IMPLEMENTATION OFFICIAL PUBLIC PROCUREMENT SYSTEM OF ECUADOR

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ABSTRACT. In the following lines we present an innovation project that being developed in the public sector directly impacted the private sector, dynamizing the economy of the Ecuador through an open participation of suppliers, this way achieving a more efficient and transparent public procurement. It could be done thanks to the enactment of the Ley Orgánica del Sistema Nacional de Contratación Pública (LOSNCP) (Organic Law of the National Public Procurement System) on August 4, 2008 that provides that every institution that manage public funds must use the Sistema Oficial de Contratación del Ecuador (SOCE) (Official Procurement System of Ecuador), being its development and administration under the responsibility of the Instituto Nacional de Contratación Pública (INCOP) (Public Procurement National Institute)

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INTRODUCTION

With the enactment of the Ley Orgánica del Sistema Nacional de Contratación Pública (LOSNCP) (Organic Law of the National Public Procurement System) on August 4, 2008, there is a complete restructuring of public procurement in Ecuador. Before each institution defined its own rules based on existing public procurement regulations, the internal regulations must be in accordance with the rules above.

On the other hand, the old law did not apply for all public-sector, for example, the state enterprises ran their own regulations. In turn, each institution managed discretionary its list of suppliers, defining their requirements for it. This means that each bidder must submitted their registration documentation for each entity in who wanted to participate as a bidder, and in most cases this record was not free. Additional to this was normal payment for the acquisition of the terms of reference for hiring, providers must purchase these documents is to be or not to participate in the process. All this meant that there is limited participation of suppliers, thus losing the opportunity to get the most advantageous terms of what we wanted to acquire.

At first the only way to transparent the public procurement was through the publication of the processes performed by each institution on its website. This is standard the transparency law in force in the country, but not the old Public Procurement Law. From the year 2002 a major effort to transparent public procurement through a system called Contratanet, and then managed by the Comisión de Control Cívico contra la Corrupción (CCCC) (Civic Control Commission against Corruption). However, the publication of the process was not mandatory for the contracting entities; the CCCC must signed agreements with each institution to commit to using the portal. This effort extends only to 486 institutions and 6000 suppliers, who were enrolled in this, additional the supplier must be enrrolled in each institution who wanted to participate. It should be noted that this software only managed the publication process, unable to interact with suppliers in the tool, such as in the current system.

In 2007 began the project of National Public Procurement System in Ecuador, which involved the development of new legislation to unify all procurement in the public sector. LOSNCP created the

Instituto Nacional de Contratación Pública (INCOP) (Public Procurement National Institute) as the governing body of public procurement, and must meet the following objectives:

- Quality of public spending
- Transparency
- Dynamism of the national production
- Participation of MSMEs
- Modern, agile and simple procurement process
- Citizen oversight
- Reliable and competitive suppliers
- Coordination of public procurement system with the government planning and budgeting

This was a complete turn to the form that the public entities must contract in the country, It was mandatory to use technological tools to make purchases. On the other hand, from the law, all public institutions must follow the same rules and regulations, INCOP was the responsible for regulating in detail via resolutions different types of procurement processes defined in law and regulation.

By incorporating the law the mandatory use of the software tools, we had to be built a system that complies with current regulations, but not until the law was published, the system requirements could not be sure. Once they had the draft law, it could start development work of the tool, a very enriching experience which is presented below, which insurance may be useful for other countries that are at this stage implementation.

This paper presents the experience in the development of the Sistema Oficial de Contratación Pública del Ecuador (SOCE) (Official Public Procurement System of Ecuador OPSE), which was developed its first phase in a record time of one year, from which it has been increasing in features and enhancements in order to facilitate the work of their users.

METHODOLOGY

The development of the first stage of the Official Public Procurement System of Ecuador (OPSE) was built in record time of one year with all the complexity that the top 15 types of recruitment processes were implemented. This project was divided in two main components:

- Development of OPSE
- Technology infrastructure

Development of OPSE

Before starting the development of OPSE, we performed an analysis of three alternatives that we can build the software, which were:

- To acquire developed software and customize according to the requirements defined in the regulations of Ecuador.
- Outsourcing the development of the Software with a specialized software company.
- We perform the development of the software.

For the decision-making is analyzed the advantages and disadvantages of each of these options, they are summarized below:

- To acquire developed software
    - The main advantage was found the experience has already been taken in implementing such systems in other institutions or countries, helping to best implement the tool in Ecuador.
    - The disadvantages was the fact that the draft law provided for a complex regulation that would contain a set of processes that a supplier could hardly have it automated with any software, which implied a strong personalization that was reflected in a larger budget to implement the project . In addition to any changes in regulations or improvement to make, we would be complete dependence of the supplier. Moreover, as is

software developed, if the supplier delivers the source code of the system, this would have very high costs.

