

ICT APPLICATIONS IN THE SUPPLY CHAIN OF GREEK AGRICULTURAL COOPERATIVES

Dimitra – Nefeli Makri¹, Athina Skandalou¹
Vasiliki Manthou¹, Maro Vlachopoulou¹

¹Department of Applied Informatics, University of Macedonia
dnefeli@hotmail.com, athskandal@yahoo.gr, manthou@uom.gr, mavla@uom.gr

Abstract. The agricultural sector plays a crucial role in the Greek economy. Cooperatives are an integral part of the agricultural sector and the logistics cost impacts the pricing policy of the agricultural products, taking into consideration the value added of all trading partners along the supply chain. Many governments all over Europe pay special attention to this issue trying to make agriculture prosperous by using information systems and technology (IS/IT). The aim of this study is to identify the present situation of ICT applications regarding the value added logistics processes of the Greek agricultural cooperatives. Especially, the role of specific information systems is examined in order to estimate the impact of logistics applications and partners in the cost of the products. For this purpose a questionnaire regarding the above issues was given to the Greek cooperatives. Almost all the cooperatives are characterized as Producers' Cooperatives and are focused more on packaging and warehousing logistics operations. The application of Quality systems in the Greek Agricultural Cooperatives has been imposed mainly by the customers' concern for the quality of the product and the protection of the environment. Although the respondents recognize the contribution of ICT in their supply chain management, the research concludes that the majority of Greek cooperatives is not aware of IT/IS in great extent and this derives from the inadequate organizational culture and education.

Keywords: Agricultural Cooperatives, Supply Chain, Product Cost, Logistics, Information Systems and Technology

1 Introduction

The agricultural sector plays a crucial role in every economy. Agricultural Cooperatives are an integral part of the agricultural sector and they constitute an important part of the supply chain.

All over Europe, Cooperatives are present in many sectors of the economy, like agriculture, banking, retail, insurance, and health care. The 132.000 cooperatives in the European Union employ 2.3 million people (European Union, 2001). They are

Copyright © by the paper's authors. Copying permitted only for private and academic purposes.

In: M. Salamasis, A. Matopoulos (eds.): Proceedings of the International Conference on Information and Communication Technologies

for Sustainable Agri-production and Environment (HAICTA 2011), Skiathos, 8-11 September, 2011.

dominant in agriculture. For example, in 1996 the market share of cooperatives in agriculture was 83% in the Netherlands, 79% in Finland and 55% in Italy (Hendrikse, 2004). In another study, Skurnik and Vihriala (1999) observed that in the European Union there are well over 30,000 rural cooperatives with some 12 million memberships, having over 50% of shares in the supply of agricultural inputs and over 60% of shares in the collection, processing and marketing of agricultural products.

Agricultural product logistics is a branch of modern logistics industry and it means the physical flow process of agricultural products and relevant information from the agricultural product producing center point to the agricultural product consuming. It includes the producing, purchasing, transporting, loading and unloading, packaging, warehousing, distributing, selling, and information activity. It involves the producing field, circulating field and consuming field of agricultural products, and connects the supplier and consumers. The aim of the Agricultural Product Logistics Development is to conquer the obstacle of time, cost and space, to put forward the efficient and fast transportation and storage services for agricultural products, to enhance the values of agricultural products, to save the circulation cost, and to elude the market risks to some extent. (Chen and Xie, 2007).

The aim of this paper is to identify the impact of specific information systems on the value added logistics processes of the Greek agricultural cooperatives. There are two crucial questions to be answered. a) How the cost of the agricultural product is affected by the Supply Chain procedures. b) How can IS/IT, through strategy and ICT application, optimize the relationship between product cost and farmer's profit. All the implicated entities in the supply chain such as farmers, producers, intermediaries, traders and consumers are examined. The paper begins with a literature review on agricultural cooperatives, the implications of agricultural product logistics on the supply chain and the IS/IT used in the agricultural sector. In the next section, the research methodology is presented, as well as, the data analysis that resulted from the statistical processing of the questionnaires. Further to the factors identification, the results are discussed and conclusions are presented.

