AUTOMATION SYSTEMS IN PUBLIC ADMINISTRATION OF THE MUNICIPALITY OF SAO PAULO

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Abstract: In this paper we present a management model that aims to reduce the time between data collection, tabulation and decision making of the public administrator. The various topics and programs deployed, whether in order routine or extraordinary actions and whose need for implementation were under the government program are reviewed with a focus on engineering, but with adaptations, can be adopted in any part of the administration.

Key-words: Logistic Automation, Public Administration, Technology, Data Management

1. Introduction

It start's from a presenting the proposed model taking into account the peculiarities and difficulties encountered in public administration and in response to the prospect of public administration. After that it explores the main aspects of information flow in various spheres of government and what will change with the adoption of this model and the examination of the guidelines for the implementation of the model taking into account the definition of automation and its application in public administration. It make's an approach to logistics deployment model having as basis the current methodology and the new methodology to

be adopted when implementing the model then provides an analysis of the technologies that can be adopted in the proposed model and shows, adopted by examples of automation, the efficiency gain achieved with the implementation of automation systems located.

2. Scenario

The service of public administration must be efficient and to solve all problems relating to their needs.
Over time, we have examples of the population view is that public administration is inefficient, has excessively high earnings and that the public official does not like the job.

This image dissipates when it is aware of the routine work of the civil and often note that the server works with the workload that the private sector is not found.

With the advent of computer technology and its popularization, and isolating the party-political demonstrations that the opposition to any government is established, we see that the population has gained knowledge and resources through more efficient collection of Internet access and even to real-time information through print. The use of Internet tools allows the exchange of information between citizens of all social classes and all levels of education and causes doubts, criticisms and suggestions are exchanged and discussed at a speed that a few years ago was not imaginable .

This gives rise to proposals that, although consistent with good content and are difficult to implement when analyzed from the perspective of the public administrator.

The government program is usually done at the time of election and provides for its implementation over four years, the needs of cities, sometimes forcing changes or adjustments during the term of office of the governor. [2]

The inclusion of changes in the course of administration can be traumatic because, if you notice between the need for a change, whether for reasons of yearning of the people or for reasons of calamities, and actually start being that can take months for recovery by solutions come to be immediate.

In deciding the higher spheres of government, in quick meetings can be established to make the decision to change course, but in the implementation of these measures is that the problem lies. Obtaining the data necessary for the preparation of projects, resource allocation, procurement of works, etc., require efforts from various departments and industries, sometimes from several departments of public administration and bureaucracy makes the terms of the work become dilated .

If the bureaucracy of government is needed both for the processes have enough content and satisfactory in view of the various audits imposed by the Court of Accounts of the Municipality (TCM) and the Public Ministry (MP), this need, however, not always recognized by the citizen. As it is impossible for the government to eliminate bureaucracy, then the creation of effective means to reduce it, through the automation of systems in public agencies, is decisive for the modern manager to overcome the difficulties imposed by both the administrative machinery and by the desire of population.

3. Metodology

3.1 Logistics automation systems in public administration - methodology of current work

Services in public administration can be performed:

a) For gazetted civil servants;
b) Staff employed by joint ventures under the CLT regime;
c) Private companies contracted through a bidding process in its diverse forms.

No matter who run the service, common to all is the collection of data necessary for performing the activity, are given for engineering, financial, accounting or administration.

The logistics of the proposed system starts with this collection. When it comes to engineering works, the development of services is for the Municipal Infrastructure and Works (SIURB), through their superintendents, departments and companies.

This work will focus on the implementation of the activities performed by the Buildings Department (EDIF) of the Municipal Infrastructure Works and the city of São Paulo (SIURB). By analyzing the systematic work of a public engineering are a following sequence of work described in this way, considering the work already set to be executed:

1. Initiation of proceedings;

2. Project development;

3. Preparation of schedule and on budget;

4. Bidding of work;

5. Start of work;

6. Supervision of the work;

7. Measurements of the services performed by periods;

8. Payments for services;

9. Receipt of the work.

In this listing, we tried to group the items representing various activities along the description of many of these activities appear and be more detailed.

