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RESPUESTAS

Mobile application as strategy for agricultural products marketing
Aplicación móvil como estrategia para la comercialización de productos agropecuarios

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	ABSTRACT
Keywords: Agroindustrial Marketing Development Mobile Technology	One of the main problems of the Peasants in charge of supply supplying the family basket of agricultural products is Columbians With the commercialization Because There Is No Connection Between Buyers and effective producers, much of the crop is lost Because it can not advance commercial actions. The objective of esta research is to Provide a solution to the Peasants to Improve Communication between the producers and traders of products related to agriculture through the use of Information Technology and Communication ICT as a support tool. As a result, the identification of the main needs of producers and traders is Obtained; A mobile application is developed Also the three main That Allows Processes of marketing (communication, sales process and purchase process) of products in the agricultural sector.

	RESUMEN
Palabras Clave: Agroindustrial Comercialización Desarrollo Móvil Tecnología	Uno de los principales problemas de los campesinos encargados de abastecer la canasta familiar de los colombianos con productos agropecuarios, es la comercialización porque no hay conexión efectiva entre los compradores y productores; de tal manera, mucha de la cosecha se pierde por no poder adelantar acciones comerciales. En tal sentido, el propósito de esta investigación, es brindar una solución a los campesinos que permita la comunicación entre productores y comerciantes de productos del agro, por medio del uso de las Tecnologías de la Información y la Comunicación TIC como herramienta de apoyo. La investigación arrojó importantes resultados como por ejemplo la identificación de las principales necesidades de los productores y comerciantes; igualmente se desarrolló una aplicación móvil que permitió los tres principales procesos de la comercialización (la comunicación, proceso de venta y proceso de compra) de los productos del sector agropecuario.

Introduction

Currently the process of marketing of agricultural products is very traditional, because the contacts are established among markets or contracting, in which the seller comes with or without the presence of the goods. Many market rates can be referenced at various stages of the marketing process both in Norte de Santander and elsewhere in the world. It is displayed through the literature review of case studies that one of the main problems producers have is about how to market production[1] Moreover, when they have achieved it through innovations and investments.

In developing countries where there is a lack of road infrastructure to facilitate marketing of agricultural products, postharvest losses of fresh products range from 25 to 50% of production [2]. This percentage represents a loss of food and an important economic impact for traders and especially for producers.

Countries like Colombia reported through various associations or cooperatives that the main problem is directly related to communication between producers farmers and group or individual demand [3].

Agribusiness is one of the most important economic sectors nationwide, generating about 6.2% of GDP, in terms of exports, it grew 32.2% over the last five years, reason why it makes it important to the proper functioning of the production chain, with major drawback today the marketing stage for its little updating and linking with new technologies [4].

Information and Communication Technologies (ICT) offer new ways for people to access information from anywhere in the world, the most interesting is that they can support processes of any economic sector and expand services to achieve digital transformation which enhances the economy of a country.

The most recent report of DANE, indicates that the telecommunications and postal sector grew in September 2011 by 9.5% compared to the same month last year, 1.8 points more than the rest of the economy, which grew 7.7 %; This growth in the ICT industry, is the most positive result of the last four years in Colombia [5].

In recent times the use of mobile applications and portable devices mark the exodus of service delivery; the significant lowering of prices on computers because of the different treaties or business agreements and the evolution of mobile technologies have made it possible to increase the number of beneficiaries and increase transfer speed information, in this regard, by the ending year of 2016. Colombia recorded an average speed broadband of 5.4 megabits per second (Mbps), an increase of 13% over the third quarter of that year, with planning to further increase [6], factors that ensured the inclusion in the market with approximately 103 telephone lines per 100 inhabitants in Latin America [7].

The above, was taken as an added value that enabled mobile high market penetration and an accurate degree of acceptance by users, as much to stop providing only voice services channel and expanded opportunities so that technology was used in different areas or serve business and social sectors. From this perspective, the footprint left by information technology in the world has been significant; becoming a tool of value creation and improvement of productive, economic and commercial processes. In the latter, in Colombia it is expected to make stronger the agribusiness sector based on application development processes that facilitate product sales and waste less and less food after [8].

