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## RESEARCH ARTICLE

### TECHNOLOGICAL PLATFORM ALLOWING TO OFFER AND DEMAND PRODUCTS AND SERVICES BY MEANS OF THE CELLPHONE. *COGANCEVALLE*- CASE STUDY

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#### ABSTRACT

Technological Platform of meeting between supply and demand that can be used by any user from his cellphone (even if it is low range) and is complemented by other technologies such as USSD and SMS, with the idea of increasing the number of people who use the technology aiming to look for machinery needs, employment, news, agricultural alerts, etc. Case study research in Ranchers Cooperative of Valle del Cauca - Colombia.

#### Key words:

Mobile Communications,  
Supply and Demand SMS,  
USSD, Agribusiness.

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## INTRODUCTION

It is intended to build the first platform of meeting between supply and demand that can be used by any user from his or her cellphone (even if it is low range) and is complemented by other technologies such as USSD and SMS. The idea is to increase the number of people using the technology in order to seek machinery needs, employment, news, agro alerts, etc. This increase in supply and demand will enable more people to have the chance of obtaining, for example, a faster and more convenient way to sell their products, animals or machinery. With the development of this project, it is aimed to take advantage of the development and penetration of mobile Internet connectivity and the implementation of fixed connectivity that has been implemented by the government, within the priority plans of the Ministry of Information and Communication Technologies (ICT).

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Whereby, the benefit of the connectivity and mobile platform, the project is decisive as a tool of reference and its usefulness is impressive, even taking into account the interaction of the urban population, linked to many ways with the rural population, which generates an even greater traffic, promoting the scope and usefulness of the platform. The project will be implemented as a beneficiary the Ranchers Cooperative of the Center and North of Valle del Cauca *COGANCEVALLE*, and the accompanying entity will be the research group TEIN, the executing company is *Estrategias Móviles S.A.S*<sup>1</sup> with the advice of *LVS.A.S* consultants. The Ministry of ICT with the audit of *Colciencias*<sup>2</sup> funds this project. The project was presented to *Colciencias*' Call for Proposals 732 in 2015, which has been chosen as the winner to be financed, and its development process began on September 13, 2016, to be completed in one year. It is important to thank all the cooperation of Dr. Andrés Sandoval, Andrés Sinisterra, Pablo Echeverry and Maria Fernanda Guzman, with whom all this

<sup>2</sup> Administrative Department of Science, Technology and Innovation that depends on the Presidency.

work was started to fulfill the goal set by LV consultants and *Estrategias Móviles* that is the need for interdisciplinary nature in agriculture and ICT in Colombia.

## MATERIALS AND METHODS

The project is presented as a beneficiary company *Cogancevalle*, where the executor is *Estrategias Móviles* with the advice of *LVS.A.S* consultants and research group TEIN. It is important to give a concise look at who these entities are and the ICT panorama in Colombia.

### Companies linked to the development of the Project

*Cogancevalle*, is a company of the solidarity sector that started being the committee of Ranchers of Tuluá 46 years ago, from which the Ranchers Cooperative of the Center and North of Valle del Cauca - *Cogancevalle* was born in 1992. Association to the service of the promotion, defense, maintenance and projection of livestock in the Valle del Cauca, which groups and represents a large part of the livestock producers in this area of the country, having become a leading company in livestock development. Currently, *Cogancevalle* has 4 offices, the head office in Tuluá, and the other offices are distributed in the City of Cali, Buga and Cartago. *Estrategias Móviles* is part of *Aldeamo*. *Aldeamo*, comes from *Aldea Móvil*, since the people in the villages could communicate easily, because everything was only a few steps away. Today, *Aldeamo* wants to make this communication easier again. *Aldeamo* was founded in 2004 and since the beginning was characterized by innovative ways to generate value to its users by using the cellphone. The company began selling ringtones for each user to personalize their phone, and today offers more than 20 services for people and companies to connect with their specific audiences through its mobile platform. *Aldeamo*, whose main office is in Bogotá, operates in 13 countries, 11 of them in Latin America, and is directly connected to more than 25 cellphone operators, allowing it to offer a wide variety of services ranging from text messages that users of the banks receive after making a transaction, to the interactive menus that some health entities use so that their patients can book medical appointments and evaluate the service. *Aldeamo* has been using technologies like SMS and USSD for more than 11 years, ensuring that all its services can be used in any cellphone, regardless of its range or whether or not they have a data plan. *LVS.A.S* consultants is a Colombian company that provides corporate solutions in consulting, management, formulation, execution and project management for campaigns of various productive sectors in the different areas of engineering, health, agroindustry, education among others, with whom it collaborates with the research group called TEIN.