- Outsourcing the development of the Software
    - As an advantage you had the experience of software development companies to build applications.
    - A disadvantage would have had a complete dependence on the supplier, so there is a high risks of operation once it has completed the development of the system by relying on a third party who has no direct obligation to the public procurement, rather than a contract requiring him to comply, but that future will depend on uncertain technical support, which the company at any given moment may refuse to do so, or turn to change the terms of the benefit of them.
    - On the other hand, in Ecuador there is no experience of having developed a procurement system of this size.
- We Perform the development of the software
    - As benefits we have knowledge of public procurement rules as such and the software once it has been developed, with no dependence on specific suppliers for any type of change.
    - A disadvantage was the possibility that the technical capacity of staff to be hired does not satisfied the institutional needs of the application development.

In addition to this, for taking final decision took into account the following points:

- For the times that were intended to implement the software solution, there was a high risk that the project can't be fulfilled in time estimates, risk to be assumed by the provider who is capable of doing.
- The responsibility for the system to work properly is the INCOP. This can't be delegated.
- Best practices recommend outsourcing support services to the institution. As the OPCE is a strategic tool through which the contracting entities of the country will acquire, process becomes an aggregator of value to the INCOP.

- As the INCOP a new institution, created in August of 2008, beginning lacked a budget for the current year, which limited the power to make hiring immediately, so a direct impact on project implementation.
- The rule over time undergoes changes, which would entail changes in the system, and must implement them as soon as possible.

Result of this analysis, we decided to implement the development project itself, defining a strategy for this construction by prototypes, where expert users continuously interacted with the Software development team. Also, we designed a software architecture in which priority was given to the reuse of code and a complete parameterization in order to quickly automate different types of procurement processes referred to in regulation since many of them would share features , for example, the stage of questions and answers that is the same in all process. The layered architecture defined for the system shown in Figure 1.

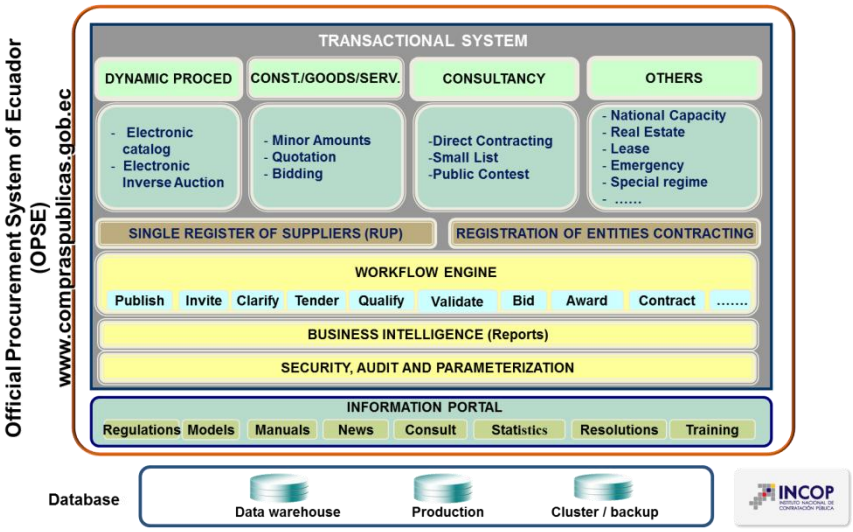


Figure 1: OPCE Architecture.

The architecture begins by defining two areas:

- The information portal, which was developed by a company specializing in design and content management portals.

- Official Public Procurement System of Ecuador (OPSE)

We began to develop the SOCE with the security, auditing and parameterization module, which will support the entire system. In security built access capabilities into the system, definition of user groups, user menus, profiles and access control as defined profile for each user. The Audit module automatically save all insert, update and/or deletion transactions that is performed in the system. It also built a log to record access to the screens that invoke the user from his login, saving even failed attempts to login. This allows complete tracking of what users do on the OPCE. These two points make up the general audit trail system, additionally exist specific logs in different modules according to their criticality.

Furthermore, from the start was designed to make the system fully customizable to fit the needs of INCOP, which is why we built a complete catalog which allows additional parameters to increase without having to modify the data structure or the programming.