2 Literature Review

According to the International Cooperative Alliance (ICA), Cooperative is an automatic alliance of members which is structured voluntarily in order to confront mutual economic, social and cultural needs. Agricultural Cooperative can be defined as a "society" which belongs to users (farmers and producers), is controlled by them and its principal aim is to safeguard the interests of its member, to pursue research into the latest developments in the agricultural cooperative movement and to promote mutual understanding and economic collaboration between the agricultural cooperatives on one hand and the farmer and other types of cooperatives on the other hand (ICA, 1995).

Hansmann (1996) presented a framework establishing four types of organizations, along with their owners in order to explain their targets (table 1)

Table 1. Organizations – Owners – Target

Organizations	Owners	Target
Producers' Cooperatives	Producers-Suppliers	Maximize the price
Workers' Organizations	Labor force	Maximize the wage
Investors' Organizations	Capital	Maximize the profit
Consumers' Organizations	Consumers	Minimize the price

Source: Hansamann, 1996

The researchers put the agricultural cooperatives in the category of Producers' Cooperatives, since farmers are the actual producers. In Greece, the cooperatives were created, not as a state decision which was imposed on farmers, but by farmers, in order to protect their property. In Greece, the history of cooperatives started, back in 1900 (Almiros Volos). This was an automatic association established voluntarily to meet common needs through a co-owner and democratically-run business. The function was defined by the statutes and specific provisions. Members were all individuals who had direct connection with farming.

According to the Statute of operating Agricultural Cooperatives, some of the values and objectives of an agricultural cooperative are, solidarity, cooperation among producers, free will, democratic- improving economic and social life, support and development of agricultural incomes. However, cooperatives are facing some problems. These problems primarily refer to, introversion of Agricultural Cooperatives, underfunding, petty interests within the cooperative, disconnect the needs of farmers from rural legislation (CAP, single payment, State Agency's (referring to buying and selling) Code), lack of co-operative idea, and lack of technological infrastructure.

Finally, regarding the present conditions of the Greek agriculture, there is great reduction of the volume of agricultural production (promoted by European funding), whereas there is a reduction in exports and increase in imports. As a result shrinking of agriculture's contribution to GDP is noted. Furthermore, the last few years, banks kept lending farmers. However, due to the financial crisis, banks became very strict regarding borrowing procedures. If this does not change, producers will gradually abandon their farms.

A useful tool for the analysis of agricultural cooperatives' environment is the model of PEST (**P**olitical **E**conomic **S**ocio-cultural **T**echnological) (Nelsen and Scolbe, 2006). According to it, economical factors are dealt with the agricultural section and the conditions which compose the total economy. Political factors have an impact, direct or implicit, in the policy of the cooperative. Socio-cultural factors along with the institutions, tendencies and perceptions mold the consumptive standards and consequently the cooperative's policies. Finally, technological factors affect to a great extent the development of new products and the producing processes.

Processes that take part in the supply chain are distribution, warehousing, transportation, packaging, customer service, and procurement (Lambert, 1993). Warehousing and distribution deal with the location, the ownership, the automation and the cost. Transportation aims for speed, reliability, flexibility and cost. Packaging

affects a company's sales and for this reason its target is the quality protection, the product preservation and the safe and easy cargo transport of the product. Customer services' principles are focused on dependability, time, convenience, communication, honesty and cost. Last but not least, procurement's goals are to improve the quality and reduce the cost, remove the obstacles to the free flow of information to supply chain, create real-time visibility into inventory in motion, and eliminate the long lead-times for critical materials (Gourdin, 2006).