### ICT panorama in Colombia

In Colombia, the government has been working to increase education coverage, especially in technical and vocational programs, as a strategy to reduce inequality (which according to the Gini coefficient is 0.517 at the end of 2013) and strengthen economic development and social development of the country. However, this training process is slowed down when, for example, finding a job, as there is no adequate exchange of information between labor supply and demand. The scope of these initiatives is limited since a large part of the population does not have frequent internet access. A study by the Ministry of ICT says, "The percentage of people in stratum

one who declares to have Internet access is 77% in 2013 (Akyildiz et al., 2002). A survey carried out by *Aldeamo* in 2014 to the users of this, showed that 53% of them access the internet less than 3 times a week. It should also be noted that Colombia is a poorly connected country, not only its road infrastructure is poor, so are its land, air and seaports and even when its communications are also deficient. Making it difficult for there to be commercial chain links in all industries, it is undoubtedly in this infrastructure that has seen greater change and development in recent years. The government through its Ministry of ICT has made great investments to connect digitally to all the municipalities of the country; where its penetration rate of Broadband Internet service in Colombia at the end of the first quarter of 2015 increased 2.3 percentage points in relation to the first quarter of 2014, reaching a rate of 21% (Ministerio de TIC. 2014). Mobile operators have also increased their penetration, reaching more than 50 million telephones, representing 106.7% penetration of which 19 million are mobile Internet users. Of these users, 37% still use 2G (SMS) technology, but more and more people are buying smartphones with 3G and 4G technology, reaching 63% in 2013, with 4,563,644 subscribers and 14,676,422 users per demand. Whereby Internet is increasingly closer to all Colombians, and with this, a great opportunity market opens up before each of us. Especially for people and companies that are far from urban areas and for those seeking to connect with them, since it is the field most affected by the lack of infrastructure and, likewise, the most benefited by the implementation of this new technology and its increasing penetration (Ministerio de TIC, 2014). Even as communications infrastructure is improving, as the figures show, it is always the countryside and the agricultural sector, the last to benefit. There are still no clear technological solutions or proposals focused on Agro, but the Government and the private sector are undoubtedly anxious and willing to make this trend change in the short term. The global and local conjuncture with regard to the world agricultural supply, make of this moment a unique opportunity for Colombia to change its rural vocation, for a developed and connected agricultural vocation, fundamental aspects to achieve efficient processes and a level of competitiveness sufficiently structured, linking production and marketing chains and giving the necessary solidity to the sector. From the approach of the problem and to the interest and the need to develop a technological platform to give new and better opportunities to the field, the idea of this great project is born, led by the companies *Estrategias Móviles* for the agricultural and agro-industrial sectors, case study as beneficiary *Cogancevalle*.