In order to present a possible solution to the most notorious difficulties of the agro-industrial sector in Colombia in terms of inputs issues, product sales, land market, financial education and improvement of quality services, ministries of ICT and agriculture from Colombia government call permanently to create useful applications in agriculture [9]. In consideration of the above, the purpose of this project is to generate a mobile application to become a communication platform between producers and buyers of agricultural products without intermediaries, which accelerate the commercialization process as a critical point in the chain agribusiness value.

Mobile technology allows to take the job or business wherever it is needed at all times and offers the possibility of using installed applications, display presentations, create documents and data, and access them; Also, it is marking a major shift in business model becoming a strength for innovation and economic development. This is evident in the way that people always have with them a device that contains information which can generate the reports needed at any given time [10].

Materials and methods

The method used for the development of a technology tool type interaction platform is stepwise, as follows: It begins with the analysis of information that has to do with the requirements, that is, at this stage are obtained and classified aspects and personalized service; then it passes to design, in this part, the system or programming language to use is defined and the type of tool required, integrating time and resources.

It follows with the implementation of the design, therefore we would be talking about the software and user interfaces; then the function test is performed through simulations, which are done installing the software on real equipment and performance is evaluated. Finally, the potential for success is evaluated [11].

When creating a technological tool that provides functions within the agroindustrial sector, it must be characterized by the management of a large data volume, therefore, it should be aware that this function is more feasible if designed through JavaScript Object Notation (JSON) which is a format for data exchange, describes the data, identifies and manages them. Likewise it fits any platform and it is easily integrated. JSON is an alternative to XML [12], and as a fundamental feature is its ease of use on platforms javascript, which has generated a huge quantity of followers for this alternative. In addition, it can be used to exchange information between different technologies and it can be read by any programming language.

Having clear that one of the greatest needs is to link the agribusiness sector with the technology, the next step is to identify how Norte de Santander commercializes. For making this, it was applied as a tool for gathering information a survey, participants in the logistics chain in the municipalities, information undermined found that 40 entities are, on average, which market agricultural products.

In this regard, the most significant of Norte de Santander agricultural production is centered, according to the Colombian Agricultural Institute (ICA) in the municipalities of Tibu, Ocaña, Abrego, Sardinata, Salazar, Arboledas, Pamplona, Toledo, Convencion, Chinacota, Durania, Lourdes, Bochalema, Cucuta, Los Patios, Puerto Santander, Villa del Rosario, Durania, Herran, Ragonvalia, Cacota, Chitaga, Mutiscua, Labateca and Silos [13]. After identifying population, it is established a sample with the parameters of (Figure 19).
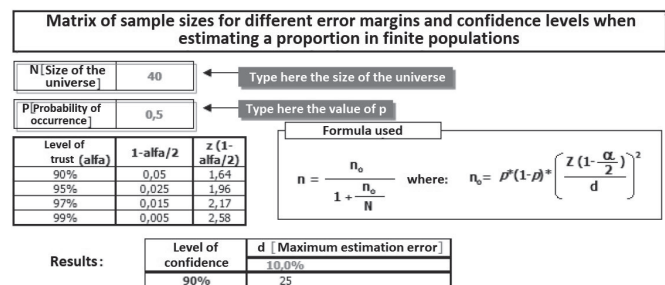

Figure 1. Calculation scheme sample. The study is necessary to calculate a sample of companies related to the value chain of the agricultural sector in Norte de Santander, authored by researchers

As it is shown the (Figure 1) displays sample calculations to determine the number of municipalities where the application of the technological tool should have been assessed, for this, a research tool was implemented in 25 municipalities of the Norte de Santander department. Thus, they were taken by simple random selection a sample of 25 companies per municipality to take the required data in the study. Therefore they applied total 625 business surveys in selected municipalities.

In some municipalities it was not possible to apply the survey (within the parameters estimated 10% error in the calculations) by different factors shown below, however, the sample was completed:

1. *Not all Chambers of Commerce report information about agrobusiness sector.*
2. *There is no official count of producers by product.*
3. *The public order situation makes it difficult for municipalities*
4. *Most producers are not legally constituted*

This research has a mixed approach because part of the qualitative study is about endogenous variables that by bibliographic review have a direct relationship with the value chain of the agroindustrial sector and accordingly the programming of the mobile application goes according to the needs; then a statistical procedure is carried out, generating quantitative data that allow identifying necessary variables and procedures that must be clear in the development of the ICT strategy.