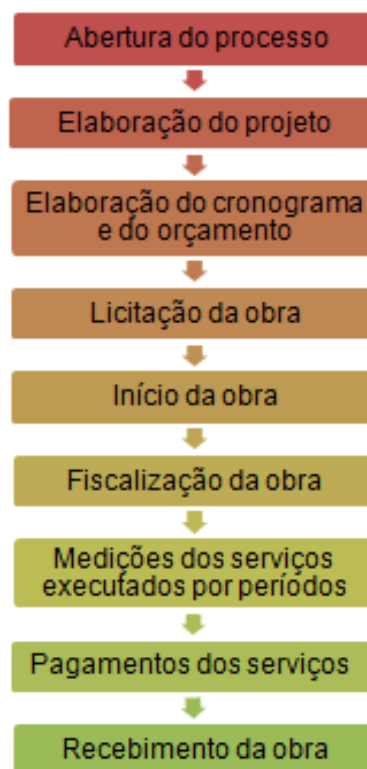In Figure 1, we have the representation of these activities.

Figure 1. Activities flow representation

3.2 Questionnaire pre-designed.

In this methodology, the register of items regarding a particular work will not change from its beginning to its end should be performed and information available in the database for use in all reports developed.

Another important item is the availability of georeferenced plant of the city for the positioning of the work by means of their coordinates.

Besides those items mentioned, others that are deemed important, will also be provided in the questionnaire. An example of this is the questionnaire that was developed for use in EMURB (Municipality Urbanization Company) where there was a need to make a diagnosis of the problems encountered in Elementary Schools (EMEF) and Childhood Education (EMEI) under the Municipal Education of São Paulo (EMS) [3]. The large number of visits required made it impossible the traditional process of analysis and we chose an automation system.

The questionnaire was simple, but comprehensive and all possible problems have been listed and if a problem was not the questionnaire immediately after detection it was inserted. In Annex I, have the engravings illustrating the steps of a pre-designed cards for diagnostics.

In this example, the total length of diagnosis was 2.86 minutes, whereas if it were done by normal standards, considering only the actual time spent between the onset of diagnosis and implementation of the final report would be 95.3 minutes, then included the mean displacement of the local office for the completion of the report (median time 60 minutes). The run time was 33.3 times lower using the automated method.

One of the most important factors in this methodology is that the preparation of the questionnaire should be thorough, with detailed analysis of the technicians responsible for the answers so that all the items analyzed is contemplated, thus avoiding possible loss in efficiency.

The time of diagnosis will increase the complexity required in the activity is greater, but there will always be an efficiency gain in the proposal form if the questionnaire is well done.

4. Technology applied to automation systems in public administration

Using the proposed system is based on technologies that advance in computing has enabled the association of modern tools with existing concepts that, by limiting technological or financial, were not able to be applied.

This work does not enter into technical details of the technologies associated with the proposed system, will quote only the various existing and possible technologies to be implemented in the automation of government services.

4.1. Technology applied to data collection

The inclusion of information that will supply the database is done by different ways and by various programs.

If the data is generated internally and through the programs of routine use in the administration, such as:

- Spreadsheets (Excel or similar) [10];

- Word processing (Word or similar) [11];

- Computer programs to design (AutoCAD or similar) [12];

- Engineering programs for computed (MSProject or similar) [13] and others;

Entries will be directly from the computers of users, after the validation set by superiors in the process.

If the data is generated externally can have different situations.

4.2. Data arising out of pre-designed spreadsheets.

The worksheets will be given access to a variety of ways, for example, the use of laptop or Internet-connected computers.

The use of this equipment greatly reduces the versatility of the system in place, but it is still possible employment.

