

CRGOURMETCOFFEE.COM: AN E-COMMERCE PLATFORM TO SOLVE THE COFFEE PARADOX IN COSTA RICA

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ABSTRACT

The coffee paradox is the phenomenon by which the coffee prices received by farmers/producers in developing countries have been increasingly lower, despite a growing demand for this product. This situation affects coffee production in most coffee-producing countries and forces many producers to leave this economic activity. Behind this problem is the fact that coffee is considered an agricultural commodity. Nevertheless, the development of specialty coffee in recent years offers opportunities to de-commoditize this product, allowing coffee farmers to distinguish themselves from the rest. In doing so, they can obtain better prices for their coffee. Although Costa Rica is a country that has conditions to achieve this process, the same must be accompanied by appropriate marketing mechanisms. E-commerce can be used to assist this process. In this paper, we present the background and the design and development considerations for an electronic platform to market Costa Rican roasted coffee through e-commerce, referred to as [crgourmetcoffee.com](https://www.crgourmetcoffee.com) (<https://www.crgourmetcoffee.com>). This system is proposed as a solution to the coffee paradox in Costa Rica. In this regard, [crgourmetcoffee.com](https://www.crgourmetcoffee.com) is aimed at enabling Costa Rican coffee farmers to sell its coffee directly to final consumers in developed countries, eliminating intermediaries, and thus allowing producers to obtain higher price margins. Besides presenting the underlying principles for this platform, we also discuss the steps taken to make the existing prototype of this system into an operational marketing mechanism and the challenges ahead.

KEYWORDS

E-commerce, Coffee, Coffee Paradox, Costa Rica

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1. INTRODUCTION

Costa Rica is located in the Central American Isthmus. It is a small country with a little more than 50 thousand km² and almost 5 million inhabitants. Its gross national income per capita was US\$11,510 in 2018, making it a high-middle income country (World Bank, 2019).

The socio-economic progress of this country has been so intertwined with coffee since its independence, that it is difficult to refer to Costa Rica without associating it with this product (see Hall and Gutiérrez (1976)).

Costa Rica began producing coffee since the XIX century. Until the decade of 1970, the country's economy heavily depended on banana, coffee, and meat –accounting these three products around 65% of the total exports (CEPAL, 2014). However, the economic importance of coffee has diminished over time, and in 2017 coffee itself represented less than 3 percent of the total exports (PROCOMER, 2018).

Coffee –like most agricultural products that are distributed through agro-chains– is at the mercy of fluctuations in international markets. As explained by Daviron and Ponte (2005), these fluctuations –evidenced in the form of significant variations in prices– affect mainly the producers of this product, which are characterized by being small farmers located in developing countries. These authors refer to this phenomenon as the coffee paradox, i.e., “the coexistence of a ‘coffee boom’ in consuming countries and of a ‘coffee crisis’ in producing countries” (p. xvi).

This situation is a major factor for the continuous decrease of coffee farmers in Costa Rica. In the last decade, this number has decreased by more than 10 thousand producers, from 53,086 (2006-2007 harvest) to 43,035 (2016-2017 harvest) (ICAFE, 2017). As a result of this condition, many lands with a coffee vocation in the country are becoming properties for real estate developments. This situation is notorious in several parts of the Central Valley, where most of the country's population is concentrated. Likewise, knowledge for coffee production –traditionally passed down from generation to generation– is being lost.

On the other hand, Costa Rican coffee continues to be recognized for its quality worldwide. In the 2018 edition of the Cup of Excellence (<https://allianceforcoffeexcellence.org/cup-of-excellence/>) –competition held in several countries to reward coffee quality–, one of the participating coffee samples in Costa Rica reached the extraordinary price of US\$300.09 per pound in the auction held as part of this international competition. This amount exceeded the record of US\$130.20 per pound, previously obtained in 2017 by Brazil in this same competition. As a reference, the price of green coffee³ in 2018 in the international market was just US\$1.15 per pound (Otey, 2018).

In this regard, Mata et al. (2016) have proposed the development of an electronic commerce system to allow the direct sale of roasted coffee from producers to consumers as a solution to the coffee paradox. This mechanism would eliminate intermediaries in the global value chain of coffee, making it possible for farmers to receive the total price paid for roasted coffee by the final consumers.

This system is envisioned as an innovative tool to promote social and economic change, and it is being developed and implemented by the Universidad Nacional (UNA) in Costa Rica (<http://www.una.ac.cr>).

³ Green coffee refers to form coffee is mainly exported, before it is roasted to be sold to consumers.

In the following sections, we discuss the background, and the design and development considerations for this e-commerce system, known as [crgourmetcoffee.com](https://www.crgourmetcoffee.com) (<https://www.crgourmetcoffee.com>). Also, we present the results of this project to date and the further steps being taken to convert the existing prototype into a fully operational e-commerce platform and discuss the challenges ahead.

2. BACKGROUND

2.1 The Coffee Paradox

The coffee paradox has been studied by Daviron and Ponte (2005) and Fitter and Kaplinsky (2001a, 2001b). This phenomenon is characterized by the increasingly lower prices that farmers receive for their coffee, even though the demand for this product has been growing. This is due to the entry of new countries in coffee production –such as, Vietnam, Indonesia, and Uganda–, which has dramatically increased the world production of this product. In May 2019, the price paid to coffee producers reached US\$0.88 per pound, the lowest in a decade (BBC, 2019).

In this regard, it is worth noting that most of the coffee consumed in the world behaves as a primary commodity –for which the quality of the product is not adequately recognized. Coffee sold under this condition is said to be traded in the mainstream market. For this reason, coffee roasters can modify the mix of beans they use in their roasted-coffee blends, taking advantage of the price obtained from different countries (Daviron and Ponte, 2005).

