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E-commerce: A Survey for Cretan Agro-Food Sector

Markos Kourgiantakis, Nikos Matsatsinis and Athanasios Migdalas
Department of Production Engineering & Management, Technical University of Crete, Greece

Abstract: In this paper, the impact of e-commerce for agro-food and organic food marketing is specified in both theoretical and practical aspect. Firstly, based on the international literature, a theoretical framework is given for the applications of the Internet as a marketing tool. The second part of this work concerns the results of a survey that was conducted in Crete in order to investigate how the local agricultural cooperatives and firms use or tend to use the business methodology of e-commerce. Cretan consumers and managers reveal their expectations from the new technology. From this survey, valuable information about the practical relation of e-commerce and the agro-food market of the island comes to light, while the differences with the theory are noticed.

1. Introduction

Since the last decade, the way of doing business has certainly changed because of the rapid development of information and communication technology. Market experts, as well as academic researchers, are predicting the huge potential of the latest networking technologies in conducting business and their forecasts about the size of online trading revenues in the next few years vary from a few hundred billion to a few trillion.

The term e-commerce generally refers to conducting business electronically. The technology of e-commerce includes a variety of systems; from fax, to intranets – extranets, to systems like electronic data interchange (EDI) and electronic fund transfer (EFT), to the Internet and World Wide Web. Today, the Internet is an established channel for much cheaper and easier commercial transactions. It is a worldwide market with hundreds of millions of buyers and sellers, a place for every kind of transaction and every type of business, a powerful medium for marketing activities.

Broadly defined, e-commerce is a modern business methodology that addresses the needs of organizations, merchants and consumers to cut costs while improving the quality of goods and services, and increasing the speed of service delivery [25]. From this definition is clear that commerce conducted through the Internet and World Wide Web provides specific efficiencies to all the participants. The benefits e-commerce provides to companies going online are many, with the biggest one being the reduction in costs and time of transactions. To benefit totally from the available opportunities, businesses must adopt and develop suitable electronic strategies of doing business, even if this often changes dramatically traditional processes. The e-business strategy must be proper for the industry the company is in, it must be innovated and it must create value and competitive advantage.

The rate and extent of adoption of e-commerce practices is different from industry to industry and from place to place. Obviously, 'internet way' is one-way for industries of digital products. For agro-food industry and other industries of physical products, the Internet could be at least a significant marketing tool which integrates and completes commercial activities. Within an industry the rate of adoption varies also. Large firms usually use first the new technology and ac-

quire an electronic philosophy, but this is not an obstacle for small and medium-sized enterprises (SMEs) because barriers to entry in the Internet are neglectful. Finally, e-commerce expansion is not the same around the world. USA is the pioneer and the leader, Europe has today the best rate of e-commerce development, but certainly great differences exist between developed and developing countries.

In this study, the impact of e-commerce for agro-food sector, giving emphasis on organic food section is specified in both theoretical and practical aspect. Firstly, based on the international literature, a theoretical framework is given for the applications and benefits of the Internet as a marketing tool. The second part of this work concerns the results of a survey that was conducted in order to investigate how agricultural cooperatives and firms in the island of Crete (Greece) use or tend to use the business methodology of e-commerce. Cretan consumers and managers of local agro-food organizations reveal their expectations from the new technology. At the last part of this work, some general conclusions and implications of this survey follow.

2. E-commerce of agro-food products

In the international literature, there are not many articles focus on the implication of e-commerce for agriculture and food industries. The point is that internet-based e-commerce can and will transform the agro-food sector, but how this will happen is still questionable [22]. The food supply chain is big enough and is separated in several business sectors such as farm input suppliers businesses, producers, first line processors (referred to as the agribusiness sector), manufacturers and finally wholesalers and retailers. Every segment of the food supply chain will be affected by the improved access to information and to markets, the improved logistics, the internet-based purchases and sales, etc., through e-commerce. The gains from e-commerce depend on the ability every sector has to adopt new technology suited to its specific role in the food supply chain, and the extent of virtual integration.