Quality Control is of utmost importance in the agricultural sector in general and in agricultural cooperatives in particular. Consumers demand not only higher levels of safety in the products (Hobbs et al, 2002, Baltzer, 2004), but they also express their anxiety through their choices for the environment protection, and the health protection of farmers and animals (Buzby, 2001). All these changes in consumers' preferences and values have been affected by the various food scandals like dioxins, mad-cow disease or dangerous fertilizers and consequently consumers, are doubtful about the quality and safety of the food (Knowles et al, 2007). Agricultural cooperatives try to improve their image in order to meet consumers' needs (Hendrikse, 2004). They need to expand in existing markets or develop new markets in order to promote their products, while it is obvious that internal processes have to be improved in order to increase their volume and services (Burt, 2004). One of the goals of the agricultural cooperatives by the application of control systems is to reduce production costs and improve product prices. According to Burt (2004), Agricultural Cooperatives try to improve their profitability in terms of increasing the net income. Control systems have been conceptualized in terms of implementing an organization's strategy, and ensuring continuing competitive advantage and quality control (Simons, 2002). International Life Sciences Institute –of India (2007) recognizes also the importance of monitoring and the surveillance of agricultural cooperatives by the administration. The above factors have led to the development of Management of Health and Food Safety systems which are based on HACCP (Hazard Analysis and Critical Control Points) and ISO 22000:2005 Management of Food Safety. Apart from them, a variety of certified systems have been created like ISO 9000, ISO 14000:1996 Environmental Management Systems and AGRO 2.1 and AGRO 2.2 which are based on Integrated Management of Production.

Today's agricultural sector has to face critical challenges from internal and external sources, such as farmers and traders. This development coincides with the increasing pressures on the agri-food sector to intensify process controls and to improve quality, food safety, tracking and traceability of products throughout the supply chain, and the environmental consequences of its operations. Information Technology and Information Systems are the key enablers to respond to these challenges (Vlachopoulou, M. and Matopoulos, A. 2010; Matopoulos et al, 2009). Information systems combine the internal and external needs of an organization, with the future requirements (Gourdin, 2006). Efforts are made to integrate IS/IT opportunities in an appropriate way into agricultural activities. IS/IT refers to a rapidly expanding range of services, methods, techniques, applications, equipment, and electronic technologies used for the collection, manipulation, processing, classification, storage, and retrieval of recordable information and knowledge sound, and graphics, including video. Such technologies include computers, personal digital assistants (PDAs), Automatic Identification and Data Capture (AIDC), Radio Frequency

Identification (RFID), high-capacity storage, networks, telecommunications, databases, data warehouses, multimedia, the internet and its world wide web. Applications include Geographic Information Systems (GIS), Supply Chain Management (SCM), Enterprise-Resource-Planning (ERP), Transport Management System (TMS), Warehouse Management System (WMS), online services, video conferencing, electronic trade, executive information systems (EIS), electronic mail, and expert systems (Schiefer, 2003).

The above technological developments provided another point of view, established customers' protection, and enhanced the traceability function of the agricultural economy. A basic scheme of traceability systems is that a unique ID is assigned to each identification unit (lot) of the products and an ID label or tag is attached to it. On the premise of RFID application, a simple and versatile at the same time database to input and refer unified distribution process records was designed. The key concept of traceability is that a temporal identification unit is an "event" which is recorded at each point of the distribution process. Data of an event record consist of an event ID, a point ID, event time, and involved lot IDs. Basic types of events are "movements" of lots such as incoming or outgoing and "transforms" of lots such as combination, division, processing, or packaging (logistics' parts of the supply chain). By cross-referring the event IDs and the lot IDs on the database, it is possible to trace forward and back the individual products on the distribution process which helps a lot both customers and wholesalers to trace their products for various reasons. Based on this database, an on-site data recording system was developed by applying RFID tags which contain unique IDs, handy RFID readers which enable wireless LAN, and an Internet-accessible database server. On the events of the distribution process, the users read the RFID tags attached to the individual lots by using the RFID readers, and these records are sent to the database server via the Internet, where are processed for any reason. The users can retrieve and refer the whole distribution process records in the database (Sugahara, 2007; Manikas, et al, 2010).

Although the significance of IS/IT for the agricultural cooperatives is great, their use is difficult since it involves people, technology and processes (Lowry, 1997). IT/IS impacts the organization, and organization affects the use of IT/IS. Boynton et al (1994), Zawawi et al (2011) found that information technology knowledge is a dominant factor in explaining the high level of information technology use in organizations. Burn et al (1997), Xiao & Dasgupta (2005) found that its adoption and use depends strongly on organizational culture, showing thus good management leadership.