However, with the advent of specialty coffee –which differs by flavor (gourmet coffee), origin (coffee with denomination of origin) or process (organic coffee, trade-fair coffee, etc.) – possibilities are arising for the de-commodification of this product, providing options to cope with the coffee paradox (Kaplinsky and Fitter, 2004).

2.2 The Global Value Chain (GVC) for Coffee

As Mata et al. (2016) claim, the structure of the global value chain (GVC) for the mainstream-coffee market is, in great part, responsible for the coffee paradox. Seven major actors can be identified in this chain: farmers/producers, processors, export agents, global traders, roasters, retailers, and consumers (see Figure 1).

Coffee is a tropical product, which can be grown in any location between the Tropic of Cancer and the Tropic of Cancer. Currently, there are 56 countries recognized by the International Coffee Organization (ICO) as coffee producers, all of them developing countries (ICO, 2019). Coffee farmers in these developing countries grow coffee trees, which produce coffee cherries. After being harvested, the coffee cherries need to be processed to separate the beans from the skin and pulp and reduce their humidity. This process produces what is referred to as “green coffee” and is usually done in large processing plants. Since small farmers commonly do not count on such facilities⁴, they sell their harvested cherries to coffee processing plants. As a result of this processing, beans from different producers are mixed, losing the coffee its traceability to the producer.

⁴ However, some small farmers have begun to process their own coffee in micro-mills.

Most of the green coffee produced is exported, although a small part remains in the producing country for local consumption (see Figure 1). In this regard, it is worth considering that green coffee lasts longer than roasted coffee –a primary consideration when coffee could only be exported by ship. Exporting of green coffee is done through export agents, which act as intermediaries between the processing plants and the global traders and roasters in consuming countries. As already explained, roasters usually blend different types of coffee beans before roasting them to release their aroma. Roasted coffee (ground or whole bean) is later packed in vacuum-sealed bags, to be finally sold by retailers –mainly supermarkets– to final consumers.

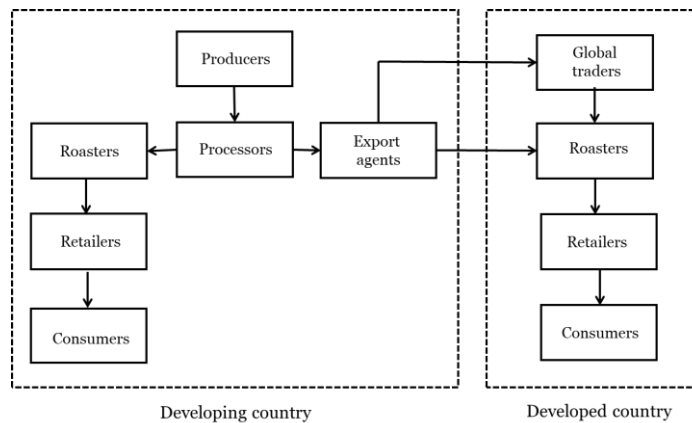


Figure 1. Global value chain for coffee (Mata et al., 2016)

The distribution of rents between actors in developing and developed countries regarding coffee has been a matter of discussion for a long time (see Daviron and Ponte (2005), Fitter and Kaplinsky (2001a, 2001b), Kaplinsky and Fitter (2004) and Fairtrade Foundation (2012)). Figure 2 shows the estimated distribution of income between actors, considering the final price of coffee paid by consumers in developed countries. As this figure presents, 70% of the final price is obtained by actors in such countries, whereas actors in developing countries receive the remaining 30%. Coffee farmers, in particular, receive 7 to 10% of the final price.

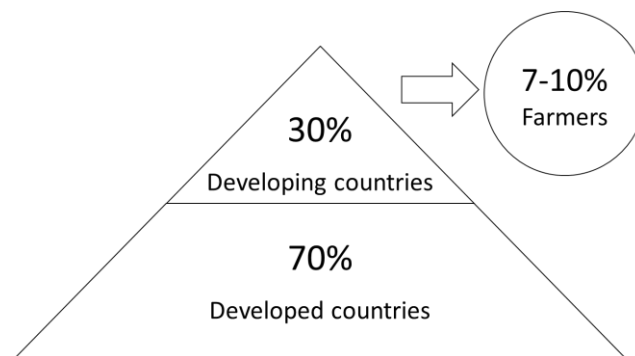


Figure 2. Income distribution for coffee (Daviron and Ponte (2005), Fitter and Kaplinsky (2001 a), ITC (2011))

Although each of the activities in the GVC for coffee described before add value to the coffee purchased by the final consumers –and therefore, this value is reflected in the price paid by such consumers–, it is claimed that oligopolistic conditions existing in this chain allow developed-country actors to extract rents –that is, a compensation beyond their value-added. In this regard, the higher income from the final price received by actors in developed countries is considered disproportionated in terms of value-added, since it is widely recognized that the main determinants of coffee quality come from its cultivation and processing (species and variety of coffee cultivated, type of soil, altitude and climate of the plantation, and type of processing for the beans) (Brown, 1991) –i.e., this value comes from actors in developing, and not developed, countries.

Furthermore, different from other agricultural products, it is the international roasters –and not the retailers, as usually occurs in other agriculture products– which enjoy a privileged position in the GVC for coffee (Daviron and Ponte, 2005). Therefore, the governance of this GVC –which relates to authority and power relationships among actors in the chain– rests on international roasters, particularly those with a large market share (e.g., Nestlé, Mondelēz –formerly Kraft Foods–, and Sara Lee Corp. (López Porras, 2014)).