The most common type of e-commerce in the agro-food sector is B2B. According to Morgan Stanley Dean Witter's view, this is because the market is fragmented, the supply chain is inefficient, buyers change sellers regularly and the value of the products is usually volatile [2]. A search in search machines and 'yellow pages' in the Internet could yield to many agricultural sites worldwide (including wineries, farms, etc.), but only a few of them offer B2C e-commerce. In contrast, predictions for B2B transactions in the agro-food sector are optimistic. Goldman Sachs [12] estimates that 14% of total US B2B commerce in agriculture could migrate on-line by 2005. It is assumed that Europe will undergo a similar rate of growth and predictions suggest that from 25,000 operational e-commerce sites by the end of 2001 a number between 1,000 and 1,500 will be allocated to agriculture and the food sector [29].

Much attention has also been paid to the form of B2B e-markets for agriculture, their current function and their role for the re-structure of the market. Many studies have shown that agricultural and food market systems are not perfectly competitive and are becoming less so over time. New information technologies and the Internet in particular, have the potential to improve the economic performance of these systems by affecting almost every structural characteristic. The hope is that e-markets will become more transparent than traditional agro-markets and supply chains will become more efficient.

The most interesting part of e-commerce concerning physical products like agro-food products is internet marketing. In general, internet marketing can give to agribusiness competitive advantages as a reduction in intermediation costs associated with wholesale and retail activities, the ability to lower costs associated with purchasing by curbing the time and effort involved in

supply and logistics operations, improved information selection and processing that leads to improved management of the supply chain, as well as the prospect of expanding market share and/or developing new markets [10].

For this research, the traditional marketing mix model of 4 Ps (Product, Place, Price, and Promotion) was selected, in order to exam better the impact of e-commerce on agro-food marketing.

2.1 Product

As Kotler [16] defines, a product is anything that can be offered to a market for attention, acquisition, use, or consumption that might satisfy a want or need. The number of products available on-line is growing steadily and they can be categorized as digital (intangible) and physical (tangible) products. Digital products are particularly suited for e-commerce because they not only take advantage of the digitization of the market mechanism, but also the distribution mechanism. Agro-food products belong to physical goods and from the marketing perspective they have two major disadvantages online [13]. First, the absence of the physical product makes it impossible for a buyer to inspect, feel and try out the product. Second, the unfeasibility of delivering products of this market electronically represents a further limitation in using WWW to the fullest extent.

But in the case of internet marketing, it is also important to consider that information is now its own viable product. Although physical products, like agro-food products, do not have the same opportunities as services or digital products have in the Internet, information about the product has the same results for all categories of goods. Customers get benefits from the lower search cost when they search on-line for information about either a special software or a good wine. Especially for organic products, for which a large amount of information related to their characteristics is required by consumers, the Internet is the best information channel. Moreover, an agro-food company uses the lower consumer's cost-of-search through the Web as a competitive advantage.

Inversely, using the proper internet technology, companies can gather information from the consumers. In contrast to conventional marketing research methods, e-marketing research is cheaper and becomes more and more valuable as the Internet-population is more representative of the real population through time. This kind of research helps companies improve their products' quality, develop new products and in general catch' consumers' needs.

Kiang et al. [14] consider that for tangible goods, the most important factor that determines the suitability of internet marketing is the potential of product customization. Products with high potential of customization are cars, computer hardware, etc. Agro-food products, whose customization is not so high because of their inflexible mass production, are still more likely to do well on the Internet. Some agricultural products are currently produced to buyer specification in contract agriculture for B2B transactions [21]. Furthermore, today most agro-food products are valued for both physical attributes and information content, and this information content could be enhanced by the Internet in order to differentiate products. In general, e-commerce is going to facilitate the creation of supply chains for differentiated products and Babcock [1] believes that in the future agriculture will have more differentiated products than just commodities.

