Farmers, Intermediaries and ICTs in an Agricultural Community in Greece- an ethnographic study

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One apple a day keeps the doctor away...
I. Abstract
The purpose of this thesis is to assess the implications of Information Communication Technologies (ICTs) on the agricultural supply chain in Greece by examining the relationships between farmers and their intermediaries, and their interactions during the buying and selling process. More specifically, the focus of the research takes place in Pouri, a small village in central Greece whose economy centers around Apple Farming, where we can observe the exchange of locally grown goods between farmers and middlemen. The thesis consists of two parts; the first part examines how Greek farmers perceive the process of buying and selling agricultural products and how they respond to problems within their current structure; through observing processes, conducting interviews and collecting narrative stories to identify the issues, we assess whether it would be advantageous for farmers to implement ICTs as part of the solution. The second part consists of a review of academic literature in order to examine the same or similar situations in the agricultural supply chain of other global regions and their economic contexts. Lastly, a thorough thematic analysis of the research data provides a better understanding of the issues facing farmers and their needs as they pertain to ICTs, in order to improve the agricultural supply chain and the entire rural sector.

II. Keywords
Agricultural Products, Farmers, Intermediaries, Apples, Buying and Selling, Information Communication Technologies (ICTs)
III. Acknowledgements

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IV. List of Abbreviations
ELSTAT- Hellenic Statistical Authority
EU- Europian Union
CAP- Common Agricultural Policy
FAO- Food and Agriculture Organization
ICT- Information Communications Technologies
GPD- Gross Domestic Product
ICT4D- Information Communication Technologies for Development
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1. Introduction

The agricultural sector in Greece is currently facing many issues affecting the supply chain; the current focus of the debate is on the potential solutions that may be implemented and the opportunities for growth and continued development. The economic context around these issues takes into account the 2008 Greek economic crisis and worldwide economic recession, which affected the rural sector and its funding.

Over the last few years, the Greek agricultural sector has been in a constant state of flux both politically and economically. In recent years, the transformation of the agricultural sector has seen gains due to the Common Agricultural Policy (CAP) in 2003, and a larger push in 2008 spurred by the economic crisis.

The critical research conducted in this dissertation presents the current situation of the agricultural supply chain and the economic and political context in Greece as compared to other global regions facing similar concerns, to address both the current and future implementation of ICTs within the rural sector with supporting evidence from academic works and literature.

Below, the context in which the research was conducted is established through information indicating the scale of the agricultural sector in Greece and a more general overview of the economic and political landscape.

According to the data provided and published by the Hellenic Statistical Authority (ELSTAT) on 2016, Greek total land consists of 132,049,000 km$^2$ or 132,049,000 stremmas or 13,204,900 hectares. The dedicated agricultural land area is 33,341.1 thousand stremmas or 3,333,410 hectares – the same as the total land mass of the country of Moldova.

The accession of Greece to the European Union (EU) in 1981 acted as a catalyst affecting the subsequent development of Greek agriculture. Nowadays, agriculture is fully governed by the rules of the Common Agricultural Policy (CAP), that is responsible for formulating and regulating the operating framework and the relationship and interactions between farmers and intermediaries.

Based on a paper of the Greek Ministry of Rural Development and Food (2016), the economic crisis of recent years combined with high unemployment rates, demonstrated the importance of the agricultural sector as a primary economic driver and highlighted farming as a viable professional choice, not only for young people in rural areas, but also for those living in urban centers. The entire supply chain is underpinned by the success of the producing farmers and the governance of their buying and selling process.

The Greek economic decline has been worsening since 2008 with the exception perhaps of an increase in production costs due to rising energy costs and taxation. While producer prices have remained relatively constant, the lack of technological and organizational improvements and the failure to differentiate production in favor of high value-added crops, has led Greek agriculture to fail in establishing linkages
with other parts of the economy. This has finally made the sector incapable of being a positive factor in economic growth (Kyrkilis and Simeon, 2015, p.1).

Lipton and Longhurst (1989) refer to the importance of economic policies that support smallholder agriculture, as more than 90% of the world’s 1.1 billion poor live on small family farms. The European Commission (2012, p.14) mandates that the CAP is focused on the economic, social and cultural development of rural Europe, with a focus on the role smallholder agriculture plays in the global agricultural supply chain.

Agriculture can play a unique role in reducing poverty and serve as an important engine for growth in developing countries (Aker, 2010, p.1). According to the Foundation for Economic & Industrial Research (2011, p.18), agricultural lands play a more than important role in each country’s economy. Accordingly to the Food and Agriculture Organization (FAO) (2011, p.18), the reasons that make the agricultural sector of great importance to society:

- For regional economic development
- For the maintenance and development of the natural environment
- In the diet habits of the population and,
- For food safety and food security in each country.

The potential gains for small-scale producers are only realized if farmers are able to meet demands by achieving higher yields, which in turn require agricultural production support strategies (World Bank, 2007) while the European Commission (2012, p.14) states that farmers have always been an essential part of rural life, making a significant contribution to the local economy.

The World Bank (2011) refers to globalization as an important role to both food markets and smallholder farmers. Understanding and addressing global agriculture developments - both advantages and disadvantages - are critical to improving smallholder livelihoods, in which ICTs can play a major role. It is in the context of globalizing agriculture where the need for information systems becomes most relevant. Aker (2010, p.1) highlights that ICTs can provide mechanisms for agricultural extension and market information systems.

The rapid spread of ICTs in developing countries over the past decade offers a unique opportunity to transfer knowledge via private and public information systems (Aker, 2010, p.10). In combination with the agricultural sector, the function of the agricultural production implies that farmers need information on a variety of topics, at a variety of stages before adopting a new technology (Aker, 2010, p.5).

Moreover, the World Bank (2011, p.1), the e-agriculture community, and the Food and Agriculture Organization of the United Nations (FAO) highlight the demand for accessible knowledge management and how ICTs/IS improve and strengthen agricultural activities and increase the number of potential customers. The study indicates a promising trend in ICTs, especially pertaining to mobile communication, for short term and long term market data, agri-inputs, logistics and transport.
In addition, the World Bank (2011, p.5) represents services that can be provided by ICTs in order to make the rural sector more efficient and scalable whilst protecting the rural farmer:

- To empower poor farmers with information and communication assets and services that increase their productivity and incomes as well as protect their food security and livelihoods.
- To harness ICTs effectively to compete in complex, rapidly changing global markets.

The five key drivers of the use of ICTs in agriculture, particularly for food producers, are presented in the World’s Bank e-sourcebook (2011, p.6):

- Low cost and pervasive connectivity
- Adaptable and more affordable tools
- Advances in data storage and exchange
- Innovative business models and partnerships

In summary, this study explores the application of ICTs to the process of buying and selling agricultural products in Greece, as well as the way that farmers’ perceive the process and respond to it within their context and environment. In addition, the aim of the study is to empower and incentivize a small community of farmers to consider implementing ICTs in their production process. Although specific information system design is not the purpose of this thesis, the research and discoveries gained from the participation of local farmers and agriculture sector workers can be applied to future system development.

1.1 Motivation

A variety of factors motivated my choice of research topic and the focus of the critical analysis. I knew initially that I wanted to explore the agricultural sector and the application of ICTs. I have personal experience in the field which played a large role in determining why I chose to focus on this sector as I saw an immediate need to help local farmers. Consequently, I decided to focus my thesis on using ICTs to solve the issues and inefficiencies in the agricultural supply chain affecting farmers, the people I have had most experience with, and improving processes involved in buying and selling products. By applying my knowledge of ICTs and design principles to the research, I explore how one might approach a solution to the array of problems facing the sector.

Moreover, the lack of formal and academic information on the issues of middlemen and farmers in connection with ICTs and the buying and selling of production, highlighted the need for such research to better understand the landscape. I have a desire to contribute my unique perspective as a farmer’s son with knowledge of ICTs and the principles of information system design, to better understand and help the community of local producers.

I grew up in Pouri, the area where the research was conducted and I am familiar with the community of farmers living and working there, as well as with the day to day problems they face and long term issues that impact their production capacity.
My parents work as farmers and have dedicated their lives to the cultivation of apple trees. Throughout my life, I have observed not only my parents but the local farmer community who cultivate apples and other agricultural products, trying to accomplish their goals, and provide for their families.

From my experience, agricultural production in this area is a high volume promising sector that can offer large returns and opportunities for growth, beyond the current state of affairs. My intention is to empower farmers by using ICTs to provide them with the tools to better manage the buying and selling process and to grow their smallholder farm business profile. Through this study, I hope that by introducing farmers to the value of ICTs they will explore the application of these tools to improve their lives.

Furthermore, people in my area had no access to the internet until 2016, due in part to the lack of technological infrastructure. As a consequence, the people who live in the village have not been able to easily follow the latest advances in technology for agriculture, and have hindered the adoption of cloud based technologies. By familiarizing farmers with benefits and value that can be gained through these tools, the farmer community can be motivated and incentivized to consider adopting ICTs for their production process.

Lastly, a seminar that I participated in, based on the issue ICT and societies was catalytic for performing research on an agricultural community in relation to ICTs. The relationships and interactions between human beings and ICTs are an interesting topic for me to investigate. The effects of ICTs on human beings and the effects of human beings on the development of ICTs are an important component of the research. In this new era, all occupational disciplines have begun to implement ICTs and related technologies to improve; production processes, societal changes, lifestyle changes, institutional changes, global socioeconomic changes, emotional and cognitive changes and supply chain efficiencies.

1.2 Aims and Objectives
The research was carried out in a smallholder apple farming village in central Greece, named Pouri. The farmers living and working in Pouri took part in the research through interviews, narrative stories and by observing their interactions and negotiations with middlemen. The goal of the research was to investigate their backgrounds, domain knowledge and experiences in order to understand the process of buying and selling agricultural goods, and identify ways this can be enhanced through the implementation of ICTs.

The agricultural sector in Greece is affected by numerous factors including; government legislation, the Greek economic crisis, the changing customers’ needs and the European Union farming guidelines.

The prevalence of ICTs is now commonplace in many parts of the world, and have altered the way we communicate and interact. Smallholder agri-producers should acquire the appropriate knowledge in these new methods of communication in order to be competitive in an ever evolving market, both in Greece, and abroad. By
changing the underlying methods of communication through ICTs, this in turn may bring positive broader changes to the agricultural ecosystem.

The investigation is structured around a pivotal question regarding buying and selling of agricultural products in Greece. In fact, the investigation illustrates a larger problem that exists in many other agricultural regions around the world. The question asks:

- What are the current methods that farmers in Pouri employ to buy and sell their products?
- How can farmers, go beyond the current methods by employing ICTs in order to find new ways to sell their crops, improve efficiencies, and enhance production?

The current methods used by Greek smallholder farmers, the intermediaries only accept the premium apples which are of a particular size and color. The apples that are not visually appealing and have been bruised or display blemishes are discarded completely.

In conducting my investigation, I reviewed essential academic literature on the subject of buying and selling products. By making a thorough analysis of the data acquired from the stakeholders involved in the research and external socioeconomic factors, I aim to present the agricultural issues facing farmers within a broader context, and the implementation of ICTs in relation to global development in supply chain management. In this way, my investigation may provide the foundation for research and information system design in the future.

1.3 Relevance

This thesis is dedicated to smallholder farmers in particular those who cultivate apples. The research examines the current buying and selling processes of apple farming in the small village of Pouri. I examined the relationship between the smallholder farmers and their intermediaries and focus on how ICTs may be beneficial to their current structure. This research can also be applied in a broader context to other producers in the agricultural sector.

The farmers who took part in the research expressed their views and concerns about the existing structure, and imparted them of the agricultural sector. They benefited from their involvement in the research through an enhanced understanding of the issues facing them and new methods and approaches made available through ICTs to potentially improve these issues. Through the apple farmers’ experiences, we can apply this knowledge to other agricultural producers.