3 Methodology

The performance criteria that have been identified during the literature review process were used as a basis for the construction of the questionnaire that was mailed to 30 sustainable Agricultural Cooperatives all over Greece, taking into consideration geographical spreading. The Ministry of Agricultural and Rural Development was the source for locating rural cooperatives in Greece. A telephone contact took place before sending the questionnaire to the cooperatives, in order to introduce the scope

of the study and to emphasize the significance of their participation.. Apart from the first contact, each member received an initial email, consisting of a short description, explaining officially the aim of the research, accompanied by the questionnaire. Within 30 days after the first contact, two reminders were forwarded to the non-respondents.

In total, 10 viable responses were received, resulting in 33% response rate. Ethical issues like economic profit, respect for the laws, quality and quantity impact, and safety issues were taking into consideration in our research questions (Diouf 2001). The questionnaire begins with general information about the cooperatives like the respondents profile, the kind of the generated products, the involved partners, supply chain / logistics processes and growth factors as well. Furthermore, our attention is focused on control and quality standards, factors affecting pricing, specific logistics application and ICT use. A Likert scale (1-5 range, 1=completely insignificant, 5=significant significant) was used. . The research is based on primary data collected from agricultural cooperatives targeted in the territory of Greece so as to have more reliable results, covering a great variety of products.

4 Research Findings - Discussion

The questionnaire regarding the above research study contains fifteen questions. Although, the response rate was small, the agricultural cooperatives that answered our questionnaire are sustainable and are these which apply a significant part of logistics functions in accordance with the processes of the supply chain. In the first part the questions aimed at the cooperatives profile. An important issue was to define the type of organizations involved in the exchange of products in accordance to table 1. According to the answers, almost all the cooperatives are characterized as Producers' Cooperatives. Producers are interested in good prices, stability and continuous interchange with Cooperatives. The Cooperatives take products from producers and then pass them into the market. This operation results in no communication between Cooperative and Consumer, or in other words there is no direct communication or a system that connects these two parts. On the other hand the Cooperatives are not directly connected with Workers' Organizations or Investors' Organizations. That shows they are not interested in the growth of the profits regarding the investors, but only in the growth of the profits for producers.

One of the most important findings is related to the crucial role that the legislation plays for the development of the agricultural co-operatives (Figure 1). It seems that the issue of the government Legislation implies the policy that this organization is going to follow. The issues of Technology and Know-How, governments' political movements, and the international security seem also to be important for the cooperatives.

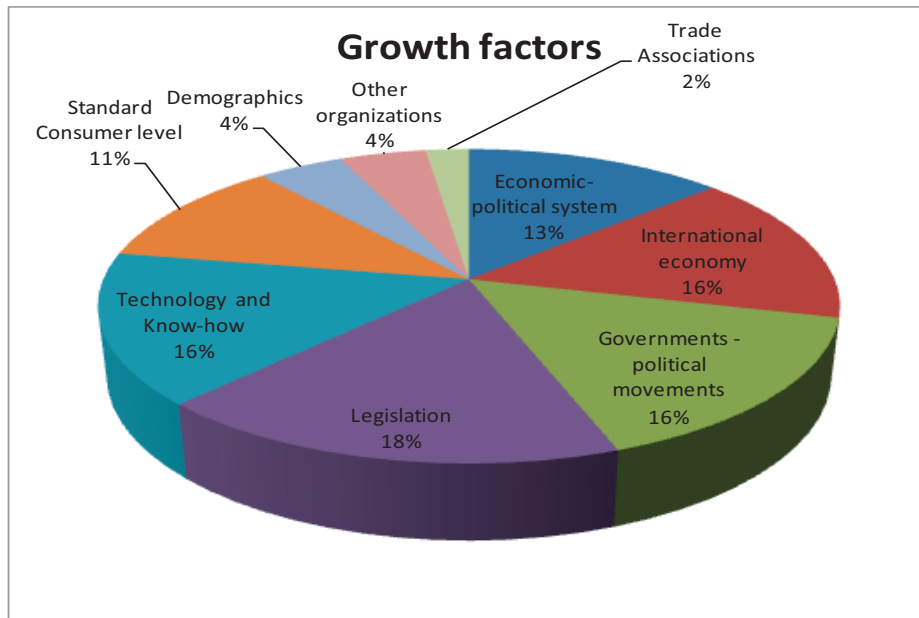


Figure 1. Growth factors of agricultural cooperatives

The findings are congruent with similar studies that outline “Legislation” and “Technology-Know how” as the most important factors stated by logistics companies (Rodrigue at al., 2001).