Given the above, it is important to note that for Colombia there are several important statistics that justify the research project, such as:

The agricultural sector contributes approximately 8.5% of the national GDP. Likewise, the cattle industry participates with 1.6%, 20% and 53% on the national growth, the agricultural sector and the livestock sector respectively. In contrast to other sectors of the agricultural economy, Colombian livestock production doubles and triples other sectors, such as poultry, coffee and floriculturists. In addition, it contributes to the generation of employment in more than 25% of the total jobs generated in the agricultural sector and approximately 7% of the total employment of the Colombian economy. The Andean (North and South) and Atlantic regions contribute 85% of Colombian livestock production (number of heads). The

livestock inventory shows that in a high proportion (80%), livestock farms on average have 50 or fewer head of cattle (Boletín Trimestral de las TIC (2015), 2017; Informe del Sector ganadero de Colombia (2015), 2017). The farmer; is the basis of the economy in the Agro; and rural entrepreneurs, do not have access to information that helps them make better labor, operational, logistical and commercial decisions, and businesses. Suppliers and consumers; do not have any way to connect directly with the field, or do not do it in an efficient way, to avoid intermediaries and optimize their processes (Revista Dinero (2012), 2017). With the development of these projects, it is aimed to take advantage of the development and penetration of mobile Internet connectivity and the implementation of fixed connectivity that has been implemented by the government, within the priority plans of the Ministry of ICT. More than 30% of the population in Colombia; Approximately 15 million people; lives in rural areas, and more than 90% of the territory is rural (Gerencia Estrategica (2011), 2017). So that the benefit of the mobile and connectivity platform is a determining tool as a reference tool and its usefulness is impressive, even taking into account the interaction of the urban population, linked in many ways with the rural population, which generates even greater traffic, enhancing the reach and usefulness of the platform.

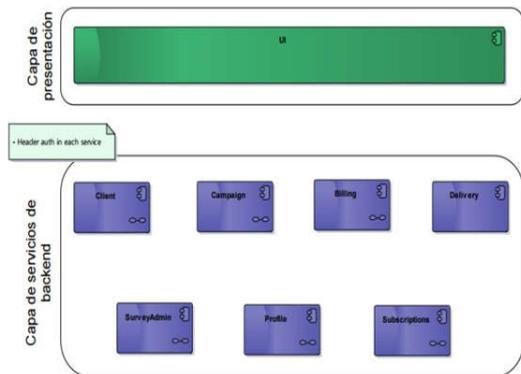
**With the above, a problem question to solve arises**

It is possible to develop a technological platform allowing by means of the cellphone realizing an "intelligent" profiling that allows to offer and demand products and services according to their interests and needs of the Ranchers Cooperative of the center and north of the Valle del Cauca?

**Application Architecture**

The solution consists of a service-oriented architecture composed of two layers described below, see Figure 1:

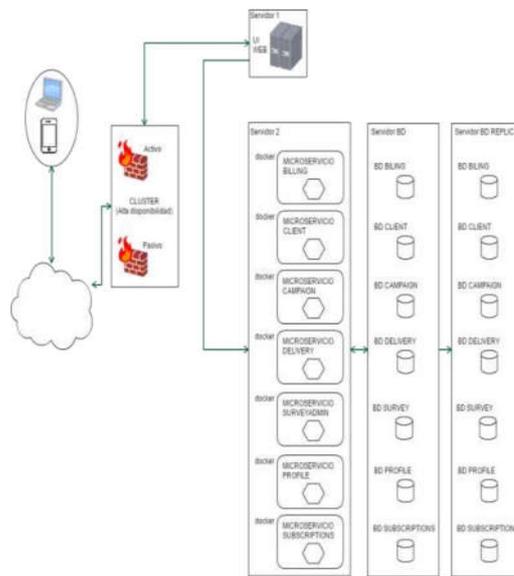
- Layer of presentation: In this are the interfaces with which the user of the system interacts. For its implementation, the Angular JS technology is used and it accesses the backend services layer through rest services with basic authentication.
- Backend services layer: Exposes services rest to allow access to the functionalities and data of business. This layer consists of 7 components consisting of independent and interoperable services, to provide scalability and flexibility to the system. These components are developed using Springboot technology and each has its own data model in MySQL.



**Figure 1. Diagram of the layered components model (layer of presentation in green and backend services layer in purple)**

- Deployment specification. See Figure 2. The graphical interface that is deployed on a web server independent of the backend services layer. The user can access the system from a browser on a computer or from the cell phone, through the internet. To provide security, there is a firewall in high availability with an Active/Passive configuration.