2.3 E-commerce Systems used to trade Coffee in Costa Rica

As previously indicated, there are five intermediaries between coffee farmers in developing countries and final consumers in developed countries (processors, export agents, global traders, roasters, and retailers). In addition to the physical activities for production, processing, and distribution that these intermediaries perform – previously discussed –, these actors also carry out informational functions aimed at matching buyers and sellers, facilitating the transactions, and providing institutional infrastructure (see the work of Bakos (1998) about these functions). Historically, coffee producers have not been able to perform these informational activities due to a lack of *economies of scale*, *expertise*, or *contact networks* (Mata et al., 2016). However, given the communication and brokerage effects of information and communication technologies (ICT) – postulated by Malone et al. (1987) –, these technologies can reduce search costs and handle complex products –as it is the case with gourmet coffee. Therefore, ICT can be used to overcome these limitations, favoring the creation of electronic markets. These effects are very well epitomized in modern e-commerce systems.

In the case of Costa Rica, Mata et al. (2016) identified two electronic commerce systems used for trading coffee: 1) the Cup of Excellence and 2) the electronic commerce systems developed by Costa Rican roasters. Both systems support the de-commodification of coffee and focus on the sale of gourmet coffee.

The Cup of Excellence –already mentioned– has been developed by the Alliance for Coffee Excellence (<https://allianceforcoffeeexcellence.org/>), a not-for-profit organization aimed at rewarding quality in coffee. The system facilitates the direct sale of green coffee –through an electronic auction– from farmers in selected developing countries to international roasters. Therefore, this is a B2B e-commerce system.

Different from coffee offered in the mainstream market, this system offers coffee from a single farmer (“single-estate” coffee), allowing its traceability back to the producer.

Although the Cup of Excellence can benefit coffee farmers –allowing them to obtain better prices, and thus mitigating the effect of the coffee paradox– its impact is limited for at least two reasons. First, the system requires that farmers prepare samples of exceptional quality (known

as micro-lots) –process which is expensive for the farmers. Second, the coffee samples presented by producers need to be cupped several times by experts to assess their quality, which is cumbersome. For these reasons, the number of coffee farmers that can benefit from the Cup of Excellence is reduced, and the quantities of coffee that can obtain higher prices thanks to this system are minimal. Furthermore, there is evidence that although producers can obtain higher prices, international roasters can get even higher gains from selling the award-winning coffees (Daviron and Ponte, 2005).

According to Mata et al. (2016), the limited scope of the Cup of Excellence to mitigate the coffee paradox can be explained using the analysis of GVCs (see the seminal work on this field by Gereffi et al (1994)), since this system does not change the geographical location of the agents in the GVC for coffee (territoriality), neither does it change the authority and the power relations between the actors involved in this chain (governance).

The other e-commerce systems found in Costa Rica to trade coffee are the systems developed by Costa Rican roasters. Different from the Cup of Excellence, these are B2C systems. Mata and Quesada (2015) found that almost 30 percent of the roasters in Costa Rica had developed such systems and that most of them are intended to sell roasted coffee abroad. Although such systems can benefit Costa Rican roasters by obtaining higher prices, this advantage does not necessarily is transferred to the farmers. By allowing domestic roasters to sell roasted coffee directly to final consumers in developed countries, this type of systems displace roasters in developed countries –upgrading the first their position in the GVC for coffee–, and thus, letting the roasters in developing countries to reach the same advantageous situation that their homologous, in developed countries, have. Therefore, although this second type of system allows a change in territoriality in the GVC, governance in this chain remains the same (Mata et al., 2016).

As a result of the above, Mata et al. (2016) conclude that the key for an e-commerce system to address the coffee paradox rests in its ability to establish a direct connection between coffee farmers and consumers. This is the intent of crgourmetcoffee.com.

This direct connection is supported by Pelupesty's (2001) remark that at present, there is not a market that allows these two actors to relate. Due to the structure of GVC for coffee, consumers connect with roasters in a “roasted-coffee market,” whereas farmers deal with roasters in a “green-coffee market” (see Figure 3), being roasters in developed countries the common denominator in both markets.

Furthermore, roasters tend to make producers invisible to consumers. In part, this is due since, in the mainstream-coffee market is not possible to trace the coffee beans back to their producers, serving the roasters as the guarantors of their quality. Consequently, Mata et al. (2016) postulate that by including meaningful information on coffee farmers in an e-commerce system, consumers can relate better to their practices and endowments, which in the end influence the quality of coffee –as already explained.

Figure 3 shows the differences among the connections provided by the Cup of the Excellence, the Costa Rican roasters' e-commerce sites, and the proposed e-commerce system (crgourmetcoffee.com) aimed to mitigate the coffee paradox in Costa Rica. As it can be observed in this figure, this proposed system changes the governance of the GVC for coffee.

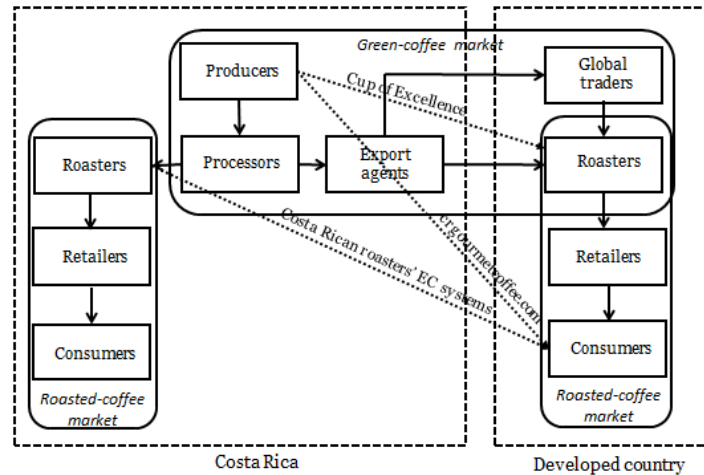


Figure 3. Connections for different e-commerce systems for coffee in Costa Rica

3. DESIGN AND DEVELOPMENT CONSIDERATIONS FOR CRGOURMETCOFFEE.COM

3.1 Methodology

We started the design of crgourmetcoffee.com in the middle of 2016. In the beginning, we thought this system could be designed with the participation of the coffee farmers in Costa Rica, using a "design thinking" methodology (Brown and Wyatt, 2010). However, we early discovered that coffee producers in Costa Rica were not well versed in e-commerce. Therefore, we switched the design approach to one based on benchmarking. In this regard, we considered e-commerce sites belonging to the following three categories of actors: 1) international roasting companies, 2) Costa Rican roasters, and 3) Costa Rican producers.