2.2 Place

E-commerce must be conceived as a fully qualified channel of distribution. For traditional industries especially, it is not just another alternative, but rather a high-potential complementary

channel to integrate within the general distribution policy, even if the full content of such a policy will probably be more than disturbed by the intrusion of e-commerce [6].

The major characteristic of e-commerce through the Internet technology is reach [30]. Reach is defined as "having the ability to connect with a large number of players or products". Klein and Quelch [15] discuss the global reach of the Internet in creating a larger marketplace. Firms have the ability to find a larger number of suppliers, to communicate and interact internationally with a larger number of companies involved in supply chain, and of course to acquire potential buyers anywhere a connection to the Internet exists.

Although this part the literature for e-commerce refers to disintermediation [11], the situation for agro-food and organic products is different and re-intermediation seems to be more realistic. For digital products, disintermediation is feasible, but for physical products, like agro-food products which usually have a large supply chain and cannot be delivered through the Internet, it is not. For such products, the need for intermediaries still exists. These intermediaries could take any form of the e-business model described before. Furthermore, since integration with warehousing, transport, inspection and insurance services are necessary, if the full advantages of e-commerce are to be realized, the role of intermediaries is enhanced and the creation of new specific middlemen in these areas is expected [22].

In the case of B2C or low volume B2B transactions, a balanced combination of 'virtual' and 'bricks and mortar stores' trade-off is needed. The brick and mortar firms have some advantages over the 'dot com' companies such as established brands, established customer base, established distribution networks, etc. What they don't have is the flexibility and the first mover advantage. Firms of agro-food products would benefit more from adopting a 'click and mortar' hybrid model [6] in which the buying act and the resulting order could take place on the web and the delivery could be done by the store located in the customer's neighbourhood. Of course, with this 'click and mortar' hybrid model, only a part of the transaction costs are saved.

Instead, in absolute B2B level, the saving in transaction costs could be significant, whatever the e-strategy is for retails on the web. In this case, internet technology in the application of intranets and extranets is suitable for big supply chains like those of agro-foods. E-commerce innovations aim to reduce the cost of procurement before, during and after the transactions [18]. Extranets can be set up to reduce the costs of dealing with suppliers by reducing task complexity, paperwork and operating costs. Development of such an internet system offers firms flexibility and control of production, but its main benefit is the convenience their customers (other firms or individual consumers) acquire.

2.3 Price

The Internet gives flexibility for every price policy a firm wants to follow. Through the internet price discrimination and special offers realized quickly any time. A Greek supplier of olive oil can use the technology to discriminate pricing between his customers in Greece and in the Netherlands, for example, when he tries to penetrate in the Dutch market with lower product's price. Or he has the ability to inform online his customers for various discounts - offers through e-mail.

But pricing on the net is a difficult task and usually prices are standardized because the internet has the potential to change the rules. Bickerton et al. [4] report that the Internet can force prices down, and finally set them close to marginal cost, for three main reasons: it makes easier for customers to choose between products, it reduces overheads making price cuts possible and it increases competition globally bringing greater pressure on prices. Generally, online access to

product and price information allows the comparison of products and increases price transparency.

2.4 Promotion

Promotion is the element of the marketing mix that includes all the ways a firm communicate with its product's merits and persuade target customers to buy for them [16]. Ellsworth and Ellsworth [8] argue that promotion have been revolutionalized by the www. A good web site can be used for advertising, brand name recognition, public relation, customer support and technical assistance.

The Internet has a powerful advantage in contrast to other communication channels that offers great opportunities to companies to promote products and services: the richness of information. Richness occurs in a virtual market since information flows in both directions are greater, deeper and faster than they are in a traditional market [30]. An example of this 'symmetric information' was the interactive information between buyers and sellers, discussed in section 2.1. Richness offers sellers the opportunity to improve target marketing and to receive higher quality feedback about product offerings.