On the other hand, the services are deployed inside dockers that allow optimizing the deployment and providing scalability to the system. In addition, these access its particular databases, which are on another server. All have a replica on an additional server.



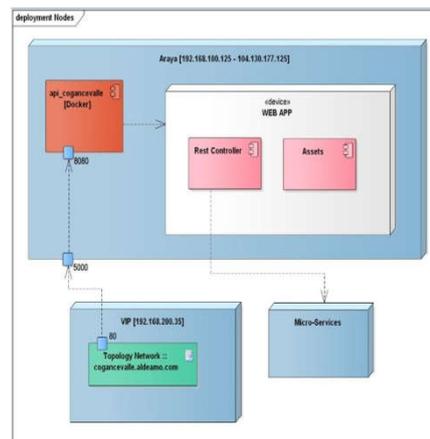
**Figure 2. Deployment Specification**

**Technology Used**

Technologies applied in the web application are the following:

- AngularJS
- SpringBoot
- SpringBootSecurity
- Bootstrap
- JavaScript
- HTML 5
- CSS 3
- Swagger

**Controller Logic**



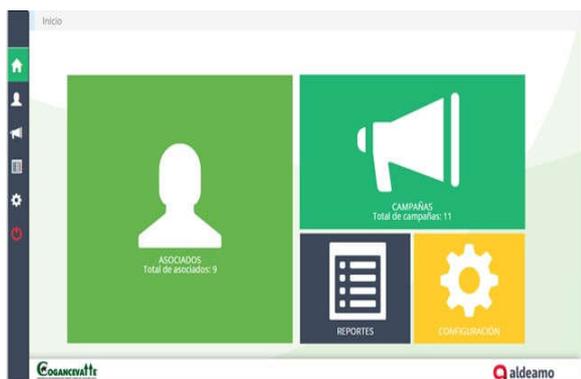
**Figure 3. Web Application Architecture Diagram:**

## RESULTS

The entry is made from the browser and type <http://cogancevalle.aldeamo.com>. In the first screen as shown in figure 4, it is possible to find the registration form, window in which people can enter the portal by entering the user and key previously shared by the consultant.

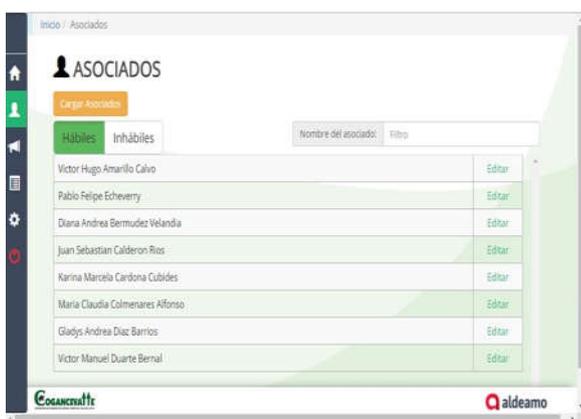
**Figure 4.** Registration form (it says: Welcome to the Management System for Associates with the Ranchers Cooperative of the center and north of Valle del Cauca; username, password and enter)

Once you have accessed the portal with your username and password, the system will welcome you and take you to the home menu page, as shown in Figure 5.



**Figure 5.** Start Menu

Through the module as presented in figure 6, the information of the Associates can be managed taking into account the status of the Subscription among other information. Initially you will find a list of Associates which you can filter by Name, additional you will find the options of Working and Unskilled where the lists are separated according to their status.



**Figure 6.** Associate Management

In the Campaigns section as shown in Figure 7, you will initially find a list of campaigns which can be filtered by campaign name and searched for active and inactive. There you can create the campaigns with the following indicators.