But how can all these parameters and why do they, play so crucial role for Agricultural Cooperatives? The question still remains. This could be more intelligible if we had a deeper knowledge concerning who is the main Supplier of the raw material for the production of the agricultural products. Some possible choices of trading parties that are usually suggested by a great range of bibliography (Martinez L. and Thornsby S. 2006; Fang W. and Tan Y. 2010; Ortmann GF and King RP, 2007) are

- Producers- Farmers
- Other Cooperatives
- Wholesalers – intermediaries
- Other

In our research 69% of trading partners constitute the producer-farmers (table 2) where their significance in the activation of the Supply Chain is obvious.

Table 2. Trading parties in Agricultural Cooperatives

Producer-Farmers	69%
Wholesalers – intermediaries	31%

Other Cooperatives	0%
--------------------	----

According to a study by Wensong and Danfeng (2004), in America and in Europe agricultural cooperatives are focused more on distribution and customer service-product marketing while in Greece they are focused on packaging (25%) and warehousing (23%) (figure 2).

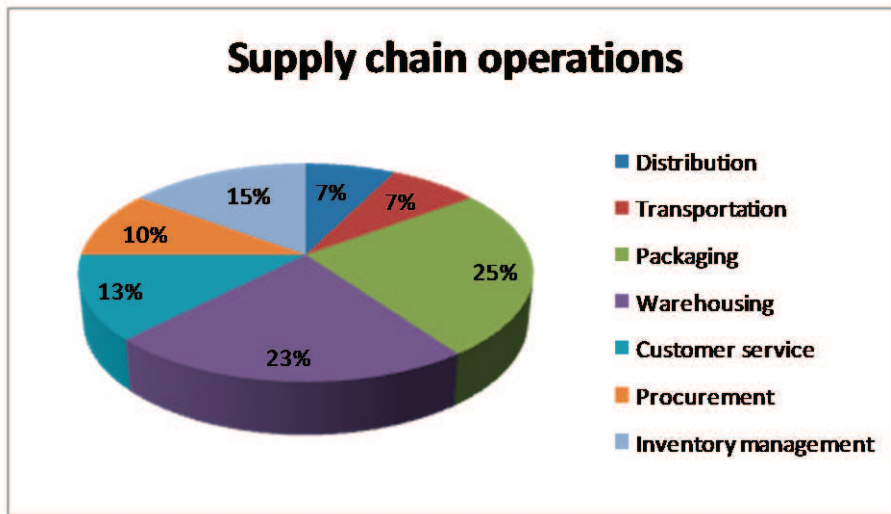


Figure 2. Operations of supply chains in agricultural cooperatives

The majority of Greek cooperatives is not aware of IT/IS in great extent and this derives from the inadequate organizational culture and education. It is worth to be noted that only 3/10 apply an ERP system while only one of them - the Agricultural Cooperative of Velvento, called “Dimitra” states the use of a WMS, as well. As for TMS or WMS, the rest of the respondents don’t recognize the use of such systems, thus, indicating the lack of integrated IS usage.

Furthermore, at this point is very important to note, that nothing would have advanced technologically, with such a fast rate without the decisive intervention of traceability.

Traceability Systems for Agricultural Products Distribution based on RFID (Radio Frequency Identification) technology were developed. Historically, the first efforts for standardization and establishment of Greek standards are made in 1970 by various bodies and chambers that are trying to create a specification without having impressive results.

Quality control goes together with the quantity control. The most popular certification system for quantity is the ISO systems. Agricultural cooperatives, in order to avoid fatal errors, should apply the technique of traceability. Regarding the ISO systems used in Greece, the majority of the respondents in the questionnaire apply HACCP, ISO 2200:2005 and AGRO 2.1 and 2.2. It is important to point out

that the above applications have been imposed mainly by the customers' concern for the quality of the product and the protection of the environment.

The application of Quality systems in Agricultural Cooperatives is based on a variety of factors. The table below (table 3) presents in which extent the quality standards are important for the agricultural cooperatives in order to incorporate Management of Health and Food Safety systems.

