Sustainability of rural agribusiness through e-commerce information systems

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Summary. Agribusiness is one of the strategies to improve food security, however, part of its activities need to be enhanced through different strategies, including the implementation of e-commerce information systems that can help chains promote their sustainability. The objective of the research was to characterize and develop an e-commerce strategy in rural agribusiness composed of rural associations from the province of Andahuaylas, Peru. The study is qualitative descriptive through the historical-logical, interview, theoretical triangulation and modeling were used, with a sample of four associations producing milk, Andean grains, guinea pig breeding and organic vegetables from the rural sector of the study area. It was possible to characterize the activities, finding an inefficient integration of information systems in commercial management. As a strategy, e-commerce was implemented through digital marketing techniques to attract new commercial allies and potential consumers according to their situation of each productive activity that constitutes rural agribusiness. The application of e-commerce contributes to increasing the efficiency of the associations that make up rural agribusiness.

Keywords: Agribusiness; Marketing; Strategy; Digital; Electronic Commerce; Association

1. Introduction

Agribusiness is an activity where the economy, business and agriculture come together (1). The great importance of agribusiness covers the chains of production, harvesting, marketing and end customers. Being one of the activities with significant contributions at the level of the development of the gross domestic product (GDP) of a country (2). E-commerce is a business strategy that facilitates the sale of products in different sectors (3). In 2015, 14% of agricultural enterprises carried out electronic business transactions via Internet connection (4). However, in the agro-industrial sector in developing countries, e-commerce is considered an alternative channel (3), since the use of digital technologies is limited at the level of an entire productive chain of the agricultural sector (5). E-commerce has several purposes, which enables the circulation and development of agricultural products. (6)

It also offers different strategies and facilities to farmers in their economic movement at the level of production and marketing (7). In 2018, Wix's website records show that 75% of internet customers used e-commerce (8).
According to the E-Commerce Wiki site, e-commerce increased in 2015 by 2.92% the gross domestic product. E-commerce allows us to achieve substantial cost savings, in order to increase revenue, provide faster deliveries, reduce costs and improve customer service (9). In the countries of the Asian continent, the use of technological information systems has an impact on customer satisfaction (7). The implementation of e-commerce in agribusiness brings many benefits of interest to the scientific literature (10). However, in Peru its use of electronic commerce is still incipient mainly in different agricultural sectors (11). Agribusiness is based on traditional model businesses primarily on face-to-face relationships with customers. Agribusiness has an important contribution to the economic activities of the country, being an economic model that integrates the production and sale of its products at the level of a society to guarantee food security and sustainability. Marketing to the tourism system is one of the destinations with the highest rural agricultural production in Peru. In the research, an e-commerce strategy was implemented in rural producer associations with productive activities in the agricultural sector. The objective of the study was to implement electronic commerce based on a situational diagnosis of the associations, to establish marketing strategies for their products from traditional sales to sales with digital strategies, facilitating the improvement of their sales and improving the quality of service to maintain the sustainability of rural agribusiness.

Characteristics of the agricultural market of the case study.

In Peru, agricultural activities have become one of the economic activities that has the highest profitability after the mining sector. In the Apurimac region, agricultural activities make up the production and marketing of primary products with sales at the level of local markets. At the level of the different programs that the Peruvian state has been implementing, to improve the productive activities of the rural sector, there are still deficiencies at the level of the productive chains, especially in the commercialization of the products that require improvements to guarantee the entire productive chain of the rural sector. Part of the problems presented by the agricultural sector is the little or no implementation of digital tools (12).

According to the different problems presented by the commercial activity of the products, it is sought: to reduce the dependence on products from abroad, to promote exports of agricultural products from the rural sector, with the purpose of increasing production and marketing through the implementation of digital technologies within electronic commerce. According to the analysis, the study area has the following characteristics:

- The province is located in the zone of high frequency of meteorological events.
- Difficulties with the transport of products: milk, dairy products, guinea pigs, vegetables and Andean grains
- Inflexibility of your product prices.
- Development of zero marketing strategies.
- Lack of compliance with Peruvian technical standards, in their finished products, generating the distrust of customers, causing losses of their products.

According to the analysis of the characteristics of the local market of the study area, serious difficulties were found in its production and commercialization of rural agricultural products, being a challenging and competitive business system for private companies with improvements in the quality of their products. At the level of characterization, agricultural activities are formed by associations that are part of the productive chains of the rural sector.
2. Methodology

The research is qualitative-descriptive, with a sample of productive activities composed of four rural associations, each association is made up of 100 members producing milk, organic vegetables, Andean grains and guinea pig breeding in the province of Andahuaylas, Peru. The rural businesses were: Asociación Aprolenvisa-San Jerónimo, alegres de centro Humaca Andarapa, granos oro de Humaca and Hotifresh Tapaya. The business activity is to produce and market, fresh milk, dairy products, Andean grains; organic vegetables and guinea pig production at the level of the Apurimac region. It was developed through historical-logical methodology and in-depth interviews, through interviews, observation of participants, theoretical triangulation and modeling. These methods were used to diagnose the state of the situation of the information systems strategies to implement e-commerce.