Evans and Wurster [9] claim that such rich product information is most useful when the product has a strong connotative context and this is the case of agro-food and organic products. These goods carry two types that are not always identical: the natural appearance of the good and symbolic information attached to the good. Today the connotative content becomes more important. The need for safe, healthy and high quality food is bigger than ever and consumers are thirsty for information about what they eat. In the new economy, information technology considerably reduces the costs of providing and transmitting symbolic information in relation to the costs of transmitting natural information with the good [21]. A few second television messages or a printed advertisement can not include so much information as a web site can.

Traditional communications media generally involve a 'one-to-many' model for promotion when the Internet, because of its interactive nature, is also suited for 'one-to-one' communication and direct marketing. Although most companies involved in e-commerce still use online conventional promotional techniques by providing standardized information to a general audience, internet technology offers the ability for building customer profiles and consequently for established dialogues with individual customers. The knowledge of consumer s' characteristics helps firms improve target marketing and to create 'web-based personalization'. The latter term involves delivering customized content for the individual through web pages, e-mail or push technology [5]. Walsh and Godfrey [28] refer to the ability of the firms carrying out a constant online dialogue with their customers as an integral part of the personalization process.

The effect of branding is also assumed to be also important in internet marketing of agri-products, primarily because customers can not directly observe what they are purchasing and are thus unable to ensure quality. Consumer's loyalty is expected to be strong for established brand names, especially for new internet-users who explore familiar brands first [15]. The creation or maintenance of a brand name is not difficult through the Internet. Every company with the proper e-strategy can have a satisfactory interaction with its customers. Once a relationship is established, the customer needs to have a strong reason not to continue with it because of familiarity, commitment and a sense of belonging [28].

Furthermore, a main point concerning agro-food sector must be mentioned here. This is the lower promotional costs in the net. Promotion of products like food products requires a large amount of money and the relation of advertising and sales is strong [23]. This is a major barrier-to-entry for small firms that want to be (or survive) in business locally or internationally and of

course a competitive advantage for big and established firms. The Internet is not only the cheaper but also the most powerful communication medium nowadays. It eliminates differences and provides small and medium-sized enterprises (SMEs) with equal opportunities to build a direct link with consumers [27].

3. A survey for e-commerce and the agro-food sector in Crete

3.1 Objectives of the research

This research had two main objectives. The first was to investigate how Cretan agro-food firms and cooperatives use the new technology, and if they don't, their tendency to use it at least as a new marketing tool. The second objective of this work was to specify Cretan consumers' opinion and perspectives for e-commerce and agro-food.

The selection of the island as the geographic region of the research was not accidental because the agricultural sector is the most important for the economy of the island and it is a representative rural area for Greece. Crete is known for the quality of its agricultural products that, due to the good climate, are produced all year around. Most of the land cultivated consists of small and medium farms cultivating traditional products and there are several 'spin-off' industries involved in the packaging and shipping of these products. The economy of Crete presents a Gross Regional Product (GRP) per capita similar to the Gross National Product (GNP) per capita, while the primary activity in Crete represents 12% of the agricultural origin of national GDP [17].

Additionally, all kinds of industries in Crete present very high percentages in the use of new technologies in contrast to other areas in the country. In general, Greece has been slow to join the Internet revolution and many studies show that Greece lags behind other European countries on a wide range of Internet and e-commerce indicators or other indicators related to the use of information and communication technologies [7, 20].

It must be noted that Cretan agricultural cooperatives were also included in this study because cooperatives and unions of cooperatives possess a significant part of the agricultural movement in Greece. The majority of agro-food production, either organic or conventional, in this country comes from the cooperatives. But, although they have facilities and knowledge for the production of qualitative products that the international market demands, the last years suffer from inefficient administration and many economic problems [19]. The quick adoption of e-commerce practices could help them to re-organize their structure and to be more competitive and efficient.

3.2 Sample and methodology

In the beginning, 30 cooperatives and private firms were included in the sample and the criterion for their selection was that these firms considered as leaders and well-established businesses in Crete. Finally 23 of them responded to this survey, constituting 77% response rate. All the surveyed firms and cooperatives are producers of agro-food (wine, olive oil, fresh juices, etc), including organic, all exporters to Europe and to USA and all of the firms are characterized as SME's (less than 500 employees). The method used was personal interview with firms' marketing managers based on a questionnaire.