The unique perspective of the farmers in Pouri and the investigation in this thesis may provide a foundation for future research focused on smallholder agricultural production. The incorporation of ICTs may uncover new methods and processes farmers employ that can be of benefit to other parts of the agricultural sector. The research in this field is proactively undertaken to empower and support small agricultural communities, in order to improve their viability locally and in the global market.
1.4 Scope and Limitations

The aim of this research was to investigate the issues facing farmers in the buying and selling process of agricultural goods, specifically apples, and how the farmers’ methods and practices may be improved through the use of ICTs. The focus is on the farmers’ perspective, and tangentially on the negotiations they have with intermediaries as part of the buying and selling process. By concentrating on the farmers’ needs, rather than those of the intermediary, we can better understand the agricultural landscape through their eyes and learn about the problems they face in their field. In addition, the intermediaries were not ideal candidates for the research as they travel to the village only once per year for 1 or 2 days in the month of August to negotiate and buy apples from the harvest. They did not make themselves readily available for interview or impart their domain knowledge willingly, as one can assume the proprietary nature of their methods and practices is core to their bottom line.

Although relevant, research into retail marketplaces and the end consumer was out of scope for this project. The perception of the buying and selling process from these components of the supply chain; where the goods come from, the way they are bought, transported and ultimately how they reach the consumer; have a significant effect on the perceived value of goods.

The results of this research may raise awareness about the issues facing farmers to the traditional components of the supply chain; intermediaries, markets and consumers; and potentially provide more opportunities for farmers to sell their products, facilitate a direct relationship with the consumer and inspire non-traditional methods for agricultural marketing using ICTs.

The research was carried out in Greece, so all of my involved participants are Greeks. Consequently, the research was conducted and completed in the Greek language.

Since, I was raised in the village; I know how little time the farmers have as they frequently work 12 hour days, 7 days a week. I respect and value the time they gave me to be a part of the research. In addition, approximately half the village never completed elementary school, with approximately 10% completing a university degree. Taking this into account, I prepared my questions in an appropriate way so as to not make them feel uncomfortable with phrases or terms they may not understand. Also, farmers are the experts in the field of agricultural production, so I had to make sure I had researched thoroughly what was already second nature to them, so as to extract the most pertinent, revealing and relevant information in my interviews.

1.5 Thesis Structure

The rest of the research is presented as follows:

- In chapter two, the geographical background of the region, and the agricultural methods and practices of apple farming in Pouri is presented.
• In chapter three, a detailed review of the academic literature of ICTs in the agricultural sector is conducted. The focus of the literature review centers around these topics:
  o An overview about agricultural marketing
  o A discussion of the concepts of intermediaries and farmers based on the agricultural sector and marketing.
  o An exploration of contract farming.
  o A general view of the importance of ICTs in agriculture.

• In chapter four, detailed description and justification is offered for the research paradigm, methodology and methods employed in the collection and analysis of data. Careful consideration is given to ensure the process is reliable, accurate and critical, using proven research methods in order to complete the investigation within certain limitations and ethical guidelines.

• In chapter five, a presentation of the data collected from stakeholders and an analysis is given. The results of the three data collection techniques described in chapter 4 are methodically examined both individually and comparatively. From this examination, a summary of the research, consequent findings and discoveries are presented. Validity and reliability of the research is verified and the ethical considerations and limitations are stated.

• Chapter six illustrates the empirical findings derived from the research methods in order to compare the results with the existing academic discourse on the subject. A discussion is given that describes the five core concepts derived from the research in combination with the thesis subject and the pre-existing literature.

• In chapter seven, the conclusion for the thesis research and the central findings are presented.

• References

• Appendices
2. Research Setting
In this chapter, there is a brief background of the geographical region, and an overview of the agricultural marketing process specifically apple farming.

2.1 The Area

Pouri, is a small rural village located on the northeast side of Pelion mountain, at the end of a main road which is 50 km away from Volos, the nearest big city (see Figure 1). It is one of the villages that belong to the local Municipality named Zagoras and Mouresiou Municipality.

![Figure 1: Pouri, the village on map](www.google.com/maps)

Based on a book dedicated to the village (Diamantakos, 1997), from 1950 onward, potato production was reduced due to the development of lowlands. Around this time, Dimitrious Samsarellos brought with him the first apple tree from America to plant in the village. Farmers soon realized the viability of the apple tree and begun to plant and farm apples, gradually phasing out potato production.

Since then, apple production is the most important economic driver and income source for the locals. The agricultural lands consist mostly of apple trees, with smaller populations of chestnut trees, olive trees, hazel trees, cherry trees, walnut trees, orange trees, mandarin trees and lemon trees. All the families who live there rely on the productivity of apple farming. In addition, there are animal breeders and fishermen, but they are in the minority. Some apple farmers also keep livestock as an additional income stream, or for personal use.

2.2 Agricultural Production

Agricultural production starts at the end of the winter. Due to heavy snowfall and the strong cold, farmers are unable to work in the fields. Winters can be heavy, and often cause problems with the apple trees; breaking the branches, or freezing the trees’ roots. The snow lasts until the end of February and can persist until the middle of March.
The beginning of March sees the commencement of work for the farmers; the process of pruning. The farmers visit the apple farms in order to remove problematic branches, that will not produce fruit, from the trees. They take these branches to specific areas outside the farms and set fire to the branches in order to destroy them (see figure 2). They choose an open space, far from trees, in order to control the burning and avoid the fire spreading. This process lasts a month, since each farmer owns 5 – 7 apple farms with approximately 50 – 150 trees in each.

Figure 2: The process of collection and setting fire to the branches at the apple farms. (My personal archive, 2017)

The pruning process (see figure 3) generally concludes in the middle of spring. At this stage, the trees begin produce flowers. The farmers regularly spray the flowers with fertilizing solution to ensure strong and healthy fruit development. When the flowers transform into tiny apples, the farmers have to visit their farms and begin the process of thinning fruit. Since the branch has many flowers, and can produce many apples, the farmer must select which apple will remain to reach full maturity, based on specific criteria. The discarded apples are either cut or left on the ground as fertilizer for the next season, or as food for livestock. This process lasts from 1 to 2 months and overlaps with the next step in the production process.

Figure 3: The thinning process at the apple farms. (My personal archive, 2017)
In the first month of the summer, farmers begin spraying the crops regularly, generally every 15 days, in order to protect the fruit from harmful parasites. They water the trees based on a schedule established by the local municipality and remove the weeds that grow in the warmer months.

In August, the farmers face unexpected weather conditions that may adversely affect the harvest. Heavy rainfalls, unusually hot temperatures and hail can destroy part or all of the production. In some instances, particularly heavy hail has destroyed entire crops in less than a minute.

During the latter half of August, intermediaries come to the village to negotiate and buy apple product to sell in the retail markets. They generally the same 3 – 4 middlemen that come each year, who know the individual farmers and each other. The farmers and intermediaries meet in the central square of the village where the intermediary proposes a price to buy goods based on an analysis of the current economic climate. If a farmer is interested in this proposal, they take the intermediary to view the apple crops on their farms. After viewing the apple crops, the intermediary proposes a final price, either better or worse than the initial offer depending on the quality of the crop and total volume of the sale. The farmer can accept or decline the offer in favor of another intermediary, of which there are only 3 – 4. In general, the price set by the intermediaries is very similar, and it has been suggested by the farmers that they collude to control the price. The deal with an intermediary is considered ‘signed’ on a handshake and a financial deposit of approximately €1000 against a future purchase. This is the way ‘contract farming’ operates between smallholder apple farmers and their intermediaries.

Moreover, when the deal is closed, it is the intermediaries’ responsibility to supply the farmer with baskets in order for the apples to be collected and transported.

One the other hand, there are farmers who are not interested in dealing with intermediaries. These farmers have chosen to sell their crops to the local agricultural association dedicated to the process of selling direct to retail markets. They face some other issues with the local association, as they are not paid up front for their products. After a 6-month period, the local association pays the farmers based on the amount they were able to receive for selling the apple crop. This can lead to the farmers not being paid, or other middlemen interfering in the process.

The period of harvesting the crops begins in the middle of September. Farmers are under a lot of pressure and are anxious to harvest the crop before the unexpected weather of fall starts.
After the apples have been harvested, the process of selection (see Figure 4) weens out the quality production to conform to the criteria and needs of the intermediaries. Intermediaries require the farmers use a measurement tool (see Figure 5) during the selection process to facilitate consistency, and supply the farmers with apple crates for easy packaging and transportation.

After placing the apples in the crates (see Figure 6), the farmer is responsible for bringing the product to the intermediaries’ truck, where each crate is weighed and transported to a storage facility. This process can take up to two weeks.
Once at the intermediaries’ storage facility, the apples are measured, weighed again and another selection takes place. Often the intermediary is not satisfied with the first selection which has taken place at the farm, and as a consequence can reduce the total amount of money that the farmer will receive. This process is commonplace and can be seen as a method intermediaries use to lower the price.

Perhaps most alarming, a considerable amount of crops is rejected during the selection process (see Figure 7), for mostly cosmetic reasons; ie. black spots, sunburned skin, lack of vivid color etc. These crops often remain discarded on the farm land and there is no procedure in place to make use of these crops, even though they are generally edible and can potentially be used in other products. The farmers do not have time or resources to dedicate to dealing with irregular production.
Now the cycle begins again, from the early October to early March is a quiet period for apple trees as the farmers must wait until the end of winter. During this time, some farmers who own chestnut trees or other fruits productive during the winter may continue to work.

The above mentioned process describes a typical year for apple production in Pouri.
3. Literature Review

This chapter presents an investigation of the academic literature on agricultural production; the role that farmers and intermediaries play in the buying and selling of agricultural goods; and the use of ICTs in the agricultural sector. Initially the review focuses on agricultural marketing concepts and how they are perceived in other global agricultural regions. Following this, we examine the role of farmers and intermediaries in the agricultural supply chain and their relationship and interactions during the buying and selling process, specifically the concept of ‘contract farming,’ as referenced in the literature.

3.1 Agricultural Marketing

Agricultural marketing is a concept that embraces a lot of activities, systems and stakeholders. Agricultural marketing can be considered any action or procedure made by the immediate stakeholders, concerning the agricultural supply chain in order for a product to reach maturity and receive market place distribution.

Patel and Shukla (2014, p.377) state that:

“agricultural marketing involves many operations and procedures through which either food and raw materials move from the cultivated farm to the end customers”.

Agricultural marketing has a start and an end. The agricultural production (of apples) describes the process from the bud of the fruit to the fully grown crop, harvested and ready for distribution. The crop’s journey is very important in determining the quality of the product and for the involved stakeholders. In agricultural marketing, the beginning of the product’s journey is the farm while the final destination is the retail marketplace. Agricultural marketing is not only the buying and selling of goods, but also the procedures and services that are required to ensure an agricultural product gets from the farm to the consumer within specific criteria for sale and consumption, including; collection, storage, distribution and marketing procedures (Abdullah and Hossain, 2013, p.131).

Abdullah and Hossain (2013, p.130) note that:

“agricultural marketing is an essential tool for uninterrupted, adequate and timely supply of agricultural products, inputs and services to target groups, including producers, consumers and intermediaries”.

Without agricultural marketing, the procedures and services it entails and the stakeholders involved, the crop would never reach the end consumer. Furthermore, Kolter (2014, p.5) underlines the importance of marketing in the rural sector and defines the role of marketing as either identifying and meeting social needs; or the way manager’s employ marketing techniques to sell products.

Agricultural marketing is a universal concept however is employed differently in each global agricultural region, in a variety of geographic and economic environments and by each stakeholder in the supply chain.
In conclusion, Agricultural marketing encompasses all the procedures and services in the agricultural supply chain that are involved in bringing products from the farm to the retail marketplace. Agricultural marketing and its features can differ depending on the geographic and socioeconomic context in which it is used.