Table 3. Factors affecting the use of control

FACTORS	REFERENCES	PERCENTAGE
Demanding customers	Hobbs et al, 2002, Baltzer, 2004	8%
Image Improvement	Hendrikse, 2004	8%
Expansion into new markets	Burt, 2004	9%
Increase customer satisfaction and reduce customer complaints	Buzby, 2001	10%
Need to improve internal processes	Burt, 2004	8%
Need for better surveillance by the administration	International Life Sciences Institute – India, 2007	8%
Reduce production costs	Burt, 2004	8%
Improving profitability	Burt, 2004	9%
Due to competition	Simons, 2002	5%
Developing competitive advantage	Simons, 2002	8%
Quality policy	Simons, 2002	9%

The majority of the Agricultural cooperatives (60%) consider that the application of control systems is efficient while the remainders (40%) consider that this control is extremely significant. Agricultural cooperatives taking into consideration the above factors, apply all the necessary systems in order to satisfy their needs and customers' needs, as well. At the same time, ISO or HACCP affects in a great extent the products' prices as 70% of the Agricultural Cooperatives changed their pricing strategy after the application of these systems.

Apart from the use of control, the agricultural cooperatives' pricing strategy is affected by other factors. Dealers' room affects their policy to the greatest extent – in a percentage of 43% - and this means that the competition is increased while rates of super markets influence them in a percentage of 36%.

Our attention is focused in particular processes of supply chain, referring to transportation, packaging and warehousing.

Table 4 indicates transportation alternatives. Owned vehicles use is preferred less than outsourcing transportation.

Table 4. Transfer from Cooperatives

3PL	39%
Owned vehicles	23%
Other	38%

According to the respondents the main goal of the transportation, it is to minimize total cost and time (half of the respondents consider that this goal is very important while 30% of them consider it important).

Packaging constitutes a central process of Greek Agricultural Cooperatives and thus the relative decisions are of utmost importance. These decisions are based on managers' opinion (24%), the opinion of the marketing department (24%), consumer claims (32%) and competition (20%). Since packaging appears as a key element for the total product image, the objectives of the packaging function was investigated. Table 5 presents the most considerable packaging objectives.

Table 5. Objectives of packaging

Facilitating consumer	18%
Protecting product quality	26%
Better maintenance of the product	19%
Easy and safe distribution	26%
Other	11%

Last but not least, warehousing is another process of supply chain in agricultural cooperatives. They choose deliberately one of the following ways of warehousing as each one of them try to satisfy their private needs and achieve their target. The ways to store products are focused on owned facilities (54%), external partner (23%) and rented premises (23%).

Taking into consideration the responses of the cooperatives, a Supply Chain Management System could be a possible solution to the problems the cooperatives face. Special attention should be given to the entities and the corresponding goals (table 6) and should be considered.

Table 6. System entities and objectives

OBJECTIVES OF THE USE OF THE SYSTEM USERS - PROFESSIONALS	<p>To have a picture of those involved in the process</p> <p>To be able to order raw materials offered by the cooperative</p> <p>To have a picture regarding to</p> <ul style="list-style-type: none"> - the structure of the cooperative - the economic drive of the cooperative - the products traded - the views of local farmers - ordering
--	--

OBJECTIVES OF THE USE OF THE SYSTEM USERS – BUYERS	- The structure of the cooperative - Economic drive of the cooperative - Products traded - The views of local farmers - Ordering (HL / CR CART)
OBJECTIVES OF THE USE OF THE SYSTEM ADMINISTRATORS	Filling the site with reports Clear and reliable details of any current order. Clear and reliable information of each order (address and telephone customer) Identify orders that are the most urgent (depending on the time of order) Monitoring the order status

5 Conclusions

The majority of trading parties in agricultural cooperatives in Greece are composed of producers and suppliers, thus their principal aim is to maximize the price of the products that they merchandise. Every agricultural cooperative is obliged to follow the legislation and the specific rules that European Union has established.

The complexity of the agricultural processes is an important issue and thus proper attention must be drawn to the selection and evaluation process of supply chain in agricultural cooperatives. The aim of this study was to identify the key measures of the Greek agriculture cooperatives examining the existing situation of information systems as integral parts supporting logistics applications.