In order to exam consumer's perspective 118 Cretans asked. The sample includes people with different ages, both users and no-users of the Internet. The great majority of the sample con-

sisted of people who have a high level of education (75% -bachelors or higher degrees) and they are users of computers (89%). Among the respondents, 91% claim that they know about the Internet and some of its capability but only 80% are internet – users and their basic activities is the communication through e-mail and searching for information. Finally, 18% claim that they have already bought a product from the web, at least once, and 62% claim that they search for products of interest.

The survey was conducted in all the prefectures of the island (Chania, Rethimno, Iraklio, Lasithi) of Crete during the period April – May 2001.

3.3 Results and analysis

3.3.1 Firms' perspective

Beginning with the technological infrastructure of Cretan firms and cooperatives, Figure 1 shows that almost all of them have an electronic accounting system, but only few are equipped with information systems proper for e-commerce, like a kind of decision support system (DSS) and enterprise resource planning (ERP) systems. Moreover, these percentages do not represent the extent of use of these systems, for which in many cases there is doubt.

Ninety-six percent of the firms have access to the Internet and its major use is communication through e-mail. One of four firms have bought at least once from the Internet, but unfortunately none of the firms use the Internet for other important activities like online banking, bill-paying, B2B trading, supply chain management, etc.

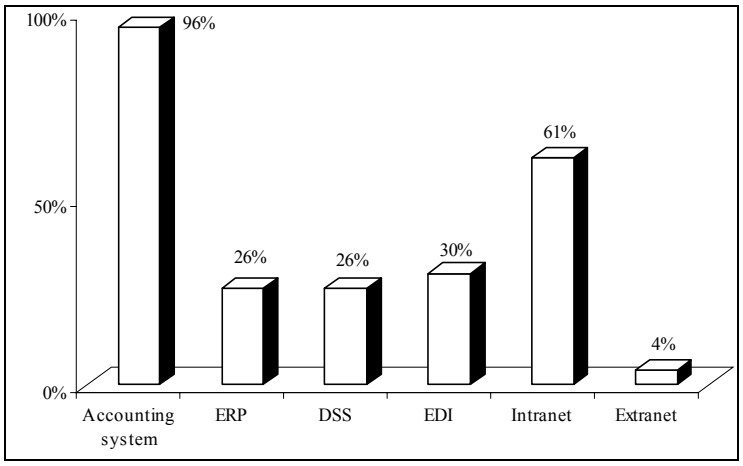

Figure 1. Infrastructure

Eighteen firms and cooperatives have a web-site that contain information about the firms (or the cooperatives) and their products. Eight of these web-sites have been functioning for more than two years and only three of these have a system for electronic orders and/or payments. A few managers mentioned that their firms started receiving orders through e-mails. After visiting the web-sites of surveyed organizations, another three web-sites were found with an electronic system for orders in construction. During the interviews, many managers complained about the low number of visitors in the firm's web-page while others noticed that their sites had already been seen, especially by many foreign agro-food firms which had proceeded to ask for further information or even collaboration.

The positive effect of electronic presence on the Internet for agro-food firms was not disputable by the respondents. Managers believe that through the Internet the relationships of the firm with consumers and other companies will be improved significantly (83% and 86% respectively), but will not happen at the same as the government and public sector (30%).

Their motivations for the adoption of e-commerce are presented in Table 1. Next to the reduction of cost of information, the stronger motivation for Cretan firms seems to be the ability for easier and cheaper penetration to new markets. Better respond to customers and the opportunity for e-marketing research are also considered important factors.

Table 1. Motivations for the adoption of e-commerce.