3.2 The Roles of Intermediaries and Farmers to the Rural Sector

Intermediaries play a prominent role in agricultural marketing and the supply chain as they facilitate the buying and selling process of crops direct from farm producers. They have experience with rural markets and understand the customers’ needs, and in this way they bridge the gap between farmers who focus on production and the retail market where the goods are distributed. By understanding their role in the supply chain, we can assess how ICTs can be used to enhance or disrupt the service they offer.

Intermediaries rose to prominence in the 16th, 17th and 18th centuries in Britain (Hill, 1967 and Smith, 2002). Initially, they were individuals who cultivated relationships between farmers and markets, but subsequently they appeared as institutions to scale the process and add value by connecting, supporting and enabling others to be more effective (de Souza Briggs, 2003, p.2).

Regarding external trade, Peng, Hill and Wang (2000) underline the role of intermediaries as specialized service firms whose mission is to fill the gap between domestic manufacturers and foreign customers, while Lehtinen, Ahokangas and Lu (2016, p.1179) highlight the importance of intermediaries in cases where the sellers and buyers are separated geographically and culturally, either on a local or international level.

On one hand, there are farmers and their workers involved in agricultural activities, who strongly believe in the importance of the intermediaries’ role in agricultural marketing. Popp (2000) underlines the role of intermediaries as tools for clients to search for and find new opportunities and open access to new markets. Intermediaries can provide a new source of products, new design and materials, new routes and modes according to the supply and demand for the product.

On the other hand, there are farmers who are against the intermediaries, but due to the current accepted practice of buying and selling agricultural crops, they are limited in their options and cannot see another way.

Abdullah and Hossain (2013, p.130) write that:

“intermediaries play a prominent role in making the agricultural business a risky business, absorbing a major portion of the benefits from the farmers, and gaining high profit by determining a high price for the ultimate consumer of agricultural commodities”.

In order for the abovementioned problem to be solved, Abdullah and Hossain (2013) underline that with a proper distribution system of agriculture, farmers can command a fair price for their goods and the end consumer can receive products at lower prices.
In addition, they argue that the value chain has a significant impact on the capability for farmers to command a fair price.

In Bangladesh, farmers are in a similar situation to the apple farmers in *Pouri*, having little to no relationship with the consumer market. Abdullah and Hossain (2013) state that the value chain for agricultural marketing should change in order for farmers to directly reach the markets. As a consequence, this could lead to the reduction of dominant intermediaries that prevail across the supply chain of agricultural products and create opportunities for the real farmer to access the market where they can sell their products at fair price (Abdullah and Hossain, 2013, p.131).

In India, farmers face a similar situation to those in Bangladesh. Nayak (2014) refers to the rising costs of food and agricultural products that middlemen have caused in the distribution from farm to fork. One of the difficulties in marketing agriculture product, is the fluctuation in the price (Abdullah and Hossain, 2013, p.132). The fluctuation of prices is a common issue that faces the farmers in *Pouri*. When it comes to proposing prices for the apples during the buying and selling process, intermediaries have the upper hand. Farmers have the option to wait, in case they receive a better proposal, but they have to act quickly as their crop has a window during which it must be sold for it to receive the optimum value, or worse yet it may be left unsold.

Sabvanis (2014 cited in Nayak, 2014, p.2) said that:

“*The intermediaries add value but they increase the cost. You need to provide farmers with an alternative avenue to sell their produce*”.

In China, there is a different point of view among farmers and intermediaries. Based on empirical research that took place in China for Wageningen University, Yang (2013) underlines; farmers apart from their roles, cooperative also as intermediaries. This also affects and is affected by the socio-economic-political context. This research examines holding both roles - farmer-intermediary - in relation to external actors.

To sum up, there are different points of views for the role of intermediaries, whether their role is beneficial and empowers the agricultural processes or is unnecessary and detrimental to the farmers’ livelihood and the agricultural sector. Thus, it is the responsibility of farmers to explore other avenues, and develop a degree of autonomy to distribute and sell their agricultural products without an intermediaries’ system.

### 3.3 Contract Farming

Contract farming is something that it missing from the agricultural process of buying and selling apples in *Pouri*. The intention of adding this agricultural marketing process to the thesis is to establish an integrated overview of the procedure and point to the gaps and issues between the involved parties, farmers and intermediaries.

Contract farming is characterized by a pre-agreed price, quality, quantity and time of procurement between a producer and a buyer. Eaton and Shepherd (2001) define contract farming as:
“an agricultural production system carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products”.

Eaton and Shepherd (2001) underline that farmers and buyers should have a common purpose when engaging in contract farming. In Pouri, although there is no contract farming, both of the involved parties (farmers and intermediaries) have a common goal. The former to sell their agricultural products to intermediaries, and the latter to buy their agricultural products from farmers in order to sell to the markets.

Eaton and Shepherd (2001) highlight the features of contract farming; the interests of both of parties come first; to keep the power balance in the market; to cover opportunistic behaviors and unfair practices in order to reduce the deterioration of the relationship between farmers and intermediaries.

According to Eaton and Shepherd (2001, pp.43-44) there are variations of the contract farming business model that reflect the situation in the agricultural sector. These are:

- Informal model
- Intermediary model
- Multipartite model
- Centralized model
- Nucleus estate model.

To conclude, contract farming establishes a set of terms and rules that take care of both the involved parties, and provide a safer and securer method for buying and selling agricultural goods in the supply chain. Contract farming empowers the farmer by valuing quality and enabling the farmer set a price – while the intermediary is able to guarantee a date that the farm producer is required to deliver the products.

3.4 ICTs in the Agricultural Sector

ICTs have entered into the processes of the agricultural sector and have offered many challenges and opportunities for the stakeholders involved. Much research discusses the appearance of ICTs in the rural sector, while they underline the strength and power they give on several farming procedures. Quan-Haase (2013, p.42) in her book «Technology and Society: Social Networks, Power, and Inequality», refers to those who support technology as ‘utopians’ and those who see only negative effects as ‘dystopians’.

On one hand, Patel and Shukla (2014) underline the importance of providing farmers with access to technology to aid in their agricultural business. For example, in the Philippines, there are many portals, e-commerce applications and innovative technologies that can be used to provide relevant agricultural information in the country specifically the rural areas (Kayathilake, Jayaweera and Waidyasekera, 2010, p.56).

On the other hand, Partovifar (2010) notes that the most significant problem is the lack of adequate access to ICTs. Laguna and Babcock (1997) highlight that anxiety and unfamiliarity is an important factor for both younger and older users of ICTs.
More particularly, examination of the research conducted by Broady, Chan and Cuputi (2010, p.478) finds older people are generally less comfortable and competent in computer use. Those who are experienced with technological means and functions, tend to act more self-confident and self-assured; those without, tend to feel anxiety and stress when involved with technology.

O’Donnell (2013) in a briefing paper, reflects on the use of ICTs in order to enhance and empower marketing for small agricultural producers, and highlights various effective features and solutions that farmers can benefit from. ICTs can offer opportunities and capabilities to farmers, to find new buyers, improve their negotiation process and ultimately sell their products.

In addition, Mahajan, Muller and Bass (1991), state that ICT services are helping farmers to understand modern cultivation methods, availability of agricultural inputs, irrigation sources, availability of pesticide and fertilizers for increasing the production and productivity of crops. Thus, ICT has many potential applications in agricultural extension (Zijp, 1994). Moreover, ICT plays an important role in enabling smallholders to produce high-level commodities and to capitalize on opportunities to participate in these markets (Lashgarara, Mohammadi and Najafabadi, 2011, p.357). Also, using ICTs can provide fast accessibility to the market, raising selection power, improving communication, identifying markets, saving time and energy, improving marketing, and business cost reduction (King, Knight and Misoun, 2003).

Having access to ICTs, is not simply having access to or the means to operate a computer. It encompasses also the ability for a user to understand the underlying software and hardware, enough that they can upgrade it themselves, and the ability to search and retrieve for solutions to problems faced by themselves and others.

When people of an area can follow the rapid development of technology, they are better able to be consistent within the socio-economic context they live in. Patel and Shukla (2014, p.378) define the categories that are affected by access to ICT; demographic, education, perception, trust and time.

Writer (2015) notes that in Uganda, a government project exists to encourage the use of ICTs among participants in order to develop and improve farmers’ conditions. They have developed a platform through which, using their smartphones, village agents collect appropriate information – such as CVs, demographic statistics, details for production – while using a GPS function for cultivated lands. As a result, village agents provide farmers with services such as; better economic practices, weather forecasts, market prices, digital financial services, crop insurance etc. In addition, the platform allows involved stakeholders to communicate amongst each other and to ask questions if they have issues.

Quan-Haase (2013, p.7) describes technology as

“an assemblage of material objects, embodying and reflecting societal elements, such as knowledge, norms, and attitudes that have been shaped and structured to serve social, political, cultural, and existential purposes”.
Farmers, who live in a non-advanced socio-economic environment, with the possible access to ICTs, may have the opportunity to broaden their minds, get motivation, and gain knowledge. This not only empowers them as individuals, but the entire agricultural sector as a whole. Thus, the investment in the evolution of the smallholder farmer through technology can lead to a more enlightened and efficient workforce who ultimately underpin a steadier and healthier supply chain.

3.4.1 ICTs for Development

Bradley (2010, p.183) provides several directions of the convergence model as necessary features of a good society; globalization, ICT, life and environment, life role, effects on human. Connecting with the area of IT convergence, Richardson (FAO, 1996) gives some examples where the application of IT can support; economic development of agricultural producers, community development, research and education.

Goswami (2014, p.125) refers ICT for sustainable (ICT4S) development as an unexplored research area, while he attempts to address and understand both positive and negative impacts of these new technologies; on the environment, socio-economical dimensions and how we may use them. World Commission on Environment and Development (1987) define Sustainable Development as the development that meet the expectations and needs of the present without referring the ability of future actions to meet their own needs.

Goswami (2014, p.127) states the three elements for the sustainability; economic development, social development and environmental protection. Those three elements should be accomplished by the eradication of income poverty, by improving the quality of education and health and by reducing the pollution. Moreover, the World Summit on the Information Society (2003) underlined that for sustainable development and quality life improvement should exist an ‘information society’ in which people can create, access utilize and share information and knowledge by enabling individuals, communities and people in order to accomplish their full potentialities.

Goswami (2014, pp.127-131) highlights the core dimensions which may improve the sustainability progress for development; ICT for environmental sustainability, ICT for economic reform, ICT for social development (role of electronic governance, improving information access and communication and ICT impact on education and health) and ICT for measuring sustainability. In addition, the ‘community participation’ (Bailur, 2007) consist one of the characteristics of the ICT for development. Michener (1998) writes also that ‘participation’, ‘sustainability’ and ‘empowerment’ are the core concepts for development.
4. Paradigm, Methodology and Methods

This chapter presents the research strategy used in order to conduct this thesis research and the systematic investigation of data for establishing facts and reaching new conclusions. The critical paradigm research method has been used for this research. Also, the participants that took part in my research are being described, as well as, the methods through which the data was collected is discussed throughout this chapter. At the end, this chapter examines the validity and reliability of the whole study, new ethical considerations that came from the methods of this study are discussed.

4.1 Critical Paradigm

This thesis is based on a qualitative approach. Hancock, Ockleford and Windridge (2007, p.7) illustrate qualitative research as developing explanations of social phenomena which aim to give us an understanding of the social world in which we live and why things are the way they are, in order to underline philosophical assumptions to research design and data collection.

H Hancock, Ockleford and Windridge (2007, p.7), gives us a set of questions that a researcher seeks to answer in his/her study:

- Why people behave the way they do
- How opinions and attitudes are formed
- How people are affected by the events that go on around them
- How and why cultures and practices have developed in the way they have.