According to our research, agricultural cooperatives deal with fresh products and natural origin products. Consequently, they follow different strategies and techniques having as basic criteria the type of the product that they merchandise. It is important to mention that fresh products demand special treatment in packaging, transfer and every process of the supply chain tries to solve special problems whenever specific prerequisites are necessary. Packaging is important for the maintenance and the protection of the products and at the same time affects the consumers' choice of the product. It limits the risk derived from warehousing and transportation of the product. On the other hand, the ownership of warehousing facilities or the use of third party logistics (3PL) is a strategic decision. It affects inventories, customer service, and product cost. The connection between the price and processes is interdependent and vice versa. However, the basic goal of an agricultural cooperative still remains the effort of balancing the cost, the profit and the maintenance of the product with business consumers and producers. Last but not least, it is the process of transportation between the supply chain nodes. The decision between the use of owned vehicles or the use of a 3PL, aims at the elimination of cost and time.

The most significant factors, resulted from the research, are considered to be the following:

- Greece has an old-fashioned technological infrastructure

- Although in Greece there are companies that can provide cooperatives with the appropriate software, the staff is inexperienced and there is lack of know-how
- The management of the agricultural cooperatives does not take into consideration the significance of logistics, and as a consequence its development is very limited
- Farmers and producers believe in the institution of the agricultural cooperative as it can provide better prices and services and this is the reason that cooperatives can and should develop their logistics operations based on new technologies and information systems...
- Processes of supply chain that are already applied in agricultural cooperatives in a great extent are packaging and warehousing

A proper integrated system of data selection and monitoring regarding products' transfer supported by new technology and information systems aims to a normal logistics function of the cooperative and generally to the recording of every condition occurring in the cooperative. Thus, the agriculture cooperative could achieve the overall supervision of the movement of the products in the supply chain.

Taking into consideration the problems the cooperatives face, as well as the low use of ICT, the integration of a Supply Chain Management System in the cooperatives should be examined. Furthermore, the cooperatives' portals should be enhanced or developed to include forum for better communication among their members, and negotiation of prices. These portals could be managed by government institutions supporting them technologically or by individuals with appropriate personnel training.

References

1. Baltzer K. (2004). Consumers' willingness to pay for food quality-the case of eggs. *Acta Agric, Scand. Sect. C. Food Economics*, Vol. 1, pp. 78-90
2. Boynton A.C., Zmud R.W. Jacob G.C. (1994). The influence of IT Management Practice on It Use in Large Organizations, *MIS Quarterly*, Vol. 18, No. 3, pp. 299-318
3. Burn J., Davison R. & Jordan E. (1997). The Information Society – A Cultural Fallacy? , *Journal of failures and Lessons Learned in It Management*, Vol. 1, No. 4, pp. 219-232
4. Burt L. (2004). *A Brief Introduction to Agricultural Cooperatives*. Oregon State University, Corvallis, Oregon, United States.
5. Buzby J.C. (2001). Effects of food-safety perceptions on food demand and global trade, *Changing Structure of Global Food Consumption and Trade/WRS -01-1*, Economic Research Service/USDA, Washington, DC.
6. Chen L.Q. and Xie Z.Z., (2007). Discussion and analysis of logistics development of farming product in China under the model of management of Supply Chain, *Science Technology and Industry*, Vol. 7, pp. 37-41