2.1. Area of study

The study was carried out in the province of Andahuaylas, Andean region of deep Peru, with a local altitude of 2935 m.a.s.l.m (13°42′ S.73°24′ O), being one of the seven provinces of the department of Apurímac. The districts identified for the study were Andarapa, San Jeronimo, Andahuaylas and Talavera, the rural areas of each intervention area have potential agribusiness activity.

3. Results

3.1 Sociodemographic profile

In Table 1. The demographic characteristics of the associations are displayed. Of which 71.6% are represented by women, however, 28%. 4% by men who are part of the associations producing milk, Andean grains, organic vegetables and guinea pig farming. Likewise, 36.3% were between 31 and 40 years old. 44.1% of the members had more than 7 members in the household, while 42.1% were
composed of 4 to 6 people in their household. As for the educational level of the members, 51.8% have primary education with 35.7% with secondary education, but 10.0% have no education.

Table 1 shows the socioeconomic profile.

### Table 1 Socioeconomic profile of respondents.

| Indicators                              | Percentage (%) |
|-----------------------------------------|----------------|
| Gender                                  |                |
| Woman                                   | 71.6           |
| Man                                     | 28.4           |
| Age                                     |                |
| 20-30                                   | 25.0           |
| 31-40                                   | 36.3           |
| 41-50                                   | 20.7           |
| 51-a more                               | 18.0           |
| Number of household members             |                |
| \(\leq 3 \) people                     | 13.8           |
| 4-6 people                              | 42.1           |
| >7 people                               | 44.1           |
| Level of education of the head of the household |        |
| No studies                              | 10.00          |
| Primary                                 | 51.8           |
| High school                             | 35.7           |
| Technician                              | 2.5            |
| University                              | -              |

Table 2. Place of origin and activity

| Association                  | Place      | Activity                                |
|------------------------------|------------|-----------------------------------------|
| Aprolenvisa                  | St. Jerome | Production of milk and milk products    |
| The cheerful humaca center   | Andarapa   | Guinea pig                              |
| Hortifresh Tapaya            | Andahuaylas| Organic vegetables                      |
| Huampica Gold Grain          | Talavera   | Andean grains                           |

3.2. Description of productive activities in rural agribusiness

At the level of the four associations of intervention in rural areas, each association develops a common activity from production to marketing. The production of milk and its derivatives is based on the commercialization of fresh milk, elaboration of Andean cheese and fresh yogurt, with a 40.0% intervention of the activity at the level of rural businesses. However, as the second productive activity is the production of guinea pig with 25%, which consists of the breeding and sale for meat. 10% is developed by the production of organic vegetables: Lettuce, Sanahoria, onion, tomato, celery and beterraga. In the end 20% produce Andean grains: quinoa, chia, tarwi and quiwicha, as shown in figure 2.
3.2. Diagnosis of commercial management

Commercial management has an important role in the economy with great importance in the systems of associations (13). The development of commercial management is based on the exchange of the market, in terms of its location, the distribution of goods and services to the customer, which is provided by the company in the face of a change in economic value (14). According to the diagnosis made to the four associations, commercial management consists of the following processes:

- Purchasing management (Inputs for dairy production)
- Production of milk, Andean grains, organic vegetables and guinea pig.
- Sales Management
- Customer Support

Sales management is carried out after obtaining agricultural products for marketing. The associations are engaged in the following productive activities:

Fresh milk and its dairy products, guinea pig farming, Andean grains and organic vegetables. The production of fresh milk is destined to the commercialization of social programs known as glass of milk in the sectors of Andahuaylas, San Jerónimo and Talavera. In order to know the commercial diagnosis of the associations, an interview was conducted in person.

Through interviews with the associations it was possible to obtain information on the commercial management of their products, the technique was applied to each association through direct observations, with the purpose of knowing about the knowledge and management of digital marketing strategies. According to the result, the associations did not develop digital strategies for the sale of their agricultural products, with insufficient incorporation of digital technologies and the lack of implementation of a business model, which hinder the economic and commercial development of the association and alter the quality of service to customers.
This event is harmful because it affects the supply of the product. The preceding elements indicate the following:

- Customer service deficiencies, during the sales of your products
- The sales channels used by associations are deficient, causing the customer to dissatisfaction with their products.
- Lack of knowledge of sales management strategies
- There is no management of digital technologies for the commercialization of its products
- The business model practiced by partnerships is traditional, they do not incorporate an advantage of digital strategies.
- Absence and lack of knowledge techniques in the field of marketing, with technological means at the level of associations

The field diagnosis resulted in the lack of incorporation of strategy management at the marketing level, all the elements at the diagnostic level will allow the plan and execution of the e-commerce implementation.