The scope of the research is descriptive - [14], focused on the development of an ICT strategy to reduce intermediaries and process between buyers and producers in the agro-industrial sector in Norte de Santander.

Results and Discussion

1. *Characterization of the functioning of Agroindustrial sector in Colombia.*

According to the subsectors surveyed in this research about how the sector information is reported it can be identified certain types of systems:

1.1. By way of processing.
1.1.1. Dairy processing and derivatives.
1.1.2. Production of vegetable oils and fats.
1.1.3. Processing fruits and vegetables.
1.1.4. Benefit of fresh meat.
1.1.5. Manufacture of animal balanced feeds.
1.1.6. Processing banana, potato and cassava.

1.2. There is another classification of the agrobusiness sector that serves as the basis of government agencies to create administrative divisions and budgets:

1.2.1. The first is responsible for the transformation of the products of the farming, cattle raising, forest, wealth and fishing in processing products for food consumption; at this stage, the process of selecting quality classification (size), packing-packaging and storage of agricultural production is included.

1.2.2. Non-food branch is responsible for part of the transformation of these products that serve as raw materials, using their natural resources for various industrial products.

1.3. A simpler classification sector cooperatives and micro perform the following parameters:

1.3.1. Agriculture products have different life: a few hours (milk, oil palm, flowers, seafood, meat).

1.3.2. Several days (fruits, flowers, vegetables)

1.3.3. Several months (wood, grains).

1.4. Another form of classification is directly related to the purchase of raw material:

1.4.1. The industry hires crews who harvest the plot farmer

1.4.2. The producer brings the harvest to plant

1.4.3. By Consignment (industrial production sold by the producer at market prices and charges for service).

1.4.4. Service (the industrial producer returns the processed material and charge for their service, eg. The sawmill receives logs and returns planks and remains).

1.5. Likewise, the sector presents a classification by the dominant input

1.5.1. Labor intensive, such as plant selection, sorting and packaging since the separation of different qualities and packaging require a lot of manual labor.

1.5.2. Capital intensive, as the cotton gin: cleaning, separating the fiber from the seed and the baling press in bales is a chain of machines without intervention of staff. There is only labor at the beginning and end.

1.5.3. Raw material intensive, such as in cattle slaughterhouse. Meat is the largest component costs.

1.6. Finally, it is possible to identify that the most useful characterization of agribusiness is the distinction between industries supplying raw materials and raw materials intensive industries. The first involved in the initial processing of agricultural products, such as milling of wheat and rice, leather tanning, cotton ginning, oil pressing, sawing wood and fish canning.

The latter are responsible for the manufacture of articles made of intermediates from agricultural materials, such as the manufacture of bread and biscuits, fabric, paper, clothing and footwear or rubber goods.

However, today, it is increasingly difficult to establish precisely what should be considered agribusiness activity demarcation: the effects of innovation processes and new technologies require expanding the range of agro-industrial inputs that can be taken into account, including, for example, biotechnological and synthetic products.

This means that currently the agribusiness continues to produce simple agricultural commodities, while also transforming highly specialized industrial inputs that are often the result of significant investment in research, technology and inductions.

2. Identification of features of technological tool to support the marketing process.

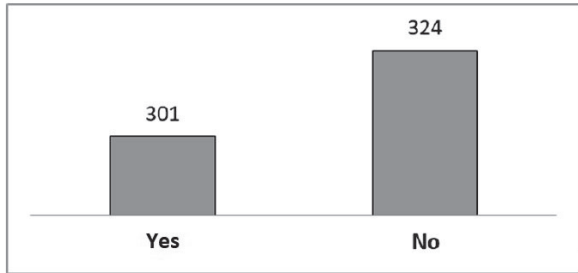According to the companies in the different municipalities it is investigated knowledge of the characterizations or categories of agribusiness aforementioned

Figure 2. Knowledge of the classification of the agro-industrial sector. In the study were asked about the knowledge the players have in the supply chain as to the classification that exists nationally the agroindustrial sector; authored by researchers