3.1.1 E-commerce Sites from International Roasters

Although most international large coffee roasters selling mainstream coffee have websites for their brands, they are mainly informational –not transactional– sites, for example, Nescafe (<http://www.nescafe.com>) – a brand of Nestlé – and the different brands from Jacobs Douwe Egberts (<http://www.jacobsdouweegberts.com>). The reason for this condition is that these roasters tend to be large consumer product companies and must rely on retailers to sell their products to final consumers.

However, specialized roasters – focusing on gourmet coffee – do have e-commerce sites. Among them, the e-commerce site of Intelligentsia (<https://www.intelligentsiacoffee.com>) – a company selling specialty coffee – proved to be useful for designing crgourmetcoffee.com. This site provides information for farmers, whose coffee is sold through it. Nevertheless, although this company promotes coffee from selected coffee producers worldwide, it acts as an

intermediary selling the coffee "on behalf" of the farmers. That is, it buys green coffee from selected coffee farmers, roasts it, and sells the resulting product through e-commerce.

3.1.2 E-commerce Sites from Costa Rican Roasters

As previously mentioned, many Costa Rican roasters have developed e-commerce systems to sell their roasted coffee. These systems barely mention coffee farmers. The most successful of such systems is the one operated by Café Britt (<https://www.cafebritt.com>), owned by Grupo Britt –a multinational company based in Costa Rica (Mata and Quesada, 2015). This site does sell not only Costa Rican coffee, but also coffee from Colombia and Peru.

3.1.3 E-commerce Sites from Costa Rican Producers

A handful of Costa Rican producers have developed e-commerce sites to sell their roasted coffee. Among them, we found useful the following websites: Brumas del Zurquí (<https://www.cafebrumasdelzurqui.cr>) and Monte Copey (<https://montecopeycoffee.com>) – both owned by farmers highly ranked in previous editions of the Cup of Excellence of Costa Rica. Although these sites have merits, they have several limitations. First, it is difficult for these sites to position themselves on the Internet, considering search engine optimization (SEO) criteria. Second, these sites offer a reduced number of products, which are limited to the available coffee varieties grown by the respective farmers. Finally, although the same producers own the sites, the amount of information provided about them is very scarce, which does not allow these sites to establish a meaningful connection with final consumers. The first two limitations are related to the need for developing a national platform to facilitate marketing and promotion of roasted coffee in Costa Rica, as proposed by López Porras (2014).

3.2 Site Structure

The site for crgourmetcoffee.com has been designed as an electronic platform, consisting of different webstores –having each a front and a back-store – for every participating farmer (see Figure 4). The front-stores are public and are composed of three types of pages: 1) producer information –presenting multimedia information about the farmer –, 2) farm information – containing information about the farms of the producer, particularly those that have been qualified for an edition of the Cup of Excellence of Costa Rica –, and 3) product information – displaying information about the products (roasted coffee) offered by the farmer through the platform.

The public site also provides a section containing information about the coffee regions in Costa Rica. An additional section presenting the history of coffee in Costa Rica is underway with the assistance of the School of History of UNA.

The back-stores are private and offer each producer the capacity to manage its information on the front-store, as well as perform functions associated with the orders made through the e-commerce site.

Besides, there is a general administration module, which is used to create, enable, and disable farmers' webstores and control the general operation of the platform (see Figure 4). Similarly, to the back-store, this module is private.

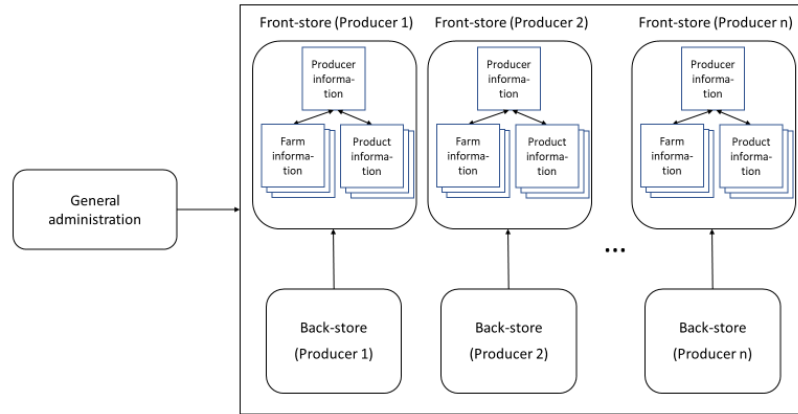


Figure 4: Site structure for crgourmetcoffee.com

3.3 Graphic Design

Several iterations were used to obtain the graphic design for crgourmetcoffee.com. The following criteria were used to guide this design: 1) a minimalist approach, 2) use of colors and images related to coffee, and 3) styles for the pages able to be displayed responsively on different devices (desktops, tablets, and mobile phones). The following sections show the design of the most important pages in the public site for crgourmetcoffee.com.

3.3.1 Homepage

Figure 5 presents the homepage for crgourmetcoffee.com. It contains a selection of products, which are randomly selected from the database each time this page is loaded.

3.3.2 Region Information

As previously mentioned, crgourmetcoffee.com includes a section with information from each of the coffee regions from where there are farms from the producers participating in this platform (see Figure 6). There are eight such regions in the country (ICAFE, 2015).