Myers and Klein (2011, p.17) write that:

“Critical research in information systems is concerned with social issues such as freedom, power, social control, and values with respect to the development, use, and impact of the information technology”.

The way the critical paradigm method relates to this research is to help gain a better understanding of the social context that farmers live in. In addition, the study talks about the relationships that farmers develop with intermediaries and how those relationships are affected by several factors. Orlikowski and Baroudi (1991) refer to the critical research as a belief in the ability to change their material and social circumstances, yet the capacity to change is constrained by prevailing systems of economic, political, and cultural authorities (Myers and Klein, 2011, p.19), in contrast with interpretive and positive paradigms that are intended to predict or explain the status quo (Orlikowski and Baroudi, 1991, p.19). Also, they mention fully understanding the effects of politics, economic factors and social environment so that a researcher can gain an integrated overview of the research area.

For IT researchers, critical research can enrich their understanding and improve practice; it offers an avenue for them to discharge their social and ethical responsibilities more fully (Stahl and Brook, 2008, p.54).
In addition, critical researchers understand a social theory not as determining how they see the world, but as helping them to ‘devise questions and strategies for exploring it’ (Kincheloe and McLaren, 2005 p.306). So the aim of the research is not only to determine current situations and practices within the agricultural sector but through questions and strategies to explore and assist the world as a whole.

Moreover, Myers and Klein (2011, pp.32-33) suggested the added values of critical research. Etzioni (1968) in the first place underline the attention of all researchers to the importance of fundamental criticism. More precisely, Myers and Klein (2011, pp.32-33) explain that fundamental criticism assist the researcher to discover more about hypothesis dedicated to the results of the analysis. Also, they analyze that fundamental criticism is connected with the “societal level since many of the fundamental beliefs and norms originate in societal institutions such as government, schools, churches and professional associations” (Myers and Klein, 2011, p.33). The second value is that research philosophy “moves values to the very core of research projects”. The researcher in my case should gain the best knowledge from the entire research area. In addition, Desouza et al. (2006) refer that the focus of the research community is to raise its awareness and efforts in addressing the needs of underserved communities. The third value is the element of transformation that comes from the connection of the critical research in combination with the ethnography method. This value reflects how the participants could change within the environment they live and act in. Fourth and final value that could be added to a critical research is the richer meanings attributed by the speaker in the social world, in order to entice people to speak (or not to speak) or act (or not to act) in certain ways (Myers and Klein, 2011, p.33).

Furthermore, critical research consists of three elements (Myers and Klein, 2011, pp.23-24). Those three elements are insight, critique and transformative redefinition.

Myers and Klein (2011, p.23) refer to:

“the purpose of the first element (insight) is to provide a broad insightful understanding of the current situation before engaging in critical analysis as outlined in the subsequent elements”.

In this research, the first element will be the first phase which will be the understanding of the current situations about the Greek agricultural apple farming market. The insight portion of this research question will be addressed by using Interviews with local farmers and the observations, where I have observed the practices of the small holder apple farm market. The second element, the critique, reflects the social practices of control and production. This element assists the researcher to examine the structure of the society and see behind the accepted interpretations (Myers and Klein, 2011, p.24). The critique part is highlighted by interviews, storytelling and observations since those methods are a view point of the current structure, as a result of the research the researcher would be in place to see hidden interpretations. In the third element of the critical research is the transformative redefinition, which reflects suggested “improvements to the condition of human existence, existing social arrangements, and social theories”. This third part is implemented by the observations conducted for the research, in order for the researcher to have the ability to draw conclusions to particular issues and discuss
actions that may assist farmers to the rural market or examine their current path that may cause them difficulties The transformative redefinition also compares some of the actions with the social existed theories.

This thesis critically evaluates the present structure of the agricultural product market in order to establish the existing state of affairs, especially in regards to the social and political environment while giving the ability to go in a specified direction and find solutions to assist in transforming or changing the current condition with the implementation of ICT’s. Critical thinking is qualification for critical researchers. The idea is to think and see outside the box in order to find out and evaluate what is important for the community being researched. All information should be analyzed by the researcher, who should have the ability to go beyond the easily perceived structure and delve deep into its inner workings.

Critical research in combination with the research strategy of Ethnography, gives a better and deeper understanding about people and how they act within their social structure.

4.2 Research Methodology

This study uses Ethnography as a methodology which gives qualitative results. Ethnography has an emphasis in understanding people’s behaviors during their everyday activities and ways of life; it also reflects the experience of the people who live in a specific community (Crang and Cook, 2007, p.1). Also, it aims to analyze and describe a certain community of people who live in a certain geographical area (Blomberg et al., 1993, p.123). According to the methodology of Ethnography, a detailed report will include elements of the people, geographical position, inhabitants and their relations with each other, the impact of external factors as well as any other influences.

In this study, quick and dirty ethnography is utilized, due to the use of real world data. Hughes et al. (1994, pp.434-435) underlines that quick and dirty ethnography provides insight not only into the use of ethnography but also about the character of the ‘real world’. Also, they state that the use of this type of ethnographic study not only seeks relevant information as quickly as possible but accepts at the impossibility of gathering a complete and detailed understanding of the current environment.

On the other hand, quick and dirty ethnography differs from the concurrent ethnography which is an ongoing ethnographic study taking place at the same time as system development (Hughes et al., 1994, p.433). In this case, there is no design system or system development, because this is a prototype research. The results of the research will lead to the foundations of creating a design in order to be used in further research and implementation. In addition, evaluative ethnography is undertaken to verify or validate a set of already formulated design decisions (Hughes et al. 1994 p.433). Explanatory, I had not relied on existing design decisions in order to conduct my research. The last use of ethnography could not have been implemented into this research since re-examination ethnography is based on previous studies in order to inform initial design thinking (Hughes et al. 1994, p.433). This study consists on original and unconventional research with newly released findings. As a result, there was no focus placed on previous studies, in order to inform initial design thinking.
4.3 Participants
The research was conducted in the village, named Pouri. I left 50 invitation letters (see Appendix E) inviting people to contact me, at the local café where farmers usually gather at night in order to catch up on the days current events and watch football. I received 17 phone calls and 3 email letters as a result of my efforts. This happened in a short period of time, so I immediately scheduled the interviews, on site observations and narrative stories collections. The candidates that participated in my research methods are displayed below:

<table>
<thead>
<tr>
<th>Participants</th>
<th>Number of participants</th>
<th>Methods they participated in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td>10</td>
<td>Interviews</td>
</tr>
<tr>
<td>Farmers</td>
<td>5</td>
<td>Observations</td>
</tr>
<tr>
<td>Farmers and Intermediaries</td>
<td>2+2</td>
<td>Observations</td>
</tr>
<tr>
<td>Farmers</td>
<td>5</td>
<td>Narrative stories</td>
</tr>
</tbody>
</table>

*Table 1: Participants*

The five of them expressed their desire to participate in the form of a narrative story. I respected their choice, the methods were implemented both by the choice of the farmers and randomly by me. (See table 1)

4.4 Data Collection
The initial attempts to gather the empirical findings began on the 1st of June 2016 and finished toward the end of August 2016. The language used to implement the research method was in Greek. The audio had to be then transcribed in Greek and translated to English.

4.4.1 Observation
Robson and McCartan (2016, p.319) defines observations:

“as the technique of examining people’s behaviors and actions of their real lives in the real word and then recording, describing, analyzing and interpreting the collected information”.

Crang and Cook (2007) state that ethnography is a way that researchers observe people’s lives in order to understand their views and thoughts. Robson and McCartan (2016, p.317) states that a significant perquisite of the observations is the directness, through which people are not asked to tell about their views or feelings or but they energy by themselves and the observer listen what they want to say.

There are two kinds of observations, passive and active. The research conducted uses passive observation, in which I was able to take notes, record, with taking no part in the actions I observed.

The observations are separated into two parts. Exploring not only the relationship of the farmers with any kind of technology they may use while they cultivate their
agricultural lands, but also following the dialogue between a farmer and an intermediary while they are negotiating the price of the crops.

Passive observation
The first part of the observation was conducted between the 5th of June and the 5th of July, 2016. Five farmers allowed me to observe them while they worked on their small stakeholder farms. The purpose of the onsite visit was to observe their relationship with technology and to examine their general environment where they complete their agricultural work and determine if there is space and need to technological advancements.

Before I started my observation, I asked for the farmer’s oral permission, in order to be with them at their agricultural farms. This entailed a simple communication with the farmers some days before, in order to be granted access and schedule a time to go together to the farm since some of the agricultural lands were far away from the village. I had my pen and a notebook with me in order to keep notes.

First part of observation

First Observation
(Held on 5th of June 2016)
The first candidate was a novice farmer around the age of 26. The observation lasted almost 3 hours and was inspiring. The farmer was very familiar with his mobile phone. He was taking photos of the crops, i.e. a weed that appeared by an apple tree. He was checking the weather, apart from the ability to send text messages and using cellular data.

Second Observation
(Held on 15th of June 2016)
The second participant was a middle-aged farmer around 50 years old. The observation lasted 1 and a half hours. He was working on thinning the apple crops. This farmer did not like technology, like his mobile phone, so he left it in his car. He only answered it when it rang.

I came up with an introductory question and I asked him about this act. So, he explained to me that he had the mobile phone just for emergency use.

Third Observation
(Held on 17th of June 2016)
The third participant was a new farmer that just purchased some agricultural lands in order to pursue a new career in the agricultural sector and crop production. The observation lasted one hour. Since he was a new farmer, he was always using his phone, and he once used his tablet in order to find information about anything interesting he noticed concerning the crops.

Forth Observation
(Held on 26th of June 2016)
The fourth observation was conducted with a farmer and his son. Because farm work was difficult and his father was getting older his son came along to assist his father that day. The observation lasted 2 hours. In that period, the father was telling his son
how technologies affected our lives and how important communication between two humans was. He was bothered by his son’s action of using his mobile phone all the time. But once, the father asked his son, to check about a specific pesticide he had heard about.

**Fifth Observation**  
*(Held on 5th of July 2016)*

The last candidate was a farmer with no car. So we went to the agricultural land by horse. The observation lasted 2 hours and the farmer had no idea about technology. He had no mobile phone. He only had a small radio in order to listen to music, because he was alone all day.

**Second part of observation**

The second part of my observation was conducted from 16th to 17th of August 2016 at the village.

**First observation**  
*(Held on 16th of August 2016)*

I asked my father if I could be present at the negotiation he will have with the intermediary this year. When we met with the intermediary, I informed him of the reason I was present and I explained to him the purpose of my thesis. He accepted to be observed. First we went, to three agricultural lands so that the intermediary could have a look at the crops. After that, he proposed a price and my father accepted.

**Second observation**  
*(Held on 17th of August 2016)*

I asked my uncle if I could go with him. The observation lasted 4 hours. We went to the agricultural lands, but a portion of my uncle’s crops were destroyed by hail. The intermediary proposed a price which was very low and my uncle started to negotiate. The intermediary did not accept the counterproposal. After that, they were trying to close a deal but they did not manage. Two days later, my uncle had negotiated with another intermediary, with a bit of a higher price than the previous one had proposed.

**4.4.2 Interviews**

Crang and Cook (2007) underlines that the interview method assists the researcher to examine people’s everyday lives and point of views in a socio-economic, political and cultural context.

I conducted an interview which consisted of 8 questions. Before started asking questions, I gave a consent form (see Appendix C) to the participants in order for it to be signed, and I informed them for the reason of the research and by whom the data will be seen. Also I informed them that I would take notes as they responded to the questions.

After having completed my first interview (see Appendix A), I realized that the questions were a good guide but the answers were not so rich. Also, for some of the questions I took closed answers. As a result, I decided to change the form of my interview guide in order to delve deeper and examine more carefully the questions I was trying to answer with my research.
While starting to formulate my second interview guide I remembered an important comment on my research supervisor had made to me about the farmers. My supervisor said that they are experts on their fields, so they want to be asked about important, useful and interesting parts of their sector.