7. Diouf J.(2001). Ethical issues in food and agriculture. Food and Agriculture organization of the United States, Rome.
8. European Union, (2001). Cooperatives in Enterprise Europe, Commission of the European Communities, Brussels. (<http://www.cpfund.ca/pdf/co-operatives-in-enterprise-europe.pdf>)
9. Fang W. and Tan Y. (2010). The Wholesale Market as the Core of Aquatic Products Supply Chain Management Model. Commercial college of Central South university of Forestry & Technology, Changsha, Hunan, China.
10. Gourdin K. (2006), Global Logistics Management: A Competitive Advantage for the New Millennium, Blackwell Publishing, Oxford, United Kingdom.
11. Hansamann H. (1996). The ownership of Enterprise. The Belknap Press of Harvard University Press, Cambridge, United Kingdom.
12. Hendrikse G.W.J. (2004), Restructuring Agricultural Cooperatives. Erasmus University Rotterdam, Rotterdam School of Management, Rotterdam, Holland.
13. Hobbs J.E, Fearn A. & Spriggs J (2002). Incentive structures for food safety and quality assurance: An international comparison, Food Control, Vol. 13, pp. 77-81
14. ICA, (1995). The International Co-operative Alliance Statement on Co-operative Identity, Review of International Co-operation, Vol. 88, No. 3, pp. 3-4
15. International Life Sciences Institute – India (2007). A surveillance and Monitoring System for Food Safety for India (<http://www.ilsindia.org/PDF/Conf.%20recommendations/Food%20and%20Water%20Safety/Food%20safety%20Surveillance%20and%20Monitoring%20System%20for%20India%20-%20Final.pdf>)
16. Knowles T., Moody R. & McEachern M.G (2007). European Food scares and their impact on EU food policy. British Food Journal, Vol. 28, No. 6, pp. 43-67.
17. Lowry R.G. (1997). Postgraduate research training for information systems: improving standards & reducing uncertainty, 8th Australian Conference on Information Systems.
18. Manikas I., Manos B., Vlachopoulou M. and Manthou V. (2010). A case study evaluation of the factors affecting fresh produce traceability. International Journal of Business Innovation and Research, Vol. 4, No.3 pp. 232 – 255
19. Martinez L. and Thornsbury S. (2006), U.S. Fresh produce wholesale sector trade practices: Initial survey results. Department of Agricultural Economics, Michigan State University. East Lansing, USA.
20. Matopoulos, A., Vlachopoulou, M. and Manthou, V. (2009). Understanding the factors affecting e-business adoption and impact on logistics processes, Journal of Manufacturing Technology Management, www.emerladinsight.com/1741-038X.htm , Vol. 20, No. 6, pp. 853-865
21. Nelsen J. and Scolbe M. (2006). Social License to Operate Mines: Issues of Situational Analysis and Process. Department of Mining Engineering, University of British Columbia, Vancouver, Canada.
22. Ortmann GF and King RP (2007). Agricultural Cooperatives I: History, Theory and Problems. Agrekon, Vol. 46, No.1.
23. Rodrigue J.-P., Slack B., Comtois C. (2001). Green Logistics (The paradoxes of). Published in A.M. Brewer, K.J. Button and D.A. Hensher (eds), The Handbook of Logistics and Supply-Chain Management, Handbooks in Transport #2, London.

24. Sugahara K. (2007). Traceability system for agricultural products based on RFID and mobile technology, National Agriculture Research Center, Kannondai 3-1-1, Japan.
25. Schiefer G. (2003). New Technologies and their impact on Agriculture, Environment and the Food Industry, EFITA Conference 5-9. July, Debrecen, Hungary
26. Simons R. (2002). The role of management control systems in creating competitive advantage: New perspectives, Harvard University Graduate School of Business Administration, USA
27. Skurnik, S. and V. Vihriala (1999), Role of Cooperative Entrepreneurship in the Modern Market Environment: Introduction and Summary. The Finish Journal of Business Economics, Vol. 48, No. 4, pp. 375-383.
28. Vlachopoulou, M. and Matopoulos, A. (2010). ICT and E-business in the Food Supply Chain, In the book titled: "Delivering Performance in Food Supply Chains" (Eds: Mena, C. and Stevens, G.), Woodhead Publishing Ltd, Cambridge, UK, pp. 416-431, ISBN: 9781845694715.
29. Wensong Z. & Danfeng L. (2004). Logistic System Comparison in Agriculture – US, European and China, School of economics and management, Beijing Jiaotong University, P.R. China
30. Xiao L. & Dasgupta S. (2005). The impact of Organizational Culture on Information Technology Practices and Performance. The George Washington University, Washington, DC.
31. Zawawi A.A. , Zakaria Z., Kamarunzaman N.K., Noordin N., Mohamed Sawal M.Z.H., Junos N.M., Najid N.S.A (2011). The Study of Barrier Factors in Knowledge Sharing: A Case Study in Public University, Management Science and Engineering, Vol. 5, No. 1, pp. 59-70