As shown in the previous figure, the page corresponding to this section contains a slide show of images from the region, mainly touristic attractions. Additional elements of this page are a description, a summary of the organoleptic characteristics⁵, and some general information about each region –all this information obtained from the section on the Costa Rican coffee regions contained in the website of the Coffee Institute of Costa Rica (ICAFE, 2015).

At the end of the page, a Google map is provided showing the location of the farms in the region within the country⁶. Shortly, it is envisioned to provide touristic information on this map along with the positions of the farms. This combination of data is presumed to favor “relationship coffee,” as it is explained in the next subsection.

⁵ The organoleptic characteristics are explained in section 5.

⁶ Due to the proximity of farms within a region and the fact that the resolution of the map for the regions was set to show almost the entire country, the pointers for the farms in a region tend to coincide. By zooming in on the map, users start finding differences in the location for the farms.

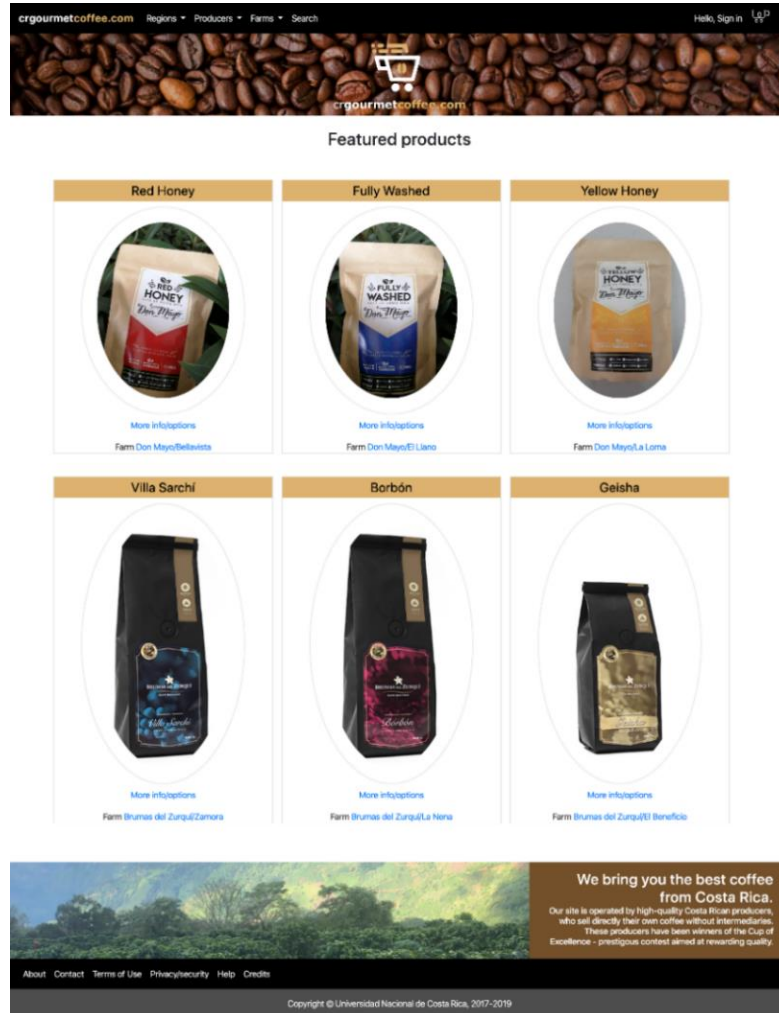


Figure 5. Graphic design for homepage

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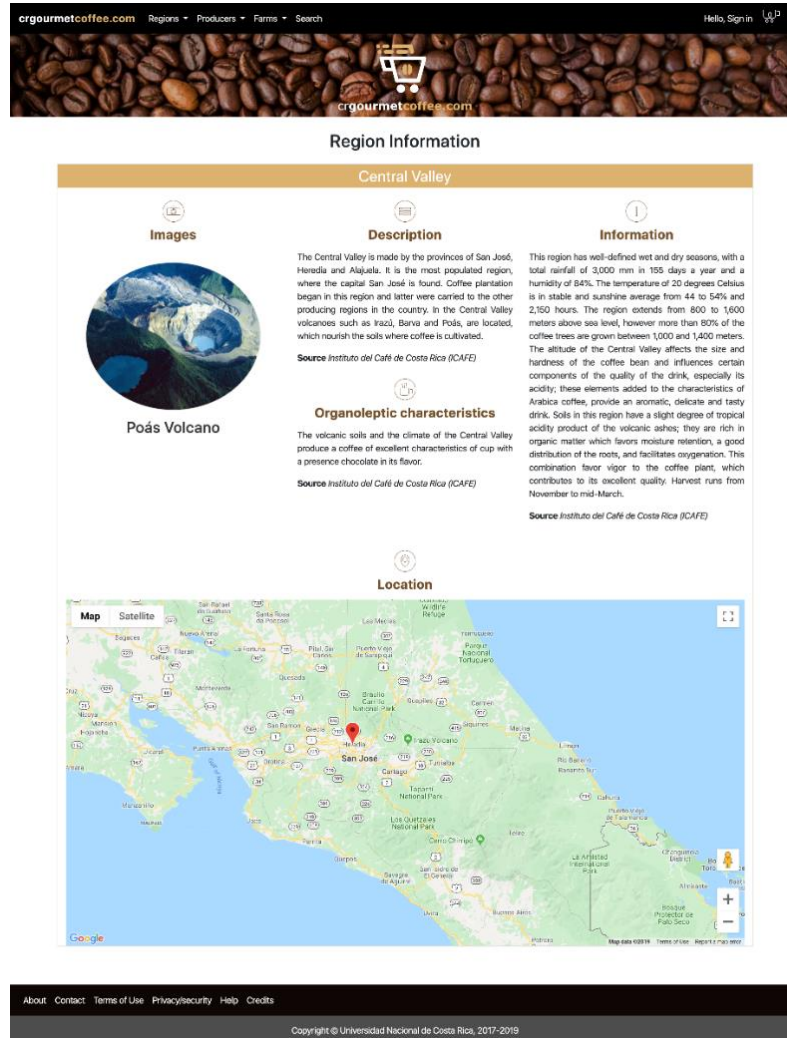


Figure 6. Graphic design for region information

3.3.3 Producer Information

A page with information about each producer and its products have been developed (see Figure 7). It is intended to achieve effective communication between producers and users (potential consumers). This page contains a slide show with images of the producer along with its description.