Having completed the changes and reformulating the questions, I set an interview (see Appendix B) with the second candidate. It was obvious at this time, I was collecting data, precious data from the farmer’s responses. Having completing the third interview with the second form of my interview guide, I felt that my interview guide was sufficient and examined the issues of my research.

To some interviewees, sub questions were asked in order for the responses to be more precise and detailed, for the better understanding of what the farmers were trying to explain.

4.4.3 Narrative Stories
People tell stories. They narrate about their experiences, about meanings of their experiences about their lives in general. Stories can come from the past or present. Robson and McCartan (2016, p.165) defined narrative research as stories that are based on life stories. These stories characterized by heroism or suffering or greatness.

Robson and McCartan (2016, p.373) refer that:

“people concentrate on the stories in order to understand and describe several aspects of their lives”.

Robson and McCartan (2016, p.374) continue:

“Life histories, and other narratives, can be the main or sole method in a research project or combined with other methods”.

Narratives, accounts and other collections of words are variously described as 'rich', 'full' and 'real', and contrasted with the thin abstractions of number (Robson and McCartan, 2016, p.459).

The participants of the narrative stories were prepared for the discussion by an invitation letters. Three of the narrative stories were conducted at the village in the middle of August 2016, when I was there for a second time. The two others were conducted via phone calls and skype calls at the end of August 2016, when I was back in Athens. When they gave me a call we made an appointment to meet each other. The two of them canceled the appointment and since I had to leave the area, we only were about to conduct one skype and one phone call. All of them asked me not to be recorded, so I only took notes.

Instructions were given and the process of the method was explained to them. Also an invitation (see Appendix E) and consent form (see Appendix C) informed them about the research in general. They were asked about an interesting event they experienced with agricultural work.
First Narrate Story  
(Held on 16th of August 2016) 
The farmer talked about the weather conditions that sometimes, may harm the crops. As a result of weather related damage to the crops, intermediaries offer less money to the farmers in order to purchase their products. He continues and gives an example of the prices for that season. He explained his fears and anxiety about economic problems, especially now with an extra layer considering the economic crisis in Greece. Sometime later, he went to a big grocery center at a nearest city and he noticed that the price of apples was extremely high unlike the low price he sold his for. With increasing prices at the grocery stores and decrease reimbursement from intermediaries due to damaged crop life this year was going to be difficult for him economically.

Second Narrate Story  
(Held on 17th of August 2016) 
The second farmer explains to us the reason the apples can get low prices even when weather conditions have been favorable. He talked about the first screening crop and the second screening crop and what farmers act when they face problems with intermediaries. He also mentioned indicative prices from that year and he highlighted the unfair part of selling products in different prices depending on the bad or good crop and finally he explained that he felt the whole crop should be sold at the price of the good ones.

Third Narrate Story  
(Held on 18th of August 2016) 
The third farmer told me about the assistance that he offers at the fellow villagers when they ask for. There are some farmers that use electronic devices such as cell phones or tablets. Since he wanted to become a programmer, he has finished his studies at a university abroad. So, now it is spread that he is technological literate, and when someone face problem with the technology s/he use, s/he asked for his help.

Forth Narrate Story  
(Held on 27th of August 2016) 
The fourth farmer narrated a story in which her daughter wanted to make an electronic transaction. She fell for a fraudulent scam and she lost her money. From that time, the farmer, felt unsecure and unsure about using new technologies and was worried ICTs would not have a positive outcome for the farming community so she did not support technological development in the agricultural sector.

Fifth Narrate Story  
(Held on 28th of August 2016) 
The fifth farmer expressed his desire to sell the agricultural crop that remained unsold to the intermediaries. He supported that this crop could be sold, not only as apple crop, but could be used in some other form, i.e. jam or juice. He underlined that they lack of understanding and tools and feared changing and deviating from their standard approach in order to achieve this new goal.

4.5 Data Analysis  
In order to conduct an original and initial analysis of data processing, we consider and analyze all the parts of the data collection in order to find patterns and commonalities
within the responses of the research participants. In a few words, we tried to identify patterns within all of our data collection, and to connect patterns with the literature review, which was a guide for getting deeper and gaining better knowledge of this data.

The data are analyzed based on Lichtman (2013, p.251) “The three Cs: coding, categorizing and concepts” model. Thus, in order to conduct an original and initial analysis of data processing, we consider and analyze all the parts of the data collection in order to find patterns and commonalities within the responses of the research participants. In a few words, we tried to identify patterns within all of our data collection, and to connect patterns with the literature review, which was a guide for getting deeper and gaining better knowledge of this data.

The purpose was to collect all the data in order to store them as codes and then assort them into categories. The final step in the analysis process is to identify key concepts that reflect the meaning you attach to the data you collect (Lichtman, 2013, p.254) (see Appendix D).

![Three Cs Analysis: Codes, Categories, and Concepts](Lichtman, 2013, p.252)

- c. Developing an initial list of categories
- d. Modifying initial list based on additional rereading
- e. Revisiting your categories and subcategories
- f. Moving from categories to concepts

**Process of the data analysis**

After collected the data gathered by the used research methods I started the analysis process. In the first step, I went through my notes of the research methods of interviews, observations and narrative stories. I underlined 421 codes. I rewrote those codes on a new piece of paper. Implementing the second step, the codes were checked again, in order to erase the same ones and those with the same meaning. At the end of the process I had 278 codes left.

For the third step and in relation to my research point, I classified those 278 codes into categories. I wrote 53 categories. After moving to the fourth step, I went through these categories again in order to erase the duplicates and those with the same
meaning. At the fifth step I revisited the categories and due to some changes and corrections of the meanings I had 39 categories left.

The last step is to connect the categories with each other in order to create the concepts, the study showed that six concepts existed: marketing and selling crops, weather conditions, human factors, intermediaries, contract farming, ICTs in agriculture.

4.6 Validity and Reliability
Lincoln and Cuba (1985) state that trustworthiness of a research is an important and catalytic part of evaluating its worth. Shenton (2004, p.73) counts four parts of reliability: credibility, transferability, dependability and confirmability. Below there are explanation of how those criteria are used to the research.

Shenton (2004, p.63) describes credibility as an attempt to demonstrate that a true picture of the phenomenon under scrutiny is being presented. In order to vest the study’s credibility, a combination of methods was used in order to gather data and information. This can be supported by the fact that in the interview section the questions were molded and amended to produce more data when more explanatory comments were needed by the interviewees.

Furthermore, the fresh perspective that participants may be able to bring, allow them to challenge assumptions made by the investigator, whose closeness to the project frequently inhibits his or her ability to view it with real detachment (Shenton, 2004, p.67). Based on that sentence of Shenton, the study was available to my supervisor in order to be examined for its development and consistency.

Shenton (2004, p.73) defines transferability as a provision of background data to establish context of study and detailed description of phenomenon in question to allow comparisons to be made. Nevertheless, previous research on the topic and discussion on academic reviews declare the importance of transferability.

Shenton (2004, p.70) underlines the importance that:

“sufficient thick description of the phenomenon under investigation is provided to allow readers to have a proper understanding of it, thereby enabling them to compare the instances of the phenomenon described in the research report with those that they have seen emerge in their situations”.

This research implies the ability for apple farmers to make irrespective determinations about transferability of the thesis’s results and outcomes.

Shenton (2004, p.73) highlights the dependability as the process of employments of ‘overlapping methods’ and the in-depth methodological description. To clarify and preserve this criterion, the methodology part of my work reflects a clear list of my steps and explicit information about gathering my data. As a consequence, all the above mentioned reasons help ensure that my study is repeatable, trustworthy and reliable.
Conformability is the last of Shenton’s criteria. The concept of confirmability is the qualitative investigator’s comparable concern to objectivity (Shenton, 2004, p. 72).

Shenton (2004, p. 72) continues that:

“steps must be taken to help ensure as far as possible that the work’s findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher”.

By implementing all the research methods, my awareness was to understand the participants’ behaviors, comments from the research point, rather inflict my personal views.

These criteria were accomplished in this study not only by choosing three ways of data collection but also from examining participants that have the same specializations. As researchers we gain a greater overview of the research question and the examined topic. In conclusion, based on Shenton’s criteria, my study reaches validity and reliability as best as it could.

4.7 Ethical Consideration

The collection of data was gathered with total awareness of the ethical considerations of research. Creswell (2009) underlines the importance of the awareness in every research plan. In this case, this was accomplished by the safety of participant anonymity.

For the interview section, people were asked to fill in an invitation letter that secures them by not exposing their personal data. The anonymity remains the main factor in order to avoid any negative outcomes. In addition, interviewees were warranted that their personal information would not be shared with others in any case and, their answers would only be used for academic objectives and aims.

The consent form guarantees all the above mentioned information about the participants who took place in this research.

For the narrative stories, participants were informed about the whole research process and its scope. Those three participants gave oral consent.

In order to obtain the academic austerity and stringency of my research investigation, I guaranteed that none of the information included was constructed or falsified. As a result, this is vouched by the transcriptions of the responses and notes taken, which can be provided upon request.

4.8 Limitations

Despite the fact that steps were taken to ensure this study had validity and reliability, there are some limitations as well. First, time plays an important role to the data collection. The limited time played a role in collecting data. With this we mean, we would like to interview some intermediaries or expand the research to customers and see their views about the researched issue. Nevertheless, my three methods gave an
integrated overview of the research topic, examining all the complexities of the research question.

Moreover, the limitation of language is a significant issue. All of my participants are Greek. So, all of the oral data and material must be translated to English. I believe that when trying to translate something to another language, some of the nuances will be missed. I tried to transfer the information I gained as best as I could. At some level there is a consideration for some limitation.

The consent form was written in Greek with simple vocabulary, since I was communicating to people who some have not finished elementary school. We were very careful not to say something that they might not understand it was made clear to them that they would be able to ask me any questions they may have at any time. The consent form was well structured and readable in order for them not to get confused. My instructions for the narrative stories were simple as well.

In conclusion, by truly understanding the limitations of one’s research he can understand the collected data better and truly understand the implications of the research and the limited edge of the data.
5. Empirical Findings

The analysis is conducted on the research and concepts presented in the previous section, and introduce the empirical findings drawn from these research methods. Furthermore, the relationship between the concepts and findings is explored.

Several results are drawn from a detailed inspection of the data gathered and a thematic analysis, the purpose of which is to determine the underlying nature and conditions. A set of circumstances highlights the importance of empowering farmers to sell their own crops; the factors that are responsible for the current state of buying and selling agricultural products; the intermediaries’ role in the process of agricultural marketing and the perception of ICTs by the farmers – both literate and illiterate to new technologies.

The five concepts that stand-out from the analysis are: ‘Marketing and selling of crops, weather conditions, human factor, intermediaries-contract farming and use of ICTs in agricultural sector’. This reflects the main concepts that govern the core research. In addition, they give us holistic views for the important aspects of the agricultural process, while emphasizing the crop at the focus on the research, apples. The research conducted does not only stress the importance of ICTs but also to encourage further research. By laying the initial groundwork in this field, the results and ideas presented and processes discovered can be further developed into functional implementation in future work.

The text below highlights the most important content from the collected data, presented in this format to demonstrate its relevance to the five main concepts. The below text is formatted in a unique way to include the responses of the participants referencing the five main concepts, employing a thematic analysis and examining the research data.

5.1 Marketing and Selling of Crops

The two primary components of the agricultural production process are; the amount of product and the type of product. These factors determine the conditions for the buying and selling process of the crop. Each component and action of the agricultural process affects other steps down the chain. Understanding these steps is key to mastering the supply chain. A farmer stated:

“For all of us, the professional farmers, a good production is among others a good first step in order to have the advantage to sell our products with convenience and without problems.”

