Increasing the Value of Farm Products: Connecting Farmers and Consumers through an E-commerce System

Gilbert M. Tumibay  
College of Computer Studies  
Angeles University Foundation  
Angeles City, 2009 Philippines  
tumibay@gibo@auf.edu.ph

Fernand T. Layug  
Santa Rita College of  
Pampanga  
Sta. Rita, Pampanga,  
2002 Philippines  
fernand_layug@live.com

Daisy S. Yap  
College of Computer Studies  
Angeles University Foundation  
Angeles City, 2009 Philippines  
daisy.yap@auf.edu.ph

Mar Stephen M. Sembrano  
College of Computer Studies  
Mabalacat City College  
Mabalacat City, Pampanga,  
3000 Philippines  
sembrano_marstephen79@yahoo.com

ABSTRACT
Farmers are expected to benefit from the fruits of their labor. Consumers, on the other hand, should not be overwhelmed by expensive farm products just because of the common practice of the traditional business trade. In the past, alternative solutions to break this trend are not viable due to the lack of available system and technologies. The middlemen or the intermediaries are the ones dictating the prices of farm commodities and the same time gaining huge amount of profit margin due to the incremental markup of one intermediary level to another. With the advent of E-commerce infrastructures and the motivation to embrace this system, the option of breaking the barrier between the farmers and the consumers is now possible. An E-commerce system that is designed to help farmers reach the consumers directly or with the assistance of a farmer’s cooperative is presented in this study. However, the E-commerce system is an option that needs to gain popularity among farmers and consumer. The requirements to gain enough knowledge of this trade and the stage to achieve full maturity of its adoption still need further motivation and investigation.

CCS Concepts
• Information systems → World Wide Web → Electronic Commerce → Electronic Commerce Infrastructure

Keywords
E-commerce System, Farmer, Farmer’s Cooperative, Farm Product, Consumer.

1. INTRODUCTION
The common means of trading farm product remain one of the important topics for farmers, middlemen, market vendors and consumers. In most cases, the middlemen and market sellers are often getting the big portions of profit instead of the farmers who should be the direct beneficiaries of the goods they produced. In effect, consumers are burdened by expensive farm goods because of the numerous intermediaries between producers and users of the products.

In order to help both farmers and consumers, a new trading system combined with a non-traditional method of conducting business should be introduced. Both farmers and consumers may gain substantial benefits by shifting to a more sustainable trading practice, for which an information system in an E-commerce platform is the best candidate to address this problem [10]. In fact, E-commerce has been in the market for decades and disrupted many traditional markets. It improves the way consumers and sellers conduct business and provide more benefits compared to the known drawbacks of other trading systems.

In the application of this strategy, the significant markup gained by the middlemen and the market sellers may now be added to the profit of the producers of products - the farmers. Thus, a more competitive and reasonable price of farm products will be available to the consumers of goods. However, this kind of trade is only feasible if technologies, knowledge and infrastructures are available for both parties.

2. BACKGROUND AND RELATED WORK
2.1 The E-commerce Systems
Electronic commerce or E-commerce systems is the electronic process by which computer users and business organizations conduct transactions over the internet, such as buying, selling, transfer products, or even an exchange of goods and services [1,4].
Over the last decade, there has been a remarkable growth of e-commerce transactions. For the global business-to-consumer (B2C) E-commerce alone, the annual sales have reached $1.2 trillion in 2013, which represents an increase of 17.1% compared to 2012 [7]. At the end of the year 2015, the total worldwide retail E-commerce sales was $22.5 trillion. That is over $1 trillion dollars compared to the year 2014 which is $21.3 trillion. By the end of the year 2019 it is predicted to reach $27.9 trillion [3]. The data show that there is a rapid increase of sales in E-commerce transaction. It has a tremendous impact in the global market.

E-commerce has greatly affected almost all businesses, especially in the purchases of basic necessity [9]. It has been popular and effective in introducing new businesses without the necessity of huge investments or capital outlays. Venture capitalists are saving a lot of money because of minimum investment requirement for physical infrastructure. With limited resources available, a company will have its global presence where goods and even services could be advertised. Another impact of the E-commerce is the intensified competition brought about by embedded advertisements to its web pages. It also provides the consumers low prices of goods yet offers more choices of product line.

The E-commerce is also gaining popularity in the area of farming. There has been a rapid development of information systems in many areas of farming and agriculture. It occupies major
agricultural processes and it has influenced farmers in using information systems for equipment, agricultural and aquatic processes [6]. Although, in many developing countries and even in some areas of developed nations, the use of internet in the regular business transaction is still in its early stage. However, given the benefits that farmers can derive from the adoption of E-commerce infrastructure, embracing this system later on will no longer be an option but a pre-requisite in doing business for consumers and farmers.