Additionally, a video will be loaded on this page, which is expected to contain a story about the producer. In this regard, it is worth noting that most coffee farms in Costa Rica are owned by families, which have been inherited through several generations. This situation leads to the use of storytelling to connect consumers to farmers. Storytelling has been proposed as a useful way for marketing (see Woodside et al. (2008)). Following Picard's (1997) influential work, we

plan to use affective computing – that is, “computing that relates to, arises from, or deliberately influences emotions” (p. 3) – to develop such a connection. Storytelling and affective computing will support relationship marketing, which “is based on the notion that on top of the value of products and/or services that are exchanged, the existence of a relationship between two parties creates additional value for the customer and also for the supplier or service provider” (Grönroos, 2004, p. 99). Such type of marketing has been proposed by Daviron and Ponte (2005) for coffee in the form of "relational coffee" –that is, selling a story with coffee, which is often involved with “traveling and the exotic” (p.156). This type of marketing aimed at establishing a direct relationship between coffee consumers and actors in coffee-producing countries. Café Britt has successfully used such a strategy in Costa Rica (Mata and Quesada, 2015). Figure 8 presents the relationship among storytelling, affective computing and relationship marketing sought in the producer information page.

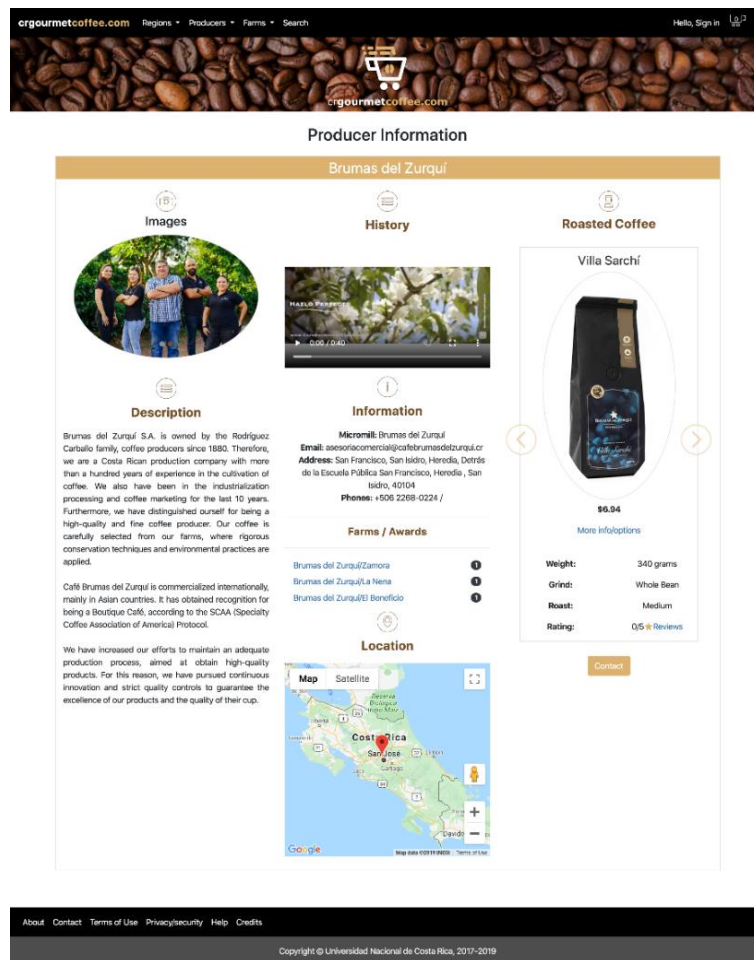


Figure 7. Graphic design for producer information



Figure 8. Storytelling, affective computing, and relationship marketing

Also, the producer information page provides general information about the farmer, the list of its farms, and their location in a Google Map. Finally, a carousel presents the coffee products from the specific producer.

3.3.4 Farm Information

Figure 9 shows an example of the farm information page. This page contains images from the farm, along with its description and general information. An important element of this page is the list of awards, particularly those related to the Cup of Excellence of Costa Rica, obtained by the farm⁷.

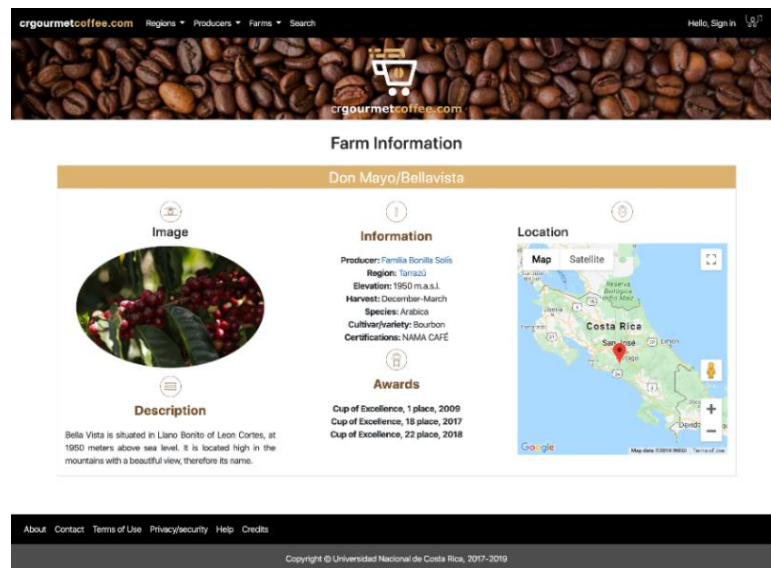


Figure 9. Graphic design for farm information

⁷ Technically speaking this award has been received by the coffee sample grown in the farm that participated in the Cup of Excellence.