A farmer that took part in my narrative stories highlights the difficulty in not being able to sell agricultural products, due to the weakness of the crop. In 2008, not only his production, but a considerable amount of farmers was not capable of selling their crops as the imperfections of the crop meant they did not meet the buyers’ criteria. A farmer narrated:

“In 2008, I faced the worst year of all. I was not able to sell my agricultural products due to them being weak. None of them were good enough, so no intermediary wanted to buy it.”
The next year (2009), the agricultural lands were exhausted from the previous year but for one significant change; almost all the apple orchards, from almost all of the farmers had a medium level of crops. Although this was not the estimated goal for that years yield, it was better than the year before. A farmer narrated:

“In 2009, I remember, I was 17 years old. After school I was going to the farm to help my parents with the work. I remember my father’s words: ‘this is a normal year, better than the previous and I hope to be worse than the next year’. This was the reality.”

Despite the fact that there were years where the crops were weak and the farmers had difficulty selling their products, there were other years with healthy crop yield and an abundance of products to sell. A participating farmer stated that, this year all of the farmers were able to sell their agricultural products to the intermediaries, and they earned enough income to last them for the next year. He explained:

“As you may know from your father, there was a year that there were too many apples in the trees and intermediaries had come to negotiate with us early enough. It was a really special year so we were afraid of either bad weather or having not had enough time to collect them.”

5.2 Weather Conditions

Weather condition was another concept extracted in the analysis of the empirical material. Thus, the weather is an impactful and unpredictable factor in the cultivation of apples is the weather. In particular, weather conditions in a Mediterranean climate generally do not change quickly, however occasionally radical changes may occur and persist. The period of highest risk is between the months of early August until the middle of September.

The crop of apples is exposed to weather all the time. All the interviewees highlighted the kind of problems that the weather may cause to the crop. The first and the most frequent phenomenon is the heatwaves during the summer period in Greece. A participant from narrative stories method stated:

“Some years before, the summer was too hot all over Greece. Apples could not have been unaffected from such heat waves. As a result, a significant number of apples were sun burned – which may cause them to rot in two to four days.”

During these years of extreme heat, another interviewee commented, about drought is also possible. When drought occurs, the apples do not have sufficient water to grow and consequently remain small, he said. In order for this situation to be prevented, farmers are required to have a schedule to water the apple trees during this period. Municipality is generally responsible for that schedule and is also responsible for ensuring every farmer adheres to it. For this reason, there is a huge aqueduct dedicated specifically for this purpose and is effectively implemented. A farmer analyzed:

“Due to the heatwaves and the lack of the rain during the summer months, we are only able to water the apple trees via the aqueduct system. This is a rural agricultural
medium that assists the whole procedure which lasts about a month, until the process is completed and is ready to start over again. Sometimes, this seems to us that it lasts more than a month, because we have a great deal of anxiety about the risks facing our crops during this period."

Additionally, other factors caused by weather conditions that may present problems for the crop are the sudden change of temperature and the sudden change from inclement weather to sun and back again over a prolonged period.

One of the farmers emphasized weather conditions that take place during early autumn (early September). This is the last month before the crops are harvested, in which the apple has almost reached maturity. He mentioned that a lot of rain takes place during this period, and as a result, a significant number of apples received more water than they ordinarily do. In a few days, not only had these apples rotted, but the leaves of the apple tree had also fallen to the ground.

Moreover, he explained the detrimental effects of frequently changing temperatures on the health of the apples. He explained:

“All of the agricultural products are easily broken or damaged; they are ‘fragile’, since they are living organisms”.

Apples that are not able to take the appropriate nutrients from their environment, or are in shock from the fluctuation in temperature, consequently are not able to develop adequately, and remain small or without color and flavor.

Subsequently, no intermediaries were interested in buying these under developed apples, so farmers leave them on the ground. He added that, apples are affected by the position they occupy on the tree; whether they are under the leaves, or are growing on the same branch as several other apples. An interviewee farmer mentioned:

“How the apple turns out to be depends on so many factors. For example, if there is another twig right beneath an apple, and the apple rests on the twig, there is a risk of a niche being created on that apple. This later may cause the apple to rot and to the ground.”

5.3 Human Factors

In addition to the issues caused by weather, human factors can play a role. More precisely, human factors represent the farmers’ actions that may benefit or results in issues to agricultural production. Humans play an important role in the development of agricultural products. One important part of the agricultural process is the spraying of apple trees with pesticides. One of the interviewees notices that the act of spraying, the reason, the pace, the kind of pesticide, and the natural condition of the tree, create a set of conditions that can affect the success of this process, from flower to fruit. A farmer explained:

“From the time that the apple starts to grow up, we have to sprinkle the tree often and for some reasons. In particular, there are a variety of kinds of sprinklings and a variety of reasons.”
The farmer continues giving an overview of the whole procedure and the reasons for sprinkling the apples regularly. There are pesticides that are used to strengthen the branch to prevent the apple from falling easily; there are pesticides for removing harmful insects; others that improve the size, the color and the taste (sugar) of the fruit. In total, there are approximately ten to twelve sprinklings of the fruit that take place annually.

Despite these findings, organic farming still exists, since organic farming produces the healthiest product free of chemicals. At the same time, the professional farmers are divided on the way it is implemented correctly. Some farmers consider it a waste of time due to the risks, while others are open to exploring it. In the research area (Pourri), there are no organic farms, except for one. Almost half the farmers were aware of the organic method and refer to it as something new and unknown, although some farmers are beginning to experiment with it. The farmer made clear:

“It is very difficult and unthinkable for someone to plant organic trees in the area. We all use pesticides and we cannot control the wind or the pressure of the pesticide that is coming out of the sprinkling machine”.

The farmer wanted to emphasize that when pesticides are used across almost all the farms, it is hardly believable that one would be able to keep their farm entirely organic in such proximity. It is certainly possible, but the farm would have to miles away from another other farm that uses any non-organic methods.

The farmer with the organic farm did not take part in the research study, but other farmers are aware of his work and they admitted that under certain conditions, and if the demand from the market was there, they would consider it a viable option. One farmer during the interview stated:

“Our focus, as professional farmers, is the market. We want our products to be wanted and be asked from both big and small markets. Since, most of the people are not familiar with organic products and since still non-organic products are more famous, we are not going to change our methods”.

5.4 Intermediaries

Another important issue that arose from the empirical findings was the economic factor in relation to the production of agricultural products. As the production of agricultural products is affected by the above-mentioned factors, also the economic context and other external factors play a role. Farmers spoke about the price they sell their products, how that price fluctuates, and how intermediaries always will take advantage of this by altering the price to benefit their bottom line.

Based on the farmers’ responses, intermediaries currently present the only way for farmers to sell their products. This arrangement started years ago, when agricultural products were merchandized for sale at market. As it has existed for a great deal of time, it is ingrained in the culture and the agricultural process, and farmers don’t necessarily understand there may be alternate options.

August is the most important month for sales of the production. During this month, intermediaries arrive to inspect the crop and evaluate the state that they are in.
Depending on the state of the crop, and the perceived value, the intermediaries will estimate its price.

A farmer that took part in the interviews described a situation in which an intermediary was not satisfied by a portion of the crop. He explained that the intermediary visited three of his seven orchards and was not impressed by certain parts of the crop. The intermediary consequently proposed a price based on the inferior crop applied across all the orchards, even though many superior quality crops existed and were not seen. He described:

“We know, every year, we may have different crop from the previous year. Some parts of the crop may be better than some others even in the same agricultural land. This turns out to be a disadvantage for us as the intermediaries proposes prices, first for the problematic crop, which are always decreased and, then propose prices for the good part of the crop that is maybe a little better. I believe that intermediaries consider this as a tricky part for us. After that we start the negotiations”.

Prices of agricultural product can be the most delicate part of the agricultural marketing process and they change every year. Many farmers state that this is the part that is the most unpredictable and they have little to no control over. They believe that it is a little understood or unknown part of the agricultural marketing process, even though they experience it every year. A farmer said:

“When it is time to negotiate about the price of apples, I feel that I am floating in the ocean without a life boat jacket”

After negotiation, the next step of the process (according to the above interviewee) is for the farmers to gather and categorize the apples sizes using a specific tool before transferring them to the intermediaries. The intermediaries then do a second sorting of the crop. The apples that are not good enough to sell are returned to the farmers. These, along with the apples that were not initially chosen, remain with the farmers left unsold.

5.4.1 Contract Farming
The current way the farmers sell their products to the intermediaries, is a more verbal agreement than a formal farming contract. During this process, intermediaries check the crop; estimate its price which forms the basis for the deal between farmer and buyer. A farmer that took part in the interview stated:

“Contract farming for us is a verbal agreement with the intermediary that is confirmed, by the way of giving us an amount of money as a guarantee.”

As a result, there are neither policies, nor terms and conditions that govern the deal. The agreement is orally formulated and this makes the farmers feel less secure as they are not protected against any bad intentions. An interviewed farmer explained to me:

“Making a deal, without signing a contract, is rather a problem. We all know that we have to secure ourselves and our crops but to my knowledge, no one has ever signed such a contract.”
The same farmer went on giving an example:

“After the selection process, the apples are put into crates, and sent to the intermediaries. Farmers know a crate can weigh 20kg, however, when the intermediaries weigh the crates again, the generally weigh in at 15-18kg, never more than 18kg.”

He noticed at the end of his response the need and the importance of having agreements (or contract farming) to capture all the variations and discrepancies and ward against them.

5.5 Agriculture and ICT

The agricultural sector apart from having been badly affected by the economic recession has been altered by the introduction of ICTs as well. Theoretically, we can address both the bad and good effects of ICTs, but a more in depth analysis is required to examine the situation from both sides. Based on the findings from the research methods, we can better understand how farmers perceive this new era of technology in relation to agricultural production, in particular the buying and selling phase of the agricultural marketing process.

To begin with, up until a year ago, Pouri (where the research was conducted) had no access to the internet. Due to this situation, the people who live there were not sufficiently knowledgeable about new technologies or the new communication tools facilitated through the internet.

Through the farmers’ interviews, observations and stories, I noticed that some participants were favorable to the use of new technologies, while others were hesitant on immersing themselves in this world, stating that their time was too precious to deal with new things. There were also those who were quite negative towards new technologies. As a matter of fact, a participant in narrative stories shared the following experience with me:

“I remember one time, my daughter got scammed and lost a lot of money in an electronic payment. I don’t like the idea of dealing with electronic transactions and all these new technologies.”

In contrast to the above experience, while I was conducting my observations in an agricultural land, my attention was caught by a particularly technologically adept farmer. During the two hours I spent with him, he was constantly holding his phone and was checking it from time to time. I asked him, what it was that he was checking and he told me that he was worried about the next day’s whether and in particular was unsure of if he should sprinkle his corps or not. He wanted to make sure that it was not going to be windy or raining the following day, and thus was checking weather websites.

Based on the lack of internet access throughout the past years, people, in particularly more senior ones, did not have sufficient knowledge about it. Nevertheless, there were some younger farmers, who had previously left the village to study or work, but ended up later returning. These individuals consequently were given the ability to gain
knowledge on the internet and relative tools. As a matter of fact, one of the
participants in my narrative story method shared:

“I've always wanted to become a programmer, so after high school I went abroad to
study. Some years later though, my love for this place brought me back here. Now, I
mainly work as a farmer but when an electronic device breaks down, my fellow
villagers ask me to take a look.”

Even though all of the above categories do use some kind of technological
commodity, such as mobile phones and electronic devices that measure the apple’s
sugar level, to name a few. Some participants in the interview methods in my research
related these kinds of commodities to potential use of ICTs in their field, i.e.
ariculture. Most of the findings that reflect to this concept come from the three
individuals who were for the use of technology. A farmer wondered and explained:

“Now you mention it, I guess my phone itself can be considered as a technological
commodity. It took me a while to familiarize myself with it but now I cannot imagine
life without it. It could be the same with other types of technology that I haven’t tried
yet. They could prove useful too.”