Motivations	Not important (%)	A little important (%)	Somewhat important (%)	Fairly important (%)	Very important (%)
Marketing research	0	9	35	26	30
Penetration in new markets	0	0	22	48	30
Better respond to customers	0	4	35	26	35
Higher competiveness	0	9	35	26	30
Products' differentiation	4	22	39	22	13
Lower cost of information	0	4	9	39	48
Lower cost of transactions	4	9	22	30	35

The main obstacles which e-commerce faces are the lack of security, the lack of law framework for electronic transactions and the small number of online agro-food businesses (Table 2). Interestingly enough, it is not a common belief that the nature of agro-products and the cost of the investment in new technology are prohibitions for e-commerce.

Table 2. Obstacles for the adoption of e-commerce.

Obstacles	Not important (%)	A little important (%)	Somewhat important (%)	Fairly important (%)	Very important (%)
small number of users	13	13	22	39	13
lack of law framework	4	4	22	48	22
lack of security	0	4	13	39	44
lack of e-agrocompanies	4	17	17	35	27
lack of knowledge for benefits	4	22	17	31	26
high cost for e-practices	13	22	39	22	4
lack of know-how	4	26	26	35	9
the nature of agri-products	26	13	13	26	22

Their future plans for e-commerce show that the adoption of the idea of e-commerce will be extensible, however, they give different meanings to the realization of such e-practices. More

than half of them are planning to start some kind of e-commerce or improve their current internet presence by the end of 2002, by developing anything from a simple web-page to a fully functional e-shop, while 30% are planning to do so by the year 2003 and 18% beyond 2004. Based on today's market situation, 61% hold a positive attitude towards an integrated e-shop with electronic orders and/or payments and among these, 7% would prefer B2C transactions in this e-shop, 36% B2B transactions and 57% both types of transactions.

Figure 2 depicts managers' thoughts concerning some of their marketing goals that can be realized online. They strongly believe that through the internet, firms can significantly achieve to monitor their markets (collection of information for competitors, trade trends, etc.), to gather information from their consumers in order to improve their products or develop new products, and improve the image of their products in consumers' minds. An online one-to-one marketing strategy could also have very positive results, but the enhancement of firms' brand names through the internet is still in doubt.

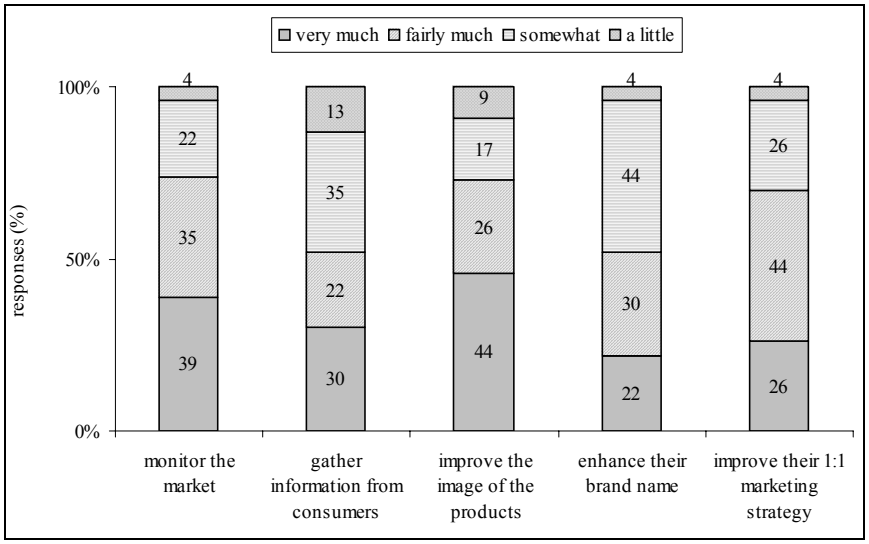

Figure 2. Infrastructure

Cretan agro-food firms and cooperatives are divided in two categories depending on the effectiveness of advertising of agro-food products in the Internet. They consider the Internet as any media available for promotion and advertising. Until now almost 40% of them have already done a kind of advertising (usually banners), but this advertising, as managers said, was for a very short period and only in Greek portals and sites related to their products.