3.3.5 Product Information

General information about the product, along with its description, is provided on the product information page (see Figure 10). This page also provides reviews for the product and allows potential customers to select its presentation: roast term (light/medium/dark), weight, and grinding of the beans (ground/whole bean). The price of the product varies according to the presentation selected. Through this page, products are introduced into the shopping cart.

As later mentioned, the review component on this page has the function to provide a reputational mechanism to evaluate the quality of the products offered by the coffee farmers participating in crgourmetcoffee.com through B2C social shopping features (see Turban et al., 2018).

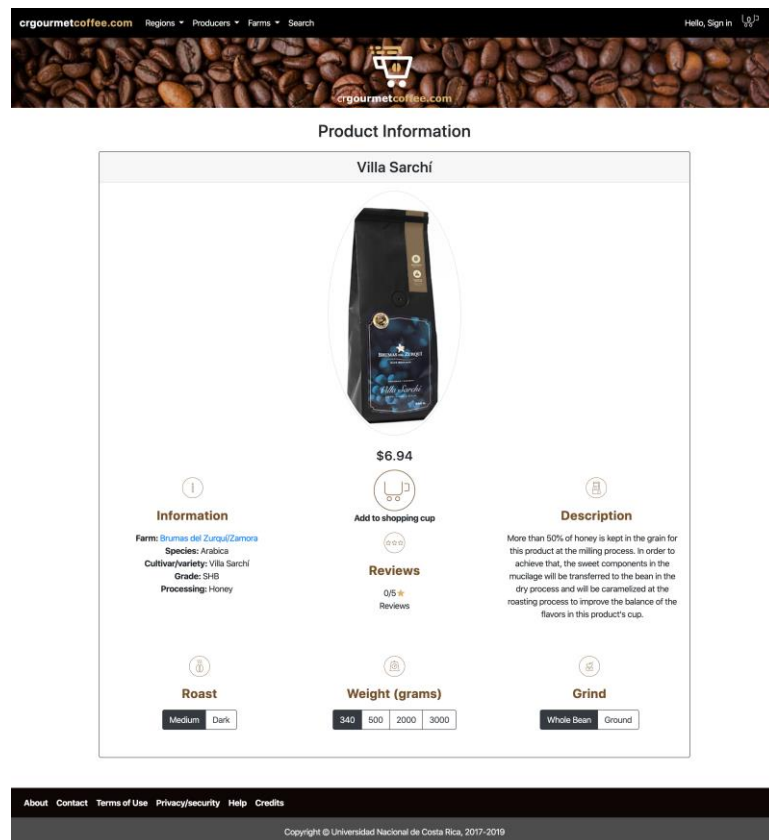


Figure 10. Graphic design for product information

3.4 Software Considerations

A LAMP⁸ software stack has been used to develop crgourmetcoffee.com. We originally planned to use an open-source e-commerce package based on PHP to develop the site. For this purpose, we considered the following options: Drupal/Ubercart (<https://www.drupal.org/project/ubercart>), Magento (<https://magento.com/>), osCommerce (<https://www.oscommerce.com/>), and Zen Cart (<https://www.zen-cart.com/>). However, only Drupal/Ubercart offered a free multi-vendor solution by adding a module known as Ubercart Marketplace (https://www.drupal.org/project/ubercart_marketplace).

After reviewing this last solution, we found it difficult to implement with this package the functionality required for the proposed site for two reasons. First, although Ubercart Marketplace allows different vendors to manage their products, all the products appear in the same webstore. Second, this package is designed, so all payments go to the operator of the site, and not directly to the different vendors. In this regard, we considered essential to separate the technical operation of the site from its financial procedures to isolate the operator of the e-commerce site from possible legal disputes that may arise from the transactions being executed, as later discussed.

Changing the code for Drupal/Ubercart Marketplace to create different webstores for farmers and allow them to receive their payments directly was deemed more difficult than to develop the system from scratch. For this reason, we selected Symfony (<https://symfony.com>) – a PHP-based framework implementing the model-view-controller architectural pattern – to develop the e-commerce site.

Also, we used the bootstrap front-end framework (<https://getbootstrap.com>), to make the site responsive, and thus eliminating the need to have apps for using it with mobile devices. An effort has been made to adapt the bootstrap commands to properly function on most browsers (Chrome, Firefox, etc.) as well as on different Android and IOS devices.

4. RESULTS TO DATE

We have completed a prototype for crgourmetcoffee.com. A usability test of this site was conducted during November 2018, using the System Usability Scale (SUS) (Brooke, 2013) and relying on professors and students at UNA. This test provided encouraging results, as well as suggestions for further improvement of the system⁹.

We also have presented the prototype to several coffee farmers in Costa Rica –with whom we have been developing the e-commerce system. They have expressed much interest in using crgourmetcoffee.com. According to them, the fact that this system provides the opportunity to create a national platform to market and sell gourmet coffee is a major advantage, since it simplifies its use –not having the producers to deal with technical aspects–, as well as it provides better opportunities to position the site on the Internet.

⁸ Linux (operating system), Apache (web server), MySQL (database management system), PHP (programming language).

⁹ Results from the usability test can be found in Mata and Hernández (2019).

Terms of use for the system are being developed, as well as security and privacy policies for the platform. Such policies consider the General Data Protection Regulation (GDPR), approved by the European Union (EU, 2018).