Ideally, to achieve the performance described in this paper is the use of PDAs (Personal Digital Assistants) [14] the vast computational capacity allows you to perform various functions ranging from cellular telephony to the use of programs for

various areas of interest. Communication between these mobile devices and the rear must meet the standard data transmission cellular technology GSM (Groupe Special Mobile) [15] can be performed using the following protocols:

- GPRS (General Packet Radio Service) [15]

- EDGE (Enhaneed Data Rates for GSM Evolution) [15]

- HSDPA (High Speed Packet Access Dowlink) [16]

- Other, which may improve or replace those listed.

4.3. Data arising out of inventory sheets

For the management of assets, whether property or street furniture, the automation system in the public can use the data collectors (PDA) [14] associated with the deployment of identification of goods across TAG (electronic tags) [17] and an RFID (Radio Frequency Identification) [18] that communicate by sending information through a software for the central database.

Collectors can be portable (PDA) [14] or the information contained in the tags [17], may also be collected through antennas installed in vehicles that, through radio frequency, sweep the roads of the city collecting the data automatically.

5. Technology applied to data management

Data management comprises several functions and aspects beginning with the receipt of data from the various means of collecting and operating systems must meet the requirements of the POSIX (Portable Operating System Interface for Computer Environ).

The server system must be capable of, besides this collection, send data to the data collectors in the field, control the use of the system by users, manage your passwords, monitor all transactions by performing the registration of each; the store activities performed; store captured images, integrating all the information to a Geographic Information System [20] already in use in the municipality.

In the constitution of the database should be made for future reconfigurations needed due to expansions such as the addition of data collectors, additional field functions, etc.. Does not interfere with other data already configured.

Its storage capacity and availability of information should be provided to ensure a workable and flexible ensuring safe speed that is expected of the system.

6. SCHOOL REFORM PROJECT IN THE CITY OF Sao Paulo. [21]

6.1. Initial implementation

The example cited in section 4.2.4 was implemented by EMURB (Municipality Urbanization Company) initially in a more simple, since the technology available at the beginning of the process was still weak [22].

This way they implemented a process automation that associated equipment and programs at the time.

He was about laptops, digital cameras, connectors for remote transmission (via internet), computers and working as a program manager with comprehensive information as well as a database.

The system was used to assemble two working groups: one external, which would make the work of data collection and another procedure, which would analyze the collected data and mount reports.

The data collected would be sent via the Internet through the remote connector, and were made up of the specification done in word processing and digital photos captured by the cameras and sent as image files.

In the central office, the internal team would receive the reports and pictures and mount a standardized final report and make available in the database for use by interested parties in this case, the Municipal Education Department (EMS) and the Municipal Infrastructure and Works (SIURB).

Thus, many steps of a diagnostic procedure had been eliminated or reduced in time by allowing a small team could get a very satisfactory result, with the perfect accomplishment of the schedule.

With time gathered from work done by two methods, grouping all activities on comprehensive items was achieved by a reduction in length of 3.4 times by adopting the new method.

Figure 2 shows the time comparison of two models of work, this comparison was done at the beginning of the work program of maintenance of school buildings in 2007.

This system allowed considerable progress in relation to time and also caused changes in the way of work so far employed.

External teams did not have to refer to the central office to the top of your daily activities straight from leaving their homes to places of execution of diagnostics.

This, combined with a logistic distribution of sites taking into account the area of housing for the technical, has enabled a rationalization of costs, because the vehicles did not have to drive to the office facing the difficulties of traffic and often restricted movement imposed by the rotating license plate numbers.

6.2. Improvement

In the last months of the contract quoted, it has evolved to an improvement of the system by studying the implementation of the model mentioned in item 4.2.4 that, in our tests showed a significantly better performance with the adoption of pre-designed questionnaire.