In addition, those participants in the interviews noted the necessity of adequate
information. They proposed that the local agricultural association along with the
municipality could organize educational seminars and/or workshops in order to
holistically inform farmers about the advantages and, also, potential dangers, that may
arise by incorporating ICTs in their work. A farmer said:

“We are definitely not against such an initiative. On the contrary! The municipality
and the [agricultural] association can invite a speaker or organize workshops to
teach us the new ways. But we would like to know, not only the advantages we would
have by using such technologies, but also any dangers that we may face down the
road. We should be prepared in advance and not find ourselves in a tough situation
that we have no idea how to resolve.”

In particular, one participant in the interview process stressed the importance of
having farmer-oriented seminars and workshops, instead of program-oriented ones.
As they themselves are farmers, they would feel that it was a waste of their valuable
time if the programs were not tailored to their exact needs. The previous farmer
continued:

“Of course, these programs should have us, the farmers, as their center and take into
consideration our limited time and the different knowledge levels that we all have.
This would mean moving forward and changing the status quo not only as farmers but
as individuals too. It could broaden our horizons!”

Last but not least, a common and real problem remains for the farmers. The crop that
is unsold is referred as valuable for them and may give an alternative dimension to the
process of agricultural marketing. Some of the participants in my research, made
notable comments, giving ideas about initial trying in order farmers take advantage of
it. A farmer who participated in narrative stories stated:
“We don’t know what to do with the crop that remains at the agricultural lands. We don’t say that the entire crop can be sold, but frankly, an important amount of it could be exploited, in particular and firstly by us.”

Moreover, through the interview method, a young farmer made the need imperative for using the new kind of technologies, more specifically the use of ICTs in order to find out ways to sell or find out alternative ways for how to use the crop that remain at the agricultural land. This young farmer who took part in the interview method gained the stimulus from a question that I asked to him and based on his experience and previous knowledge propose it. The young farmer underlined:

“My first thought for the crop that is unsold is that we, as farmers, to use new ICTs to sell the crop that remain back at the agricultural land. First, we have to believe in ourselves, and support our will to make a different step. I was influenced by a previous question you asked and I use it now. It may need more concentration, but I think it could be implemented.”

5.6 Summary of Empirical Findings

In this chapter there is an in depth analysis of the empirical findings that came out from the three methods conducted in my research. The analysis is consisted of 5 concepts which are interrelated. The different kind of methods I used in combination with the people who took part in my research, gave me an integrated overview about farmers’ status quo, how they perceive the new technologies and their desires in order to improve and develop their skills focusing on the agricultural sector. People with different experiences and background but with common denominator, their love to agriculture and their will and desire to improve their lives, managed to outline the initial structure of an ideal community.

The first concept is referred to the selling of the crops. Also, is underlined the importance that farmers have in their minds for selling all the crops. But, this is so difficult, since other factors are influence the whole procedure of agricultural marketing.

The second concept is stated on the weather conditions and how important role it plays. There are several instances related to real facts that give us a presentation of the problems that farmers face due to the weather conditions.

On the other hand, the third concept is dedicated to human factor and highlights the situations of how human beings can affect the agricultural crops.

The fourth concept explains the role of the intermediaries and how they act during the selling and buying process. Their moves during the agricultural marketing in order to end up with the price of the products. In addition, the farmers’ thoughts about contract farming were expressed.

The fifth concept describes the perception of ICTs by the farmers. Also, the role of ICTs is described on the situation about the crop that is unsold and remains at the agricultural lands.
To the next chapter, I am going to develop a discussion section dedicated to the empirical findings in relation to previous research and literature on the issue. The focus will be in giving explanations and interpretations about the research question which is placed in the very beginning of this thesis.
6. Discussion

In this chapter is discussed the concepts of the empirical findings section and the connection with the research questions and other issues and comments that came out through the analysis method. The main goal of this chapter is to response to the research questions and considering the results of the data collection.

My love and interest for my village and for the people who live there lead me to do this type of research. I was raised in the region of Greece; I knew an abundant amount of information about this region and life in this rural farming community. Being given the ability to help an existing issue with this particular community which I love coupled with my knowledge in ICT’s I was able to push myself to incredible lengths to conduct this research which intern I hold dear to my heart

Without the use of ethnography, I would never find the way to conduct this thesis. These tools assisted me to discover a new world in research and helped me define and set new guidelines to what research meant for me. Through these methods I found the connections with my research topic in order to be examine the possibilities for ICT’s in this community.

The initial intention was to examine the current situation of the agricultural marketing system in this particular area, focusing on the crop that is unsold which remains and rots on the agricultural lands. Then my thoughts were to discover which way ICTs could help this type of situation and find a better more viable conclusion. Five concepts were created by the analysis of the empirical findings, stated in the previous chapter. In this portion of this thesis, it is time to argue these concepts in relation to previous literature researched, this way we can take a unique point of view on these issues.

The research question asks:

- What are the current methods that farmers in Pouri employ to buy and sell their products?
- How can farmers, go beyond the current methods by employing ICTs in order to find new ways to sell their crops, improve efficiencies, and enhance production?

6.1 Marketing and Selling of Crops

Agricultural marketing is a process that plays a significant role in promoting and selling the agricultural crops. Agricultural marketing embraces the steps from the actions that take place in the agricultural land till the step that the product reaches the end customer.

Abdullah and Hossain (2013, p.130) suggest:

“agricultural marketing is an essential tool for uninterrupted, adequate and timely supply of agricultural products, inputs and services to target groups, including procedures, consumers and intermediaries”.

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Abdullah and Hossain give an integrated overview of what is happening and what is under consideration.

Kolter’s (2014) concept of agricultural marketing highlights the idea as selling what you make rather than making what you sell. In my case, the main income of the families comes from the agricultural crops. Examining the socio-economic factors of the general environment and connecting my work with Kolter’ concept, it is important for farmers to understand that they can go beyond the rural crop producing work and let themselves be creative and inspired in the way they sell their crop.

A variety of actions take place in order for the procedure of agricultural marketing can be implemented and completed. Among other actions of this process, the economic part plays an important role. Patel and Shukla (2014, p.378) notices and separated the importance of agricultural marketing in three parts:

- To analyze the transaction of agricultural crops through rural markets,
- To highlight the price structure of different crops in rural markets and,
- To examine the composition and structure of sellers and traders engage in.

Firstly, the analysis of the transaction of the agricultural crops in combination with rural market highlights the instant relationship that the procedure of transactions, the kind of crops and the rural markets hold. Farmers mind as a matter of fact that, all their crops should be sold in the markets, as a result to be considered a good year. According to my research, farmers believe that having a good crop means automatically that they can sell their products to intermediaries. Also, the analysis of transaction of agricultural crops through rural market that Patel and Shukla (2014) estimate as the first important of agricultural marketing, in my case is implemented by the intermediaries. This happen, because intermediaries have instant connection both with the farmers and the markets.

To connect with the case, agricultural marketing embraces, spraying of trees, watering of the trees, pruning and thinning, selling and promoting the products and the crop’s condition in general. All those farming activities reflect the farmer’s process in this particular area.

One more statement that could be added to the above mentioned Patel’s and Shukla’s (2014) ascertainment is the analysis of the crops’ condition. Based on the findings, both farmers and intermediaries are worried about the crops. The importance of a strong well developed crop is to have it more easily sold in the urban markets. From the one side, we have the farmers that want to sell their crops, in the middle is the intermediaries that want to buy and sell good products and at the end is the market that wants to have good agricultural product, as to attract more customers who value a particular looking crop.

**6.2 Weather Condition**

Weather conditions such as climate changes, the repeated fluctuations in temperature, drought and floods play a part in the development process of the agricultural product. Most of Europe has experienced increases in surface air temperature during the 20th century, which amounts to 0.8° C increase in annual mean temperature over the entire continent (Beniston and Tol, 1998). Greece is one of the twenty-eight European
Union members. The importance of examining Greece as a separate region is just as important as examined Greece as a part-member of a bigger community, the E.U. community. As a member of E.U., Greece is not only affected by temperatures but also by the changing policies which affect the market. As a result, Greek agriculture is influenced by the principle actions proposed by the E.U. which change and force the agricultural markets to react in different ways.

Olesen and Bindi (2002) argue about the climate changes in European countries in relation to agricultural productivity. In relation to my research, Greece is affected by several climate changes and that has an impact on the agricultural sector. In addition, they underline that extreme weather conditions which could cause havoc on the crop overall affecting the agricultural product as well as at the market as a whole.

The weather is an unpredictable factor. It could change from moment to moment. Extreme meteorological events, such as spells of high temperature, heavy storms, or droughts, can severely disrupt crop production (Olesen and Bindi, 2002, p. 246). Having a look at the research findings, farmers are never sure, about the quality of crop they would have at the end of the year. Through the research findings we can see that the Greek farmers have discussed the issues that these kind of weather events can cause to their bottom line as well as to the market as a whole.

Increase in temperature (Olesen and Bindi, 2002; Malla, 2009; Kumar and Parikh, 2001) floods or too much rainfalls (Olesen and Bindi, 2002; Malla, 2009) and droughts (Olesen and Bindi, 2002) can cause severe problems that are stated by the farmers that took part in my research. Farmers underline that heatwaves in summer burn the apples in very short amount of time, they dry and fall down to the ground and rot. Moreover, they highlight that droughts, affect the agricultural crop but they try to minimize the problem following a schedule for watering the trees based on the Municipality’s instructions. On the other hand, heavy rainfalls, cause intense and great problems as well. As a negative effect of too much rain, apples gain a lot of water in their flesh, so they become more susceptible to rot. In addition, the sudden and repeated change of the temperature affects the apples in a way that, they do not gain all the useful components such as size, color, and flavor.

The agricultural crops are characterized as ‘fragile’ by the farmers. This fragility is not difficult to be damaged or destroyed by the unpredictable weather changes and conditions. Malla (2009) and Parry et al. (1999) agreed that agriculture is sensitive to short-term changes in weather that affect the production of crops, thus agriculture is affected differently in different parts of the world.

6.3 Human Factors

In this section, the intention is not to go through the benefits and hazards of pesticides on the human being but to underline some issues with humans that are causing problems to the environment, in particular to the crop. The focus is to the point that humans use pesticides in order to improve their agricultural crops but sometimes pesticides destroy part of the crop as well.

Farmers use pesticides in order to kill caterpillars, benefit yield and better quality of the crop (Aktar, Segunpta, and Chowdhury, 2009, p. 1). However, pesticides can be harmful both to the environment in general and to the agricultural crop which is sold.
Farmers in my research find the action of spraying the trees with pesticides very important and useful. There are numerous pesticides that are responsible for the size; the color, the strength, and the flavor of the apple crop, there are even pesticides to keep the branch and the stem strong so that they don’t break from the weight of the apples. Although the fact those pesticides are expensive the farmers prefer it than any other action or process. It may be an easy choice for them.

Moving forward, and making a 180°–turn from traditional apple farming, organic farming has appeared. In my research only one farmer produces an organic product, since it is more difficult for them to develop an organic rural farm. Farmers find it difficult to start dealing with organic products due to several issues. One particular issue is that the organic farms exist in between non-organic farms. Since pesticides are sprayed onto trees the wind often spreads the pesticides to surrounding agricultural farms as well making it almost impossible to produce an organic product. The one particular farming this research that produced an organic product was far away from the rest of the agricultural lands.

In conclusion, farmers admit the use and abuse of the pesticides (Aktar, Segunpta and Chowdhury, 2009, p. 1) on the agricultural lands and according to the farmers’ view, their attention and focus is on the market and how they can sell their production. Till now, they have not noticed a dramatic change in the market and a significant growth in the organic apple market. It seems that this change to a more organic product may be seen in the future but for now it is not what the market is calling for. A contributing factor may be due to the increase price of the organic product and the decrease in the overall economy in Greece.