Furthermore, contractual terms with the farmers – that will be using *crgourmetcoffee.com* – are being finalized. In this contractual agreement, UNA legally will be only the facilitator of the platform –as previously mentioned. For this reason, the university will not be responsible for any of the transactions occurring through the platform.

To expedite the process for preparing *crgourmet.com* for operation, however, we have decided to use an informed consent form before signing the contracts with the coffee farmers. This form has allowed us to receive actual information from the producers, which is currently being entered into the system. Based on this, changes are being made to the programs to adapt them to the information provided.

5. FURTHER STEPS AND MAJOR CHALLENGES

As previously explained, we are in the process of making the existing prototype for *crgourmetcoffee.com* into an operational e-commerce platform. In this endeavor, we are offering *crgourmetcoffee.com* to selected coffee producers –that have been highly ranked in the previous editions of the Cup of Excellence of Costa Rica– without cost until the end of 2021. After that period, we will reevaluate the way the system will be provided. In the long term, the ideal will be to license the software to an “association” of gourmet-coffee producers. Although this association does not exist, we believe *crgourmetcoffee.com* could lead the way for creating it.

For implementing *crgourmetcoffee.com*, we are currently in the process of seeking the collaboration from key government agencies in Costa Rica, such as the Ministry of Science, Technology, and Telecommunications (MICITT), the Ministry of Agriculture and Livestock (MAG), the Ministry of Foreign Trade (COMEX), the Export Promoting Agency of Costa Rica (PROCOMER) and the Coffee Institute of Costa Rica (ICAFFE). These organizations are key to develop a national platform for trading roasted coffee.

We are also looking for funding for this project. Although UNA is covering most of the labor and operational costs needed to launch this platform, additional funding will be instrumental in promoting the platform on the Internet and in improving the farmers’ capabilities to sell roasted coffee.

To provide a consistent framework for handling payments and providing the necessary logistics services, we are in the process of selecting a company to offer the electronic-payment services and another to provide the shipping services needed for this system. Logistics is a major challenge for a platform like this since shipping many small orders –as it is necessary for B2C– is a complicated and expensive process (Turban et al., 2012). Furthermore, coffee farmers are accustomed to exporting green coffee, which is a volume process; therefore, selling small packages of roasted coffee will demand farmers to develop new methods and skills.

Training producers to use the system and operate its back-store facility also presents challenges, since many of them are not well acquainted with IT. However, we have found that children of the coffee farmers are very knowledgeable in IT –some of them even have a university education. Therefore, training efforts will focus on this group.

Finally, securing the quality of the coffee sold through the system is paramount. Two primary mechanisms guarantee coffee quality: organoleptic and non-organoleptic (Daviron and Ponte, 2005). Organoleptic mechanisms rely on the human senses, and they are associated with coffee characteristics such as acidity, aroma, body, and taste. For this purpose, coffee samples are cupped by experts and assessed based on such traits (ITC, 2011). However, cupping is a cumbersome and expensive mechanism, used in the Cup of Excellence.

On the other hand, non-organoleptic mechanisms rely on subjective attributes of coffee. In this regard, the most commonly used is the creation of brands, which is mainly used by roasters. International roasters invest heavily in advertisement related to their brands, for example, Nescafé, Folgers, and Maxwell House.

We plan to use a combination of both mechanisms in *crgourmetcoffee.com*. In this regard, the system will be offered only to farmers that have been ranked as producers of specialty coffee by the Cup of Excellence of Costa Rica. By doing so, there is a certain guarantee that the participating farmers have already the endowments (coffee trees, agro-climatic conditions, etc.) and knowledge about coffee cultivation, harvesting, and processing to produce high-quality coffee. Furthermore, through marketing methods –such as relationship marketing, previously mentioned– and the name that Costa Rican coffee has worldwide, we plan to create a reputation for the platform. Creating such a reputation will overcome the limitation of positioning on the Internet individual farmers' websites –as already mentioned– since participating farmers would be able to rent the reputation from the platform (see the pioneering work on the economics of e-commerce by Choi et al. (1997)). This last mechanism will be complemented by a rating system for each of the coffee products offered through *crgourmetcoffee.com*¹⁰. The module for obtaining such ratings, as well as reviews for the products, is currently under development.

6. CONCLUSIONS

Although e-commerce is growing in Costa Rica, as in most Latin American countries (Visa, 2016), this growth is mainly due to the use of foreign platforms, such as Amazon, E-Bay, or AliExpress. Furthermore, most e-commerce efforts in the country have focused on creating sites for the local market; however, the reduced size of the country (roughly 5 million inhabitants) makes this market off-putting.

Instead of thinking inwards, efforts to develop e-commerce sites in Costa Rica should look abroad. In this process, using products where Costa Rica has a competitive advantage – such as coffee – is key. Cafe Britt, as already mentioned, illustrates well this approach. According to Mata and Quesada (2015), this company sold approximately 18 percent of its coffee through e-commerce in 2013.

The platform *crgourmetcoffee.com* has being designed and developed with this principle in mind: focus on the foreign market with coffee –product in which Costa Rica excels. In this way, this platform is aimed at mitigating the coffee paradox, and thus encourage Costa Rican farmers that produce gourmet coffee to continue in the business.

Furthermore, we believe this platform might motivate new generations to get involved in the coffee activities of their parents, favoring to pass down the coffee tradition and knowledge from generation to generation. Adding a technological component to coffee production and marketing

¹⁰ Such a rating system was already explained in relation to the page providing information about the products (see section 3.3.5).

can make it more attractive to the farmers' children to get involved in the coffee activities of their families.

Although crgourmetcoffee.com has the potential to become a tool for social and economic change, obtaining evidence about its effectiveness will be the only way to test the underlying principles of this platform. We hope to have such confirmation by the end of 2020.

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