2.2 The Traditional Trading of Farm Products

To illustrate the essentials of E-commerce system for farmers and consumers, there is a need to understand the current market situation in which farmers and consumers conduct transactions. The common practice of trading farm product involves a number of different mediums. The traditional commerce usually passes different levels of intermediaries which increases the cost of goods. Most often, the markup gained by intermediaries are even bigger than the farmers’ income. The usual process of transaction is illustrated in Fig. 1.

![Figure 1. Common trading of farm products.](image)

During the harvest seasons, middlemen directly acquired products from the farm. The products are transported by the intermediaries either to another intermediary entity or directly to the market vendors. Then, the market vendors will sell it to convenience store owners or directly to the consumers.

Using these processes alone, considering the standard retail markup of at least fifty percent (50%) per transaction, prices of farm products will increase by at least two hundred (200%) percent [2]. This enormous percentage of profit in between producers of farm products and consumers has also been the reason for the demise of middlemen in many different markets [5]. However, there are cases where only one middleman is involved. The products are directly acquired by the consumers from the market. Still, at least one hundred percent (100%) incremental markup is exorbitant for consumers.

3. E-COMMERCE SYSTEM OVERVIEW

3.1 Farm Trading Using an E-commerce System

Just imagine the many benefits that farmers and consumers may gain through the use the E-commerce system if products will be sold by farmers to a larger number of consumers and more consumers will be able to buy directly from the farmers. Fig. 2 illustrates the implementation of an E-commerce system wherein farmers could directly sell their products to the consumers. The diagram shows that whenever E-commerce system is implemented, at least four (4) processes will be eliminated. Thus, using the E-commerce medium in farm product transactions benefits both farmers and consumers. More importantly, it simplifies the trading process.

![Figure 2. Trading farm products through an E-Commerce System.](image)

Using an E-commerce system as the medium of transaction, the decrease of farm product prices is possible because the cost of farm products could be added up to the income of farmers or it will be a reduction of cost of products on the part of the consumers. On the other hand, the cost of delivery in an E-commerce transaction may be an issue to consider because the cost of deliver could be added to the price of the product. However, this now irrelevant because the delivery charges can be treated as discounts. Farmers will no longer need intermediaries to sell their products.

The shipping requirements for many farm products are different from the usual delivery of goods. Handling farm products usually requires special shipping procedure. In fact, there are shipping companies which are more expert in this area and are ready to help farmers and consumers, but the farmers’ themselves have the capacity to deliver big volumes of farm goods. To lessen the burden passed on to the farmers and consumers, the participation of the farmers’ cooperative is one of the most viable solutions to handle this problem.

In effect, the income that will be generated by the farmers’ cooperative becomes the income of the farmer members of the organization. Generally, cooperative organizations are dividing their income among the members after every annual operation. Although, there are shipping companies that are also experts in this area and much willing to cooperate in helping farmers and consumers. Fig. 3 shows the complete E-commerce trading diagram.

![Figure 3. Complete E-commerce diagram of farm products.](image)

3.2 Farm Products of the E-commerce System

There are at least six (6) categories of farm products. Farmers and farmers’ cooperative are sellers of this trade and for this new method of conducting business, three (3) types of buyers exist. Fig. 4 shows the design of the E-commerce system, including the different sellers and buyers of products.
3.2.1 The Sellers
- Farmers – the main producers of farm commodities who benefit less compared to the gains of middlemen and intermediaries.
- Farmer’s Cooperative – an organization created by the farmers themselves to serve as the vessel in providing updated agricultural information, farm supplies, fertilizer support, marketing arm in selling farm products and anything that could assist farmers in improving their lives [8].

3.2.2 The Buyers
- Common Consumers – the users of farm products burdened by expensive cost of goods due to the many levels of intermediaries.
- Business Consumers – the bulk users of goods like restaurants, hotels, and companies requiring regular supply of farm products.
- Special Consumers – are those consumers that require an exact specification of a farm product, in some cases it is called special orders. Consumers that require a specific size, age, amount, date and other needs with special arrangement. In this transaction, farmers could get higher gains compared to the usual production.

3.2.3 The Farm Products E-Commerce System
- Livestock – these are products that are typically domesticated animals raised on a farm or just in the farmer’s backyard. Farm animals such as carabao, cows, horses, goats, and pigs.
- Poultry Products – a group of domestic farm fowl, such as chickens, turkeys, ducks, geese, quail and other domesticated fowl generally raised for eggs or meat.
- Fish Products – these are aquaculture farm products such as carp, tilapia, milkfish, catfish, shrimp, oyster, crab and other aquatic animals.
- Fruits – a group of farm products that are normally fleshy seed-associated structures of plant that are sweet or sour, and edible in the raw state, such as bananas, lemons, pineapple, mangoes, avocado and strawberries.
- Vegetables – these are farm products that are typically used as accompaniment to meat or fish, whose seeds, tubers, bulbs,
- Grains and Root Crops – a group of farm products that are plant roots used as vegetables grown for their enlarged, edible storage root that consist of root crops such as beets, carrots, potatoes, radish and other tuber crops. Grains are the seeds of crops such as corn, wheat and rice.