Continuing with the configuration of the system, we worked on the engine layer workflow, module that defines the configuration, perform the implementation and monitoring of different types of procurement processes which includes the new law. This module also allows to parameterize the information to complete for the generation of a new procurement process depending on its type, It must necessarily enter the schedule of dates for each phase that will pass the flow. Also when running the process, the system also stores the date and time each stage was completed and if any user who performed it (there are some stages that the System automatically change the state).

Furthermore, in order to begin to collect data of the contracting entities and suppliers who would use the system, we developed the Unique Record of Suppliers module and contracting entities module. These modules were the first that went into production to be used by users.

Once built these modules, we proceeded with the implementation of different types of hiring processes, fifteen in the first phase, starting with those they would certainly be covered by the new procurement law, namely Electronic Reverse Auction and tendering. Before the publication of the LOSNCP, began testing

with these modules, so that from August 4, 2008 can operate without problem.

Following this were progressively incorporated different types of processes defined in law, coming to publish all the normal system processes, as the electronic catalog (shopping cart) until May 2009, a year after the project started. Since it was mandatory to use the portal to the entire public sector, which includes all public and private institution in which the state holds more than 50% participation, as indicated by the LOSNCP. A very important point in this was that the new law provided for transitional arrangements allowing delaying the use of the tools for recruitment in the system even when these were available.

Since the development of this first phase, have been incorporating new modules that automate other recruitment procedures in the Law, and currently has a robust platform that automates the various processes of hiring in force at the LOSNCP. On the other hand we are working on the optimization and improvement of the system. In addition, there have been constant changes to the system requirements for changes in regulations, the same that have been done without problem because we have all the knowledge about the system.

In this sense, and to seek alternatives, initially decided to outsource the development of electronic catalog module, taking into account that in this the suppliers can have experience, but only this module came to have a dependence supplier until INCOP technical staff took control of this development, so as not to depend on others to change the system. This allowed us to determine how important it is to have full knowledge of the tool independent who has developed.

Another important development has been the OPCE interconnection with other government systems such as: public financial system of Ecuador, Systems of Internal Revenue Service and Social Security Institute, with whom there is exchange of information to validate. This has enabled better control the statements made by suppliers.

We are currently working on implementing a business intelligence and reports tools, to provide information to all users of the portal, once all features have been developed. With these tools the users will can to obtain statistical information for better analysis of

public procurement in the country, according to this make better decisions.

It should be noted the short time it took to develop all the functionality required by the law in the fifteen recruitment process, with the complexity that this implied. The system was in operation immediately following the publication of LOSNCP, and with the system in production new modules were adding, thus increasing the complexity of its development, since new versions put into production in the OPSE could not affect the functionality of the system. In one year, was completed the core functionality of the system, because that was made in stages and by priority.

Finally, for the system development we fully used free software, because there is a government policy that provides for the use of such software, being the first system of this complexity in production out nationwide with free software. We used PHP and Java programming language, PostgreSQL as database and Apache as application server. This development became more complex as the functionality of the free software development tools can't be compared with the licensed Software development tools where they provide a number of features that greatly facilitates the development of software. Still, the project was successfully executed by technical staff, who put all their effort and knowledge to make the project succeed.

Technology Infrastructure

Parallel to the development of OPSE, We were performed studies to determine the technological infrastructure that would support the System. The main difficulty was to know what will go the demand of the service when the system will go to production?. There was no real reference load that the system was to support, not being able to take CONTRATANET statistics for this because this platform covered only 486 entities and their use was not mandatory. But with the enactment of the LONSCP, would be mandatory OPSE would be used for over 5000 public institutions, with the corresponding register of suppliers around the country.

In view of this, we were decided to implement a technology infrastructure that allows it to be scalable over time. Thus, it acquired a blade servers solution with scalability to 16, so that as you will require processing can continue increasing the number of

servers that were initially 5. In addition to distributing the load among these servers, it incorporated a load balancing solution, enabling more processing with this increase as it requires. At the same time, this configuration also works with fault tolerance because if one server fails, access to it is blocked immediately by the load balancer, distributing the service requests to other servers if available. This feature also serves to remove a server in maintenance without having to suspend service.

Another point on the infrastructure was the storage, for which acquired a redundant storage system with a capacity of 96 TB. With this facility was going to increase the storage capacity according to system demand. Currently the storage has a capacity of 10 TB, being used in a space of 6 TB. Centralized storage set allowed to the servers work in cluster, accessing all of them the same information, thus avoiding the loss or data inconsistency. Additionally, these equipment have high safety standards of backup, because has redundant array and also these system keep disk on hold in case a disk that is working starts to fail. In addition to this, we acquired a robotic unit that automates the data backup, and the corresponding restoration.