6.4 Intermediaries

Intermediaries are a part of the process of agricultural marketing. Based on this research, intermediaries are mostly individuals who represent a bigger organization, in this area of Greece. The intermediaries are responsible for selling and promoting agricultural products either in several rural markets in the country or they sell the crop to markets abroad. One of the empirical findings is that farmers can find advantages and disadvantages from their interrelationships with these intermediaries.

As in the research area, farmers do not have direct access to the market. Abdullah and Hossain (2013, p.130) note that in Bangladesh, agricultural business is entirely based on intermediaries because farmers are not familiar with how to access the markets, where they can promote and sell their products.

According to the farmers that took part in my research, they explain the fact that intermediaries are the only way to the markets. Farmers could only sell their products to the intermediaries. Abdullah and Hossain (2013, p.130) find a problem to the supply chain of farmers’ products and commodities and discuss this difficult situation of getting goods to the market and attribute it to the lack of literacy of the farmers.

On the one hand, farmers are frustrated with their relationship with the intermediaries based on the offered price; they first recognize and admit that they depend on these intermediaries to assist them with the market. Lehtinen, Ahokangas and Lu (2016, p.1181) explains the importance of the intermediaries to the agricultural marketing and promotion of the products, not only to the local markets but also to the export
markets. Intermediaries not only have knowledge about marketing, pro and cons, about distributions of products, but they also know about customers’ needs. As a consequence, intermediaries around the world can act as vital bridges between the farmers and the end customer. They can help people and institutions that provide resources and often shape the rules of the game to make better investments in the people and communities that lack resources—and, too often, also lack the influence needed to change that (de Souza Briggs, 2003, p.5).

Based on the thesis, intermediaries are responsible for selling the agricultural products that they buy from farmers. They have the control of the sold crop, so they should sell it based on the opportunities they have or they want to explore. Ellis (2003) states that intermediaries increase and improve the quality of productivity of host economies, meliorate the efficiency of distribution, open up new markets, develop marketing technology, decrease costs in order to overcome the obstacles to trade.

Surprisingly a great number of farmers support that use of intermediaries because it is the only way they know how to get their product to the market. Based on the findings, farmers state that intermediaries try to take advantage of the farmers by paying more attention to the lower grade crop and focusing on the amount of grade B product. As a result, intermediaries make offers for the whole crop, but the price is reflecting a lower value due to the emphasis the intermediary places on the lower grade crop. To associate with my case, there are some farmers that are frustrated with the intermediaries. They support that the intermediaries are trying to take advantage, without considering the farmers hard work and losses. Patel and Shukla (2014, p.378) liken intermediaries and middlemen as vultures that eat away the benefits that the farmers are supposed to get.

Nayak (2014) argues that middlemen deceive farmers as to the true value of product they are selling. Abdullah and Hossain (2013) state that farmers are deprived of getting the right price for their products.

Furthermore, in order for an intermediary to buy a farmer agricultural products, they must first provide an amount of money in advanced in order for the deal to be completed. Nayak (2014) states that intermediaries provide money in advance to the farmers to cover cultivation and other expanses of the agricultural work and recall their loan for production after harvesting has taken place.

The same is happening to the researched area. Farmers indicate that, no contract farming is signed, only a verbal agreement that is confirmed by the amount of money, as a guarantee. As a result, a deal, without terms and conditions is risky for the farmers.

One farmer which participated in the narrative story method highlighted such an event:

“Just to have an image about the selling procedure, I’ m telling you that the total amount of money reflecting to the crop is separated into doses which are given to us over the whole year. So, I had an agreement with an intermediary who bankrupted in the middle of the year. As a result, I will not get the doses I should have been paid. So, without contracts and written agreements I could not take any legal action.
Fortunately, he returned back after two years, and gave me the 2/3 of the money he owed me.”

According to the Food and Agricultural Organization of the United Nations, contract farming is a part of the agricultural marketing system and acts by connecting the producer with the buyer. The organization notes the importance of contract farming which enclose the obligations of farmers and buyers, this entails the sellers’ obligation to supply the volume and quality of product as specified and the buyers’ obligation to off-take the goods and realize payments as agreed. Eaton and Shepherd (2001, p.1) underlines that a well-organized contract farming offers an important way in which small producers can farm in a commercial way.

Based on the Eaton and Shepherd models of contract farming (2001, pp.43-44) and associated with this case, the informal model is the most appropriate that can be distinguished in this research area. To explain further, there is no contract farming among farmers and intermediaries, as a result there are only oral deals without signing any kind of paperwork. This is a gap to the agricultural chain which both sides have noticed.

To conclude, not only intermediaries and their role, but the whole procedure with the contract farming agreement could affect the relationships between farmers and middlemen. Contract farming could avoid numerous and severe issues that are developing with the relationship between farmers and middlemen.

6.5 ICTs in the Agricultural Sector

ICTs and new technologies are considered, without a doubt, as the new era of the present and near future. All the sectors, especially on a professional level, have been influenced by the impact of the ICTs. The focus remains whether technology determines society or society determines technology (Quan-Haase, 2013, p.42)

By the research conducted in this particular area of Greece, we can determine that there is a huge amount of people who support technology but then there are those who are against it. In connection with my research and based on the analysis of the empirical findings, there are farmers who are positive with technology and ICTs whereas there are those who for some reason are against the influence of technologies in this sector. To be more specific, the farmers that participated in this research, and based on their views and comments, describe their opposing views about using ICTs in their workload.

To begin with, those who are not optimistic of the use of ICTs believe that their time is precious and feel that they don’t have time to or energy to begin learning a whole new. Since the area had no access to ICT’s previously, they have neither incentives nor the will to do so, as a result they don’t believe it will be beneficial. Also some individuals, either due to their background or current environment, have fear of IT or feel that it will be difficult to implement and use. It is hypothesised that an individual will use IT more if they have a positive perception or high trust level in IT (Patel and Shukla, 2014, p. 379).
For instance, the situation of the farmer that is referred to the fraud that his daughter faced, it demonstrates his thoughts and beliefs about ICTs while he expresses, through his words, his criticism, negativity and pessimism about this new era of technology.

Whereas, there are those who are keen on technological commodities and innovations, they use it in their every day’s life, including their work. Patel and Shukla (2014) underline the importance of technology which farmers should have access to. In relation to my research, it is highlighted that those farmers that are favourable to technology and ICTs could more easily find a solution to a problem or check for something they are interested in ICT services assist farmers to understand their modern cultivation methods, availability of agriculture inputs, irrigational sources, availability of pesticide and fertilizers for increasing the production and productivity of crops (Mahajan, Muller and Bass, 1991).

Despite the fact that some are ‘utopians’ and some are ‘dystopians’ about using technological commodities and innovations and their effects on society, the remarkable point here is that all of them use some kind of technology. Based on my research, farmers find it difficult to acknowledge the potentialities of technology and the great opportunities it has. Through the questions of the questionnaire and based on the responses they gave, they came to the realization that technology is in their everyday lives, to some in a higher level, to some in a lower level.

Some of them, want to reach beyond their status quo, they want to broaden their minds, came to the conclusion that maybe ICTs can be considered as some kind of technology which in a period time from now, they assume it as normal and they will have ICT’s embodied in their lives. They believe that, even the use of mobile phones was something new when they came in our lives and we never understood what profound affect they would have, the same is happening with ICTs.

A Young farmer during the interview stated strongly that they seem to have a more optimistic outlook on technology. He said:

“We will definitely come to the point to consider ICTs as part of our lives, such as mobile phones”

From the empirical settings of my research, the two main categories, that stand out reflect the way that society and the people who live in it are interrelated and affected (Quan-Haase, 2013, p. 41). The following figure reflects the technology way that technology affects society and society affects technology. It also shows the influence from each other, while ending up, underlining the social change. Patel and Shukla (2014, p. 379) refers the social development and economic development by the use of ICTs.
Based on the above mentioned figure (see Figure 9) and based on the empirical findings, we conclude that technology affects and is affected by the people who live in a community and what kind of technology they use. Also, society affects and is affected by technology. To sum up, technological determinism views technology as the driving force of social change, while social determinism vies social factors as affecting technological development and use (Quan-Haase, 2013, p. 48). Since, the examination of my researched area covers a certain area of Greece, this area, without a doubt, has a different social background, different historical context, different cultural experiences, these mean, based on Quan-Haase (2013), that technology can cause multiple and different things.

Explaining the first case connected with the research. Farmers are already keen on some kinds of technologies, such as, agricultural machines or tools. So, when this kind of technology entered the farmers’ everyday lives, farmers were affected either in a bad or in a good way. The same happens with the ICTs, some farmers find it useful and practical while some others find it difficult to use such technologies. But at the end, society and people who live in are affected.
The second case indicates the fact that society affects technology. In relation to my thesis, farmers can affect technology in the level of use. To mention an example, people made other people find ways and create tools that make their lives easier and more effective. This shows that people can affect technology too.

In the last case, technology and society are affected by each other. Combining the above examples and situations, we can determine that there are influences both for and from technology and society.

However, there are some people who do not have sufficient knowledge in order to start using the internet functionally or make electronic fund transfers. Above, I referred to people, who are ideologically against technology due to the fact that they have faced a negative situation, fear it, or due to the lack of knowledge and understanding of its benefits.

Broady, Chan and Cuputi (2010) underline the difficulties that older people face in order to ‘communicate’ with computers and familiarize themselves with ICTs. Based on the research conducted by Broady and Babcock (1997) computer anxiety may be developed in young and older people. The examination of their research shows that age, among others, plays an important role to the anxiety that people have during a computer use, while they came to a conclusion that older people face higher levels of computer anxiety then the younger people.

Based on the research, the farmer whose daughter lost an amount of money in an electronic payment has anxiety in order to proceed and complete such actions and this feeling spread to all her interactions with ICTs.

Furthermore, a great feature that farmers should obtain in order to reduce anxiety and fear is trust in ICTs. Kayathilake, Jayaweera and Waidyasekera (2010) underline that the better informed farmers trust ICTs more. In order to have trust in something, you have to learn and experience it. Some of the farmers in the research have no experience and they have inadequate knowledge on the ICTs. Factors like the lack of ICT proficiency, lack of ICT benefit awareness, too hard to use, lack of technological infrastructure, cost of technology, trust level in the ICT system, lack of training, system integration and software availability limit the use of ICTs by farmers (Taragola and Gelb, 2005).

Active ICT farmers who participated in the research, having taken advantage of the questions and responses, one can conclude that having training programs and seminars for the better understanding of the uses of ICTs based on the agricultural sector is beneficial. Patel and Shukla (2014, p.378) underline the importance of an individual gaining knowledge not only how a computer is used, but also to have access to the equipment. They find significant useful for farmers to know about the ability to upgrade computer hardware and software, the prices of computer equipment, the expenses of the internet use (Patel and Shukla, 2014, p.379). The higher the level of the gained ICT information a farmer has, the better reaction farmer will have during ICTs actions.

Those farmers underline the need of such workshops and training programs, because of the rapid change of the world, and the need to cover and develop their agricultural...
work systems. In addition, they state that those programs should be charged on the municipality or the organization. They highlighted the need farmers will be the core of such programs, since farmers and, in particular the illiterate farmers, are the weakest link in the chain. Patel and Shukla (2014, p.379) refer that ICT offers an abundant of special programs for farmers, both for the social development and the economic development. As a consequence, there are farmers that are knowledgeable on ICTs and are willing to help those who do not know as much. This reveals a team spirit that people have in order to develop their community they live and broaden their mind, as an ultimate goal the farmer’s education.

Last but not least, a real problem that arose through the research methods and empirical settings is the crop that remains unsold. Their comments on that problematic situation are valuable and my intention is that