Respondents were also asked to state the reasons why a possible promotion on the net might be unsuccessful. Beyond the mistakes that can be made by the firm in the promotional strategy, according to surveyed managers the interaction with individual consumers can fail not because consumers are indifferent for agro-products in the Internet (22%) but because consumers today are still indifferent for every product available online (61%).

Concerning online distribution and sales of agro-food products, 61% of respondents have the conviction that intermediaries can be reduced in long term, but only 10% believe that the Greek agro-food sector will be ready for transactions in the following 5 years. The motivation for such a delay is the absence of suitable infrastructure in agro-food firms and also the lack of trusted framework for conducting business between firms electronically. The positive point to be made here is that 35% of the firms have already been asked an electronic transaction by other firms trading with them to conduct.

In Figure 3, the activities which the surveyed firms want to achieve electronically with their suppliers are presented. Unfortunately, e-procurement activities like electronic payments and the acceptation of invoices from suppliers, that significantly help the logistics process, have low percentages in preference, when more simple procedures (but also important) like the identification of possible suppliers and electronic orders are mainly wanted. Very interesting is also the willingness for checking electronically the availability of supplies, that could be a good starting point for electronic cooperation among firms in the agro-food sector. Maybe the latter activity has become more important because of the large supply chain and the large demand of agro-food products.

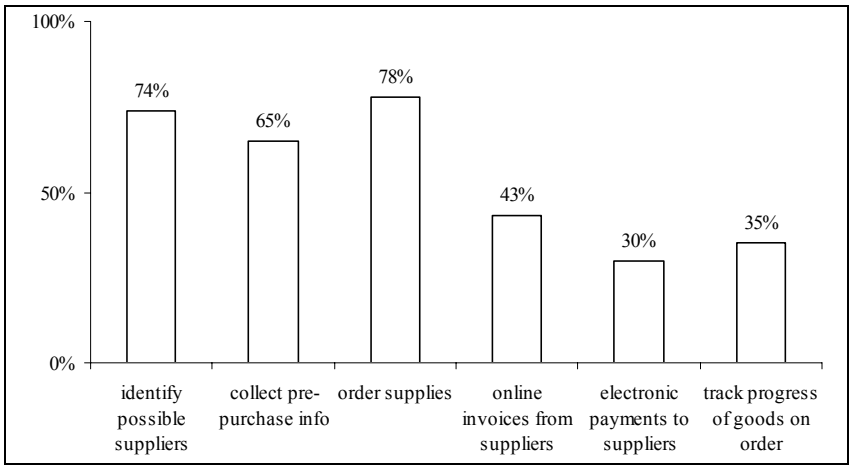

Figure 3. Online activities with suppliers

3.3.2 Consumers' perspective

Concerning consumers, sixty-three percent of the interviewed Cretans are willing to search for information about agro-food products in the Internet. The survey shows that consumers want information about the price, the quality and the safety of a product with the same intensity. A major reason for an online search for an agro-product is to seek for variety (62%). Additionally, the means for better price comparisons (48%) and the low availability of the product in the market (52%) also plays an important role.

One out of three consumers claims that information from the web can lead purchasing of an agro-food product from an offline store. Beside this fact and in contrast to what firms believe, the reason consumers will not search for information for an agricultural product in the net is not their general indifference to products available online, but rather their preference for the traditional way of gathering information for and conducting their shopping of agro-products.

Advertisement of agro-food products does not seem to play a major role in Crete as only 16% of respondents will pay attention to it. It is very interesting to notice that 41% of the consumers are willing to respond to questions concerning products, and 38% are willing to be informed by e-mail about a firm's offer during or after a visit to the firm's web-site.

Only 11% of the respondents hold positive attitudes towards online buying of agro-food products. The main reason for this is their strong belief that physical contact is needed for such products (78%). The oversupply of agro-food in the market (57%) and the lack of security in internet transactions (53%) are also important obstacles for consumers.