Also, It was necessary to ensure the system against possible attacks that may happen in time. Thus, it acquired a perimeter security solution where were installed equipments such as: network Firewall, Application Firewall, IPS - IDS, and antivirus, to minimize the risk of attacks or unauthorized access to OPSE. All this infrastructure also working on redundancy (if a computer is damaged, there is another that goes to work immediately).

The implementation of this infrastructure, as well as software development, we gradually realized, this being monitored constantly, which has allowed early to detect updates that especially had in the storage system. In addition, we included an additional server as a backup to the currently employed, if beyond the capacity of existing processing.

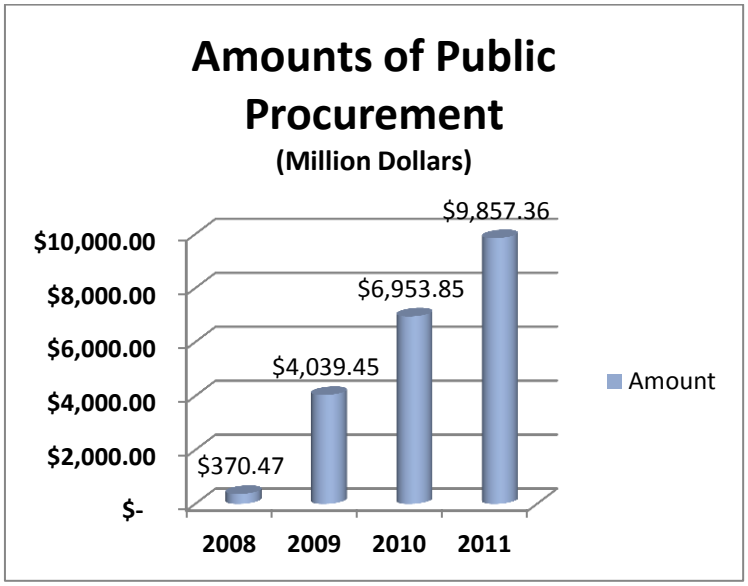
What made these three years has enabled support concurrent access of about 500 users at peak hours, supporting the creation of 600 average daily procurement processes.

Similarly, to date continues to implement new infrastructure and processes as it determines best practices in information technology, such as ITIL and COBIT to provide a better service, mainly by increasing the availability of the system, which currently

is 99.5%. Is currently implementing the alternate backup site in order to be protected from contingencies in which they come to destroy the INCOP datacenter.

RESULTS

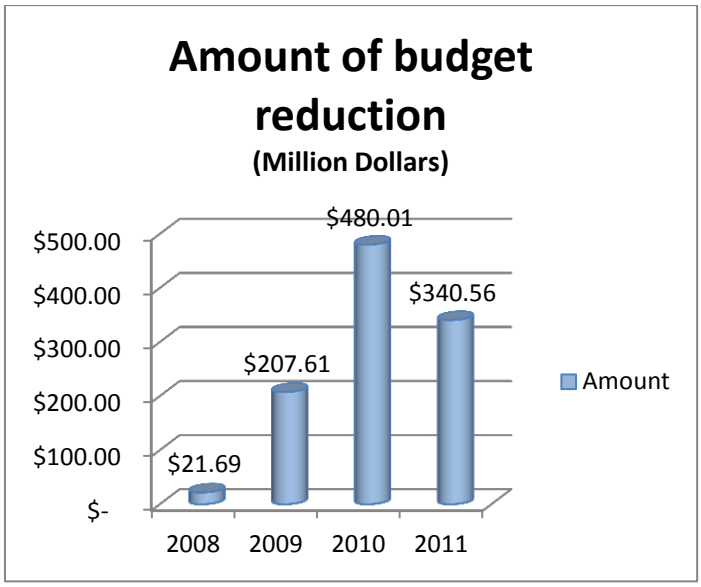
The first major result is the amount of transactions in the system to date. $ 21.221 millions of dollars have been transacted through the Public Procurement portal (figure 2). In 2011 OPSE traded 15% of the GNP of Ecuador.



Source: INCOP

Figure 2: amount of public procurement

Since the publication of LOSNCP in August 2008, the State has achieved a budget reduction of approximately U.S. $ 1.049 million (figure 3), Vs. The State has so far invested U.S. $ 11 millions in 3 years. Technological investment (software development and infrastructure) in 3 years has not exceeded U.S. $ 5 millions, which makes the project developer has been very successful.



Source: INCOP

Figure 3: Amounts of budget reduction

In budget reduction isn't considered the indirect savings that the system has generated in the contracting entities and suppliers, however this is recognized by those involved in public procurement, reflecting the results of a survey conducted by the company Hexagon in the question of figure 4.

