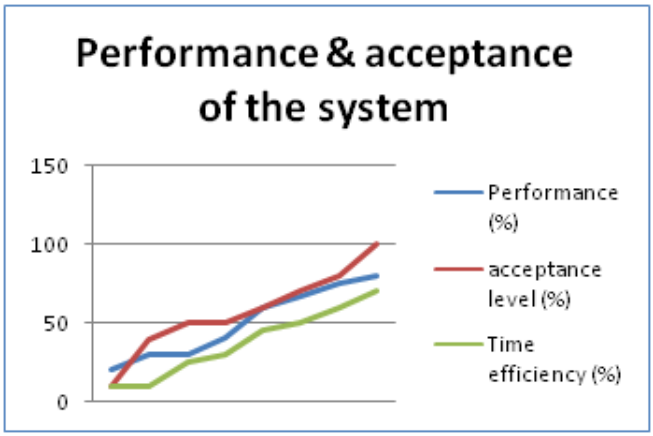

Chart 1

As the performance level of the employees was increasing but the acceptance level of this software was not very pleasant. Many employees who were about the age of 40 and more, they were rigid to change the system; they were not interested in changing their way of working. Some employees were feeling good to have that computerized system, so that it will replace paper work and file management system. Now all the work will be online and managed and categorized in a database. Finding any old file of any customer was time consuming, that is now vanish. I asked many people too, about that new system of filling application form online for the electricity new connection, dis-connection etc. More than 60 percent people were happy with that because they know the benefits of using online applications, which help them to reduce cost, eliminate geographical barriers and the main benefit of apply online 24 X 7. But there is a group of people who are not aware of these benefits or if aware then do not know the working with computers, so they do not want to change this system. There is a scope for those peoples that they can fill the application form with the help of some other person who knows the task. In this case they need to depend on others. In any case, acceptance level will surely increase, because a new era is now computers field. Everybody wants

to communicate or interact with any other person/Govt. Organization/Private Organization or any firm; he needs to do it digitally. The future of the DSS is very bright. I would be seen anywhere. Overall, we can say that the satisfaction level of the system is 70 percent and 30 percent people was not satisfied with that because of some problems.

Problems in the proposed application & Future Work:-

As detailed in the earlier section that the 30 percent people were not satisfied with the system because there were some problems in that. These problems are-:

a) User interface seen by some people including employees feel that is not friendly. They could not feel easy with that. It could be more easy and understandable than that.
b) Authorization is given in the system, which is very tight. Employees did not like that tight security. Only authorized person can do work in his area, even not other employee could interfere. So that security system they do not want.
c) Time check is a option in that system, where the administrator can check that how long a work is waiting for and because of whom. So employees did not like that option.
d) Every task is associated with other person; if one is not doing his task then the next employee could not do his own. So everyone is linked with one another. They also did not like that. This option removes the importance of the individual. They want to work alone, without the association with others.
e) After using this system corruption could be controlled, because now it would not be possible to linger on any application because of some special fruit. This is a big problem for some employees.
f) Every application generates a unique transaction id with it; if the customer forgets his id then it is not possible for him to check his application again.
g) In this system, Applicant has to deposit hard copies of the details and the application form in the office. There is no option to upload the soft copies of all.
h) Online payment option is not given in this system, so for fee payment, applicant has to come to the office.
i) To implement this system, a proper training is required. All the employees related to this connection giving process should be trained, because mistake of one person could bother to all.

After mentioning above problems in the proposed system, one can easily search the future scope. As discussed the future scope of this application is vast, because this application could facilitate the customers to apply online and track the status of the application any time. There is no need to go to the office and ask for the connection again and again. This could remove the bureaucracy and corruption too. No special treatment could be given because of special relationships. All the control is given to the administrator, who could check the status of any employee and give the scores for performance appraisal according to their work. This will definitely force the employees to work in especially public sectors. It is observed that spending more time in practice it will improve the profitability of the organization too. As used DSS, an organization could provide better services at lower cost, then profit could be increased.

For future scope it could relate to the billing system, inventory system, grievance systems, etc. So a DSS application could help to take decisions for the organization. Further supportive research is required for the analysis and different options for the connection giving process, that could be easier for the employees and as well as for customers.

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