Consumers were also asked about the sale of organic products over the Internet. Almost all (99%) claimed that the Internet is a more suitable medium for organic products rather than for

conventional agro-products. One reason is that consumers acquire more information (about the ingredients, the way of production, etc) on organic products (75%). Furthermore, the availability of organic products in the physical markets is much lower than that of conventional products (48%).

Concerning the cooperatives of the region, all Cretans are of the opinion that a web-site with information and links for all Cretan cooperatives will be useful and interesting. Finally, when asking about what individual cooperatives' web-sites must offer to their visitors, 45% of the respondents want these web-sites to provide only information about the cooperative and its products, while 55% are interested in electronic ordering and payment capabilities.

4. Conclusions

It is widely accepted that traditional markets have began to be transformed into electronic markets and it is expected that the domination of e-commerce in every section of the economy is not far.

The impact of e-commerce on the agro-food sector is important and crucial for the future. Although agricultural products do not have the same opportunities as digital products online, agro-food firms should adopt e-commerce practices in order to benefit from the advantages that the new technology offers. The main point is that depending on the characteristics of agro-food products, the integration between the virtual value chain and the physical value chain becomes critical for the successful operation of e-commerce for such products. The Internet gives significant benefits both in B2C and B2B commerce - like lower transaction costs, easier penetration in international markets etc. - and internet marketing, based on the interactive nature of the medium, can find useful applications for agro-food business in various ways.

This study brought to light the slow rate of and the small extent to which the adoption of e-commerce to the agro-food sector in Crete is taking place. Even though the majority of Cretan agro-food firms and agricultural cooperatives have already started making their presence known in the internet by developing web-sites, they still keep the degree of customer impact provided by their web-sites to an informational level. Of course, this is the most basic level and a good starting point for their introduction to e-commerce, but the web-sites are just a means to provide static information, also available through traditional marketing. Cretan SMEs should be equipped with the proper technology and should create transactional and relational web-sites, that is to develop interactivity with their energetic or potential customers. This is the only way in order for these firms to exploit the great opportunities of internet marketing.

However, the investment in innovative technology is not the most important movement towards the new economy. The bigger obstacle for the Cretan agro-food sector is the absence of the philosophy and the understanding of e-commerce. The administration of these firms has not yet realized the full potential of e-commerce. The frequent confusion encountered in the answers given by the managerial staff shows incomplete knowledge about the full benefits that they can acquire.

This is especially true for the cooperatives, which the Greek government continues to subsidize and in many economy issues in order to encourage interest in agronomy. The fact that almost all of the surveyed cooperatives prefer a centralized e-shop for all Greek cooperatives as the best way for online distribution and sales is characteristic.

Cretan agro-food firms, however, have started to develop a tendency towards the use of information technology, especially the Internet, in order to initially achieve capabilities for B2B and

international transactions. Considering the results from consumers' survey, this seems to be the right first step. Consumers in Crete show a weak tendency towards online searching for and buying of agro-food products. For them, the nature of agro-food products is the main obstacle. Of course, in order to have a complete perception of this consumer behaviour, it should be realized that the penetration of the Internet in Greece is still small compared to other EU countries. Moreover, in Crete, many consumers are also producers of agricultural products.

Beyond the above, the most positive and very promising for the future findings, which were extracted from the current survey, are three:

- Agro-food SMEs in the island recognize that the internet is the new marketing medium in the twenty-first century and it can be suitable for the trade of their products.
- They tend to improve their current internet presence in the following three years.
- Managers of Cretan agro-food private firms and cooperatives are willing to learn more about e-commerce and its applications.

In conclusion, in contrast to familiar studies in developed countries [24; 3; 26], this exploratory research reveals the weak relation between e-commerce and the agro-food sector in Crete, as well as the need to provide the firms, either from government or academic institutions in Greece, with more accurate knowledge about and motivations for the adoption of the Internet technology.

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