ATIVIDADES NECESSÁRIAS PARA O DIAGNÓSTICO	TRADICIONAL DURAÇÃO HORAS	IDEALIZADO DURAÇÃO HORAS
Preparação de mapas e roteiros para vistorias.	2	1
O responsável se desloca até a sede para obter os mapas e roteiros em que serão realizadas as vistorias.	2	0
O responsável se desloca até os pontos de parada agendadas para realizar as vistorias.	1	1
O responsável anota em papel as ocorrências e as fotografas em cada ponto de parada.	6	2,5
O responsável descarrega as fotos em um computador e digita o relatório anexando as fotos.	3	0,5
O responsável envia o relatório a seu supervisor.	1	0
O supervisor distribui os relatórios para que o demandante, de acordo com as competências e urgências, envie ao executor das obras.	2	0
TOTAL DE HORAS TRABALHADAS	**17**	**5**

Figure 2: Comparative table of activities from time from diagnosis of the maintenance of school buildings.

With this enhancement to rationalize this enhancement provided a further reduction in time in the order of 8 times compared to the original

procedure in which the automation was not implemented.

This reduction was observed taking into account the average length of a survey in a school and also taking the survey and not fully implemented on time as shown in item 3.2.

Figure 3 shows the comparison of time between the traditional and automated enforcement.

ATIVIDADES NECESSÁRIAS PARA O DIAGNÓSTICO	TRADICIONAL DURAÇÃO HORAS	IDEALIZADO DURAÇÃO HORAS
Preparação de mapas e roteiros para vistorias.	2	1
O responsável se desloca até a sede para obter os mapas e roteiros em que serão realizadas as vistorias.	2	0
O responsável se desloca até os pontos de parada agendadas para realizar as vistorias.	1	1
O responsável anota em papel as ocorrências e as fotografas em cada ponto de parada.	6	0
O responsável descarrega as fotos em um computador e digita o relatório anexando as fotos.	3	0
O responsável realiza a vistoria	0	0,1
O responsável envia o relatório a seu supervisor.	1	0
O supervisor distribui os relatórios para que o demandante, de acordo com as competências e urgências, envie ao executor das obras.	2	0
TOTAL DE HORAS TRABALHADAS	17	2,1

Figure 3: Comparative table of activities from time to improve diagnostic testing.

6.3. Consolidation

If the effective implementation of improvement, with adoption of pre-designed questionnaire can not be fully used in the contract for surveys and diagnosis of the schools due to the termination of the activities, she served as the basis for a new contract signed in that needed a EMURB inventory of all bus stops in the city.

A new questionnaire was pre-conceived view of the new demand and the registration was initiated in the georeferencing of all bus stops, by type of diagnosis, condition, services needed for their maintenance and pictures of the place.

Other demands were being created due to this automation, and today the system is fully consolidated.

7. Conclusions

The government has quirks like any other sector and obviously a change in work procedures involves resistance.

It was thus in the implementation of automation model adopted initially in the project EMURB School Reform and so shall it be when implemented in any sector of government.

Resistances ranging from insecurity to the official about his future until the total abhorrence of the new method as a function of unfamiliarity with the use of advanced technologies and totally innovative.

It is for the manager's understanding of these programs provide the necessary training and comprehensive way to resolve all issues related to questions of officials who will participate in this work automated.

The experiences with deployments already done has proved that, as the methodology is becoming known, the suspicions are becoming increasingly rare and the acceptance of officials is full.

New dynamics should be implemented so that the results of an industry can automatically be used by other sectors with the standardization of reports using the maximum possible of computer tools that facilitate the exchange of data without the need for rework.

The result of this proven methodology is largely favorable to considerable reductions in execution time, the final cost of the services provided, reliability of results, quality of presentation of the final product in a standardized, especially in power management process that provides managers of all levels.

The cost of deploying these systems tend, as they are massively, reaching ever lower levels allowing any organs, even with few resources, have access to this technology.

Another great advantage of the system is that it adapts to any work situation, be it technical or administrative data from interposing related areas where necessary and providing results that can be used from top management to make it available to the public via the Internet room or situation.

Statistical data can be automatically updated without the need for more preparation in advance and meetings to assess the performance of activities can be conducted with information obtained in real time so that course corrections are immediate.

This is very useful at times critical of the administration, especially in cases of disaster, where the response must be fast in light of the problems presented and the charges made by the press and the general population.

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