**Campaign Name:** It is the identifier for the search of the campaign; it is the name of the same.

**Message:** Corresponds to the content of the messages to send to the associates or recipients. When entering the text of the message, the size of the message will be shown in characters and the total of messages of text to be sent by each shipment.

**Start Date:** It is the date on which the sending and the validity of the campaign will begin.

**Closing Date:** This is the date on which the shipments will stop and the campaign ends.

**Periodicity:** Corresponds to the recurrence of the campaign's dispatch, if it is immediate and once or if the delivery must be repeated weekly or every month.

**Recipients:** In this section you must select the source of the subscribers who are going to receive the communication. You can choose between 3 options:

**Partner segment:** It will display the following window in which you can send to subscribers who fulfill some condition related to their profiling variables.

**Contact list:** In this option, you can upload a file with the cellphone numbers that are the recipients of the communication.

Once all the campaign information is loaded, you can select Preview as shown in Figure 7 (displayed in the title of the picture), which will show a summary of the campaign and an example of the message on the mobile phone:



**Figure 7.** Campaign preview (Preview, title, message, number of recipients, start date, closing date, periodicity, go back and create are the buttons)

For the Report, as shown in Figure 8, in the left section you will see the list and filter option of the campaigns by their name or date of shipment. In the right section the detail of the selected campaign, includes the details of the messages, date and effectiveness, as well as the clicks on the Links URL of the message and attachments.

CAMPAÑA	FECHA DE ENVÍO	TÍTULO	MENSAJE	FECHA DE ENVÍO	% EFECTIVIDAD	CLICKS	URL
Subasta Buga	2017-03-10 09:00:03						
Subasta Zarzal	2017-03-10 09:00:03						
Curso Derivados Lácteos	2017-04-25 09:00:33						
Ser asociado Páge	2017-04-05 16:40:47						
Aftosa	2017-04-17 16:25:20	Aftosa	Hola (NOMBRE_COMPLETO) Cuido vacunación aftosa mayo 8 a jun 16. Entre a (URL) para mas informacion.	17/04/2017	0	3	http://www.cogancevalle.co/
Campaña Prueba de Campo 01	2017-04-18 10:30:49						
Campaña Prueba de Campo 02	2017-04-18 10:30:49						
Campaña Prueba de Campo 03	2017-04-18 11:30:59						

Figure 8. Campaign Details (campaign and date of dispatch)

## DISCUSSION OF RESULTS

This first part is the fruit of all the interdisciplinary collaboration of the partners and technicians of *Cogancevalle*, with the team of *Estrategias Móviles* and advisor and consultant of *LVS.A.S.*, where the most important discussion is the appropriation of the technology by each one of them. Associates and technicians of *Cogancevalle*. Each of these aspects will be presented in an upcoming article where the appropriation of technology as management of new knowledge will be evidenced, starting point for the beneficiary to take ownership of it, and can mark new technological challenges for the agro and ICT.

**Recipients:** In this section you must select the source of the subscribers who are going to.

## Conclusions

"Mobile technology as a tool to facilitate the meeting between supply and demand". Given this, the project concludes that mobile technology will facilitate the meeting between the supply and demand of the agricultural and agro-industrial sector, especially for low-income people where, for example, decent jobs have a greater economic and social impact. For this, these three areas of action have been achieved:

- Our platform: It will facilitate to the users the filling of a profile with its basic data, especially to those of low

educational level and few technological abilities. In addition, develop a system that sends the correct offers to the appropriate profiles automatically.

- It will broaden communication channels: It was developed a system for information to reach users' cellphones in as many ways as possible using technologies such as USSD, WAP and SMS.
- It will broaden communication channels: Public and private entities that combat unemployment, for example, sought to join efforts and that the offers are published on a regular and regular basis.

All this experience, will give a clear idea of a leap towards convergence, thanks to this type of calls where it opens doors of new synergies such as the university - state - company. Therefore, the idea of working with an entity as recognized as *Cogancevalle*, allows, to strengthen ties for the pursuit of applied and productive research as is what our country needs with this type of project that was developed.

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