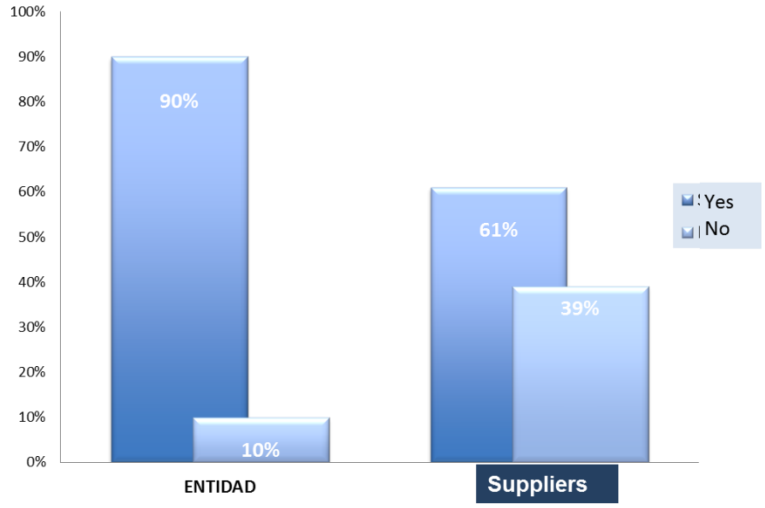
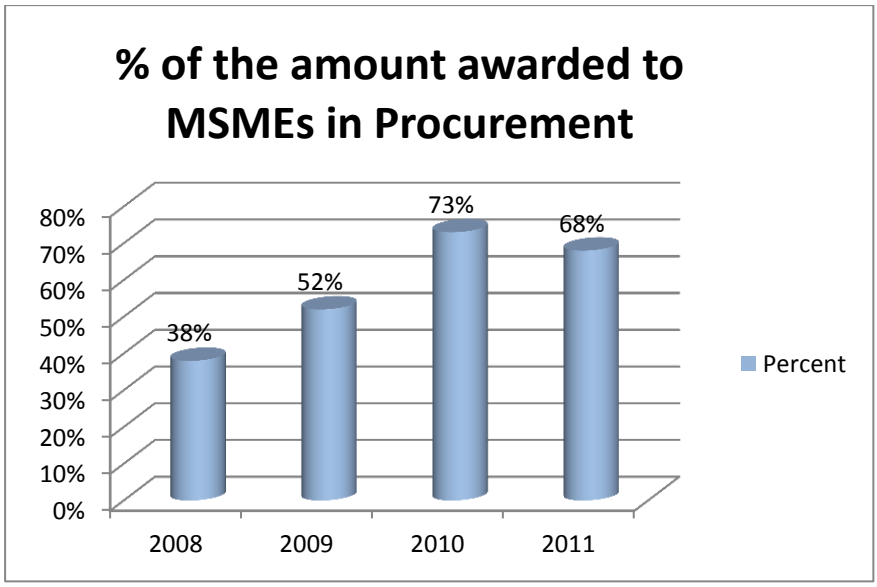


Figure 4: Survey - Do you think that the existence and use of the website has generated Entity resources in your organization?

Source: HexagonTools®, Hexagon Group (2011)

Additionally, the system has enabled greater participation of MSMEs in government procurement, through incentives to this sector (figure 5).



Source: INCOP

Figure 5: High participation of MSMEs in Procurement

49.895 Enabled suppliers en el SOCE, becoming the largest database of providers in Ecuador.

Below is the time it takes the procurement before LOSNCP compared to the time of the main types of processes carried out in accordance with the new regulations (Figure 6).

Figure 6: Times new vs. old regulations

CONCLUSION

The results of this project are palpable and speak for themselves. This shows how information technology can improve processes and optimize resources. What for other countries of the region took plenty of time to obtain, in Ecuador, thanks to the enactment of a new law, we could make it in a short time, being recognized by the Public Procurement Inter American Network in 2010 with the Price to Leadership in Public Procurement.

Another material outcome is time and other resources savings in the public procurement process as the whole public sector now counts with an automated and standardized tool. Additionally, it offers a consolidated suppliers database that currently constitutes the biggest list of suppliers of the country.

Besides, due to its procurement volume, the State is the biggest buyer of the country and therefore it can dynamize the country's economy, fostering the national component of the procured products and above all supporting the participation of micro,

pequeñas y medianas empresas (MIPYMES) (micro, small and medium enterprises MSME) in the public procurement.

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