4. DISCUSSION
4.1 Technology and Technical Requirements of the E-Commerce System
To be able to implement an E-commerce system, a web or internet infrastructure is necessary to setup the entire process. It includes different technical and payment channel requirements such as computer server, software platforms, payment mediums and shipping companies. Table 1 shows the different technical requirements, specifications and functions needed for an E-commerce system.

<table>
<thead>
<tr>
<th>Technical requirement</th>
<th>Requirement specification</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer’s E-commerce server</td>
<td>domain name and web application</td>
<td>an internet address that will serve as the presence of the E-commerce system and application system that will manage the web platform</td>
</tr>
<tr>
<td>E-commerce storage</td>
<td>web hosting</td>
<td>it will store all the transactions such as the product and product details, including the storage of the E-commerce application</td>
</tr>
<tr>
<td>Payment medium</td>
<td>bank account or credit card</td>
<td>bank account or credit card that will hold payment for farmers and farmers’ cooperative</td>
</tr>
<tr>
<td>Shipping channel</td>
<td>shipping company and farmers’ cooperative</td>
<td>the shipping company will deliver the farm products to consumers similar to the function of the farmers’ cooperative</td>
</tr>
</tbody>
</table>

4.2 Over-all Design and Processes of the E-commerce System
There are four main entities in the Farmer’s E-commerce system, the farmer, the consumer, the farmers’ cooperative and the shipping company. Fig. 5 illustrates the over-all design and process of the E-commerce system.
The farmer is the main user of the E-commerce system and the beneficiaries of its implementation. Aside from posting different products and the details of each product, the farmers may decide whether to deliver the goods directly to consumers or send the products to the farmers’ cooperative and let the cooperative expedite the sale online.

The farmers’ cooperative should be the entity that will maintain the E-commerce infrastructure such as the E-commerce server and the database or the storage of farm products. It could also be the medium of farmers to sell and deliver the products at the same time. A farmers’ cooperative is basically the organization which farmers are gaining from its operation. Therefore, a farmers’ cooperative represent the farmers themselves who benefit from the income of the cooperative.

The Shipping Company is an alternative shipping medium aside from the farmers’ cooperative. There are some shipping companies specializing in handling farm products which could be used to deliver farm goods to far places. Shipping companies could be used to expand the area covered of the farmers’ market.

The consumer is another primary entity of the E-commerce system. Aside from the farmers, who are the producers of goods, consumers are the main source of farmers’ income. Either consumers are the common users of the products or the businesses that uses farm products or they are using the farm products as raw materials in their regular business operations.

5. CONCLUSIONS AND FUTURE WORK

The idea of developing an E-commerce platform to sell products produced by farmers is no doubt a good alternative for consumers to acquire farm commodities. This is an avenue where farmers can promote and sell their products while consumers on the other hand can search needed products and buy products directly from the farmers without passing through different intermediaries. Aside from the farmers, a farmers’ cooperative will also benefit from this project by promoting the products produced by their members and by serving as an alternative shipping channel in delivering bulk orders or farm products that require special handling.

This alternative system of conducting business for farmers and consumers will increase the gains of farmers while decreasing the costs of goods for consumers. Later on, intermediaries will have limited control over the price of farm products. The farmers may dictate reasonable or even cheaper costs of farm products. It will also minimize spoilage and waste of farm goods due the provision provided by the system for the special consumer requirements. Soon, farmers will produce the required products of regular and business consumers on the specific period depending on the demand.

However, there is a need to orient and educate farmers in the use of the E-commerce systems and its infrastructure. At present, many farmers are not comfortable with the use of the internet and the proper advertising or posting of their products using an E-commerce system. The farmers’ cooperative may assist farmers and their members to schedule trainings or tutorial sessions in this regard. The cooperative may provide orientation, seminars and trainings on the use of the system or even educate farmers with the use of computers and gadgets. In many areas, the use of tablets and smart phones are gaining popularity which can become an alternative way of communicating to the E-commerce system aside from the common computer systems. In addition, the interface of the E-commerce system may be designed to fit mobile phones and tablets. Eventually, mobile applications of the E-commerce system may also be considered to be developed across different platforms and further development to fit different into different mobile models should also be explored.

6. ACKNOWLEDGMENTS

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7. REFERENCES