3.3. Proposal of e-commerce development strategies

In companies, e-commerce generates market opportunities with dynamic prices and services (15). It offers different possibilities of having contact with new customers, being effective access to purchases and sales of products and services (16). E-commerce brings many benefits to farmers, facilitating the reduction of exchange costs in the market (17). In addition, they offer new opportunities and market strategies for rural agribusiness with decisions to improve their activities economically. (18).

Digital strategies represent new ways of marketing products with a positive impact on the economy, through their digital media seeking to be closer to customers and provide a quality of service, enabling a competitive advantage (19)

The slower aspects of digital strategies include:

- A timely management in the relationship with customers to increase experiences and increase purchase intentions.
- In companies they provide technological solutions as business strategies
- It facilitates commercial, corporate exchange and functional improvements at the company level.

E-commerce implementation strategies seek to improve interaction with consumers by being a new business model (19, 20). According to Turban, a proposal for an e-commerce model is established through B2B, a business-to-business relationship and the development of social electronic commerce that is developed through social networks that facilitate the marketing of products with shopping facilities. Established models allow the development of commercial marketing strategies to facilitate the purchase and sale of products and improve purchase intention successfully in e-commerce (21, 22, 23).
Figure 3 represents the foundations and stages of strategies

3.4. Information systems implementation strategies

The development of the strategies consists of four important phases that allow the improvement of trade. Each phase is complementary facilitating the development of adoption of a digital strategy. The diagnosis of the study allowed to identify the deficiencies presented by the associations at the level of the production of milk, dairy products, guinea pig and organic vegetables, according to the diagnosis the following strategies were established:

Stage I: Diagnosis.

Objective: was to identify the needs of the clients and peculiarities of the producing associations in each activity. At this stage a market study was made in which the associations operate on the properties of the marketed product. This phase helps to uncover the weaknesses of the traditional trading model carried out by the associations. To this end, the following activities were developed:

- Examination of the commercial and financial functioning of the association to establish the commercial processes that were key to improving the production of each association that makes up rural agribusiness.
- Description of the properties of the product to be marketed, the costs and resources they use to reach the market. A SWOT matrix analysis is necessary at the level of the planning of its activities.
- Identification and enumeration of potential customers at the local and national market level.
- Implement quality production to establish costs and customer acceptance.
- Establish different mechanisms for access to products and strengthen the productive chain of associations.
- Use of different marketing means for different clients.
Stage II: Planning.

Purpose: To develop a strategy and promote computer tools for its creation.

Carrying out this activity requires an in-depth study, with specific customer research, analysis of trends in digital commerce and the permanent integration of information technologies. In this stage, different planning activities were developed through the use of digital tools, which contribute to increase the marketing of the commercial and the perception of new consumers according to the following proposals:

- Detect similar businesses and examine the primary resources of your proposals
- Obtaining the legal, technological functions and administrative, material and personnel resources to carry out the implementation of digital strategies, allowing associations to create new trade opportunities. With facilities in the use of accessible and simple to use mobile devices.
- An e-commerce website was developed according to the characteristics of the association that enables a correct relationship with consumers and ensures the stability of the business.
- An easy, agile and secure marketing was developed through secure payment mechanisms.
- Interaction with social networks to attract new potential customers in the market.
- A digital marketing strategy was implemented with different customer access facilities to ensure the purchases of their products.

Stage III: Implementation

Objective: To carry out the strategy developed in the associations.

- The strategy was implemented through the resources defined in the planning phase through the use of technologies to optimize their relationship with customers.
- A website is opened through Wix according to the productive activities of each association that guarantees the security of the means of payment.
- Linking through the use of social networks Facebook, WhatsApp and You Tuve.

Figure 4: Images of marketing sites using a digital platform
Stage IV: Follow-up and feedback.

This phase allows the continuous monitoring of the execution of trade strategies through customer interaction with producers that enables improvements in the marketing of their products, for this it is necessary:

- Conduct continuous evaluations of the strategies implemented that generate improvements and access to new opportunities for the exchange of their products from the associations for customer satisfaction
- Examine consumer behavior on the organization's web portal.
- Establish means of communication with ease of access of the administrators of the web portal at the level of the associations and their management board to carry out corrective activities in time.

4. Conclusions

It was achieved to characterize the associations that form rural agribusiness. When diagnosing, several deficiencies were found in the marketing system in the associations that affect commercial management and especially the productive activities that cause food shortages and negatively influence the consumer. The implementation of electronic commerce was developed to improve the marketing strategies of its products in rural associations. The trading strategies in the partnerships allowed new market opportunities to insert their products to potential customers. The products that are marketed through the associations are milk, dairy products, guinea pig and organic vegetables according to the food needs of the population. Digital strategies were implemented in all four associations; creation of the website, means of payment, means of promotion through the use of social networks Facebook, WhatsApp and YouTube. The study helps to seek improvements in rural businesses for the development of agribusiness in Peru and boost the use of e-commerce in the Peruvian market.

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