As seen in (Figure 2) the majority of respondents (324 producers) expressed not to have knowledge on the classification of the sector, given that this informality of the work done in the field persists. However, 301 respondents know that the sector is divided into the activities of agriculture, livestock, beekeeping.
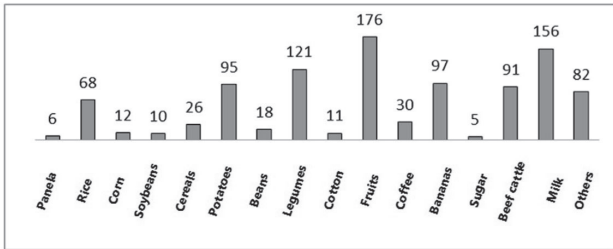
Figure 3. Products with higher production. Within the study were asked about the products with higher production in the agribusiness sector, the above makes evident the list of products to take into account within the technological development; authored by researchers

In (Figure 3) it may show that the product that is processed in the sector are fruits, followed by milk, legumes, bananas, potatoes and rice. According to the characterization of the department, it is in line with production typical of the region.
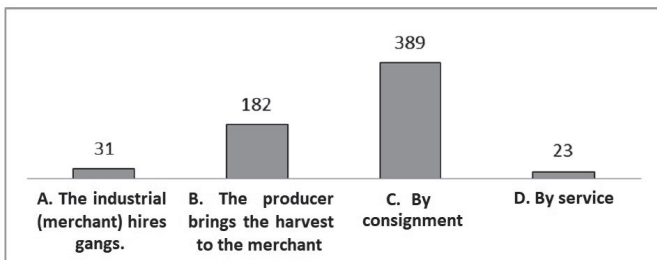
Figure 4. Value measure of production. In the study it was asked about the valuation process of production; authored by researchers

According to the classification of the sector by selling production can be seen in (Figure 4) 389 respondents carried out the marketing process consignment, in other words, the trader sells industrial producer price and assigns. Similarly, some producers expressed perform the procedure and deliver the product directly to the merchant, but none holds make direct negotiation with the buyer. In this contemplation, which seeks strategy it is that there are fewer intermediaries and more profits for farmers.
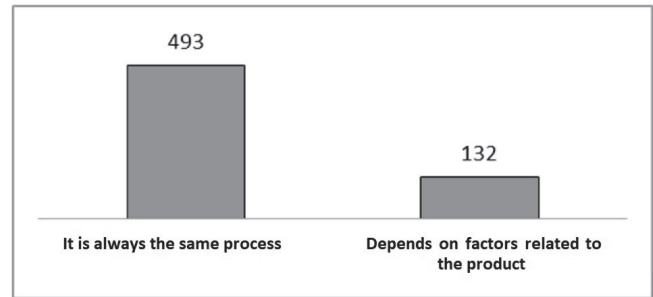

Figure 5. Frequency of the assessment process of production. In the study it was asked about the time it has made the same assessment process of production; authored by researchers

In order to verify the way of frequency trading, it is evidenced in (Figure 5) that most producers retains the same process, which corresponds to an industrial or merchant.
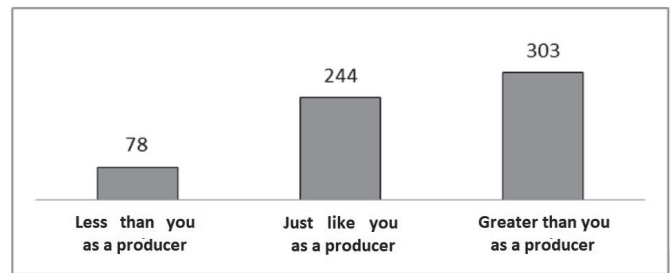

Figure 6. Percentage of profits for industrial or merchant and producer. Within the study, one of the most important to validate one of the hypotheses of research questions was to verify that in reality the trader usually has higher gain than the producer (farmer); authored by researchers

As a means of comparison of the proceeds received in the process of marketing products in the agribusiness sector, may be evidenced (Figure 6) that a third party usually appears in the negotiations, in this case, it is an industrialist, this factor reduces the margin profits, as indicated by the respondents, industrialists, earn a higher percentage than the producer.
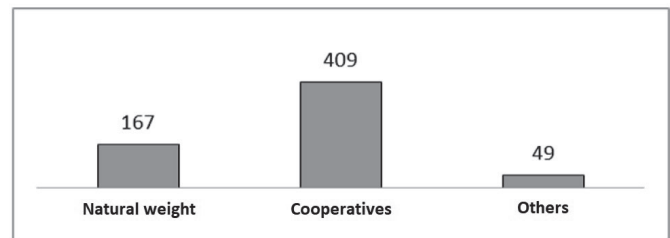

Figure 7. Type of person the merchant or manufacturer. Within the study also, it was asked about the type or representation that has the industrial or merchant in the value chain of the agribusiness sector; authored by researchers

According to surveys, a large percentage of traders or industrialists from cooperatives are those that handle large amounts of data and create networks of buyers for each product, taking care, then, to offer production that comes and negotiate prices. It is emphasized that the trader almost always delivers a very low percentage to the producer.
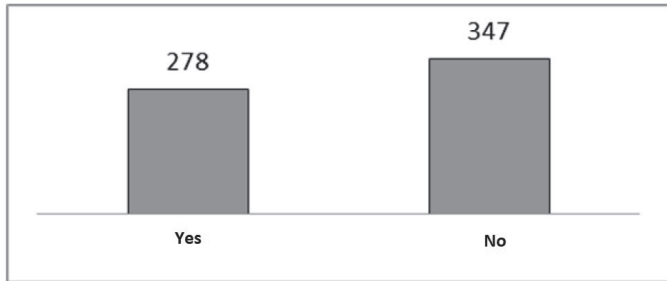

Figure 8. Experience in conducting direct marketing processes with the buyer. Within the study, the process carried out by farmers to carry out direct negotiations with the trader addressed; authored by researchers

As found in (figure 8), the producer experience on having to perform marketing processes directly with the buyer is in question, in that sense, 347 respondents say they have not attempted this process without intermediate traders; This is justified by the time of transfer of the goods, little financial management, there is no facility to transfer the goods to the buyer's place and it cannot leave the farm alone for safety reasons, among other reasons.

3. Development of the mobile application To make that communication between producers and traders can take place directly and anywhere in Colombia, the development of application programming was implemented in an open language as Android for future releases and programming language support cloud was proposed.

This allowed verifying user data, products and online payments, facilitating information management. As indicated scholars, new technologies suggest that everything can be developed or worked in one place, it would imply that applications are not on hard drives but on the Web to access from anywhere, reasons that favor this proposal.

The mobile application is proposed as a strategy to improve the communication channel at the stage of product marketing between traders and producers in the productive sector of agribusiness in Colombia; This application was entitled "Assets reflects the necessary activity between the two roles in the commercialization process of production".

This application was created in native language Android with a methodology of architecture in the cloud for managing tables or databases containing information variables: users (producers and traders) products to market and data to make payments on line.

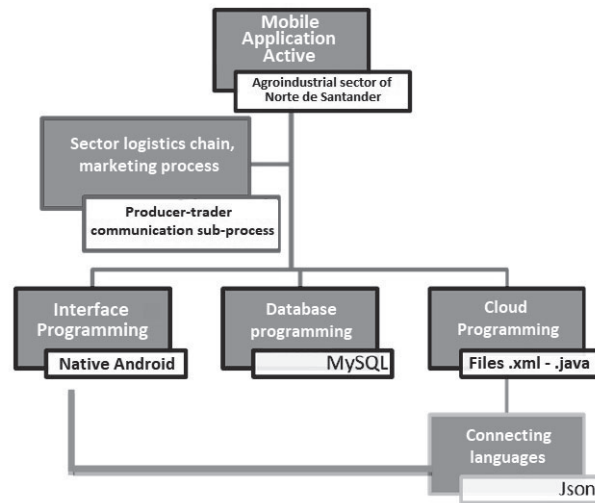*The following figure shows an overview of the application:*

Figure 9. General map application

CPANEL is a cloud manager which can treat databases and directory files; in this case for application development a WebService REST was used with php files, joining the files Android by a method of JSON, which is a programming language that allows the connection between several languages (in this case Android and PHP). Through CPANEL management it can be evidenced between MySQL databases through PHP and JSON for communication with Android. The (Figure 10) shows the three basic functions within the application CPANEL used in the application.
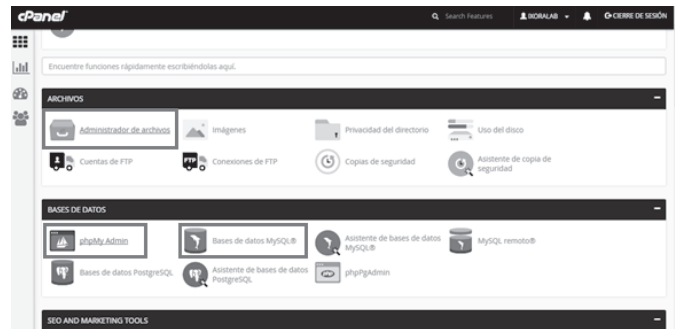

Figure 10. Platform CPANEL file manager operation of the mobile application and basic functions

Currently, mobile devices are available to everyone by offering not only variety of devices but operating systems; the two most popular systems are the Android OS and IOS. Android OS meanwhile, offers facilities to new mobile application developers, facilities like the variety of testing methods, access to developer mode from the mobile and a certificate for development of software apps from scratch.

The application is built taking into account an interface easy to understand, low weight and technological resources to ensure its operation on any mobile device, in this case, it is considered the main ways or operating characteristics of the agro-industrial sector and contact form (figure 11).
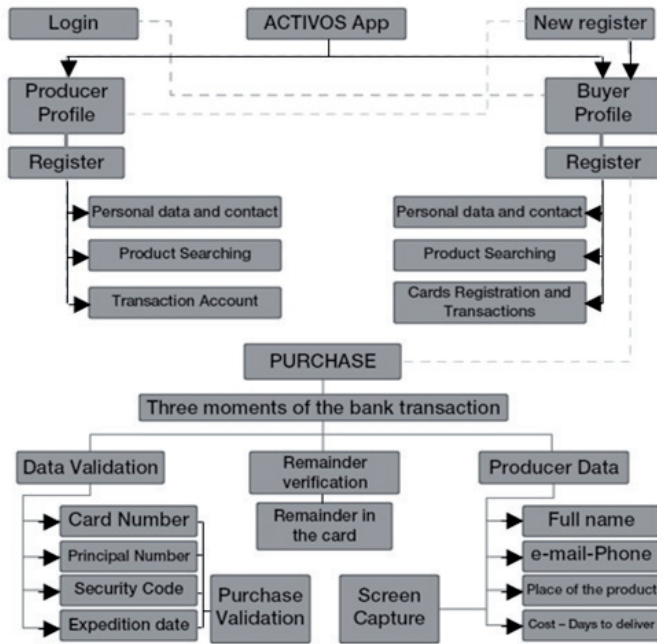
Figure 11. Map application operation

Above, in (Figure 12) the graphical interface of the application for entry and registration of products from producer profile is shown. The application asks the user to start what role does: buyer or producer to determine which variables and active databases should consult.
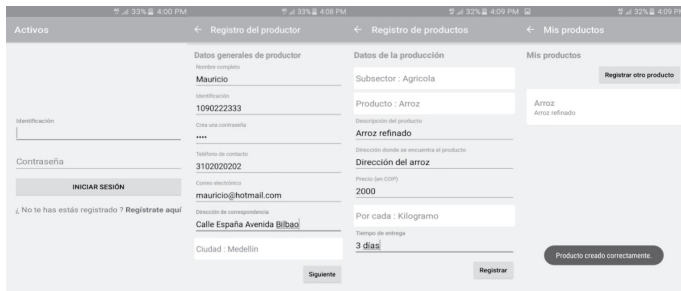

Figure 12. Graphical interface mobile application profile according to producer

Producers can register the account or data necessary to feed the database and the system accounts identified by an ID producer or trader; this step is essential for paying the product, send the application directly to the exact count money.
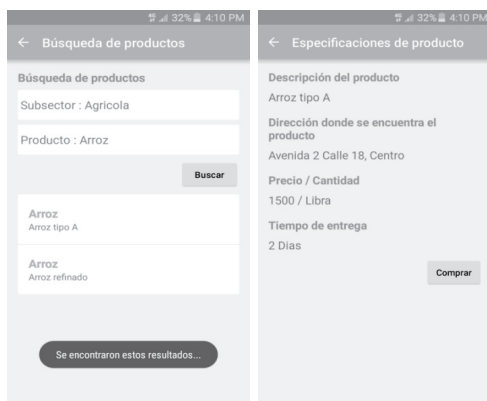
Figure 13. Graphical interface of the mobile application as buyer profile

When a buyer is recorded, you can search for products that are available for sale by subsector or product. The application displays similar products and the characterization that the producer gives each according to its use. product description, where is, price and estimated delivery time: in detailing the product requires an interface with data as it unfolds.

The user then has the option to purchase and a screen is displayed with the information necessary for the transaction (Figure 14):
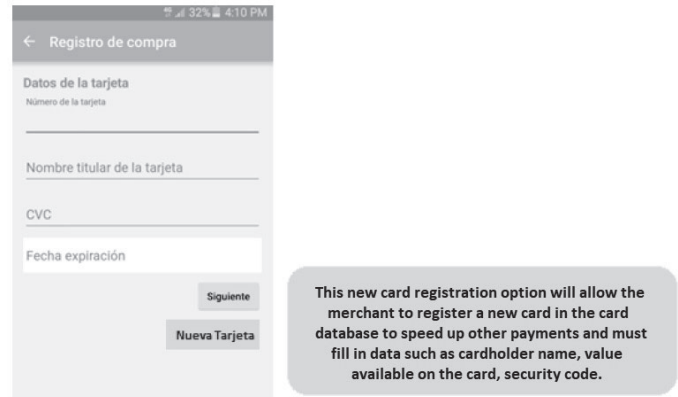

Figure 14. Graphical interface for typing purchase information by credit card

Figure 15. GUI showing the purchase made and contact details

On this last screen there is a button that lets you save the data producer called "keep order" which takes a picture of the screen and stored on the mobile device.

Each of these files are associated directly above the JAVA with the same name, so Android Studio makes it easier to manage interfaces in conjunction with the operation of each, in other words, if a file exists Order.xml then there is a file Order.JAVA that will store, receive or ask the user any information necessary.

In verifying proper operation of the mobile application that will help as a strategy to ensure effective communication between producer and buyer in the marketing process in the agroindustrial sector of Norte de Santander, it can be highlighted the following processes by comparing the APP with databases (figure 16).

Figure 16. Validation of user enrollment in databases and registering on the application

In Figure 16 it can be demonstrated on the left side the successful user registration Carmen Emilia Hernández Cárdenas as a trader (buyer) because it opens the option to search for products; the right side, it is evident from the administrator panel databases recording the data with the merchant profile (profile with the letter C column).

Figure 17. Test User Registration producer

In (Figure 17) the successful user registration John Aguirre shown as app producer from the database in CPANEL it can prove that is producer by the profile P on the column. Finally in the transaction process, the application throws a notice corroborating the discount card and the remainder.

Conclusions

In Norte de Santander the process of marketing products is done through intermediaries, which allows to classify economic activity as "consignment" where the trader sells production by the producer at market prices and charges for its service; the latter being the one earning more money. The above dynamics does not allow the gains to come entirely to the farmer - producer and also the capital investment in land is scarce.

The survey allowed to determine the current state marketing process and detection of the main weaknesses of the chain, with the same producers expressing their dissatisfaction but accepting their little training in financial matters.

Technological tools are always helpful for the economic development of the country and particularly in the productive sectors, as streamline processes and reduce paperwork in time and money affect any economic activity.

With the Assets application you can establish direct communication between buyer and producer quickly, assisting in the communication process of the commercialization stage in the value chain of the agribusiness sector.

One of the most important aspects of this project is that it can become a profitable business model whenever an information manager is established and becomes an important database in generating information from the business sector which is required to analyze economic behavior.

At the same time, communication fees or utility may be important, whenever it is lower than currently charged by a third party for the process of marketing products.

One of the limitations of the strategy of creating a mobile application for producers in the agribusiness sector is that they are peasants many of them without schooling, where an important digital issue in Norte de Santander is evident, even if government plans and joint actions capacitor to perform work for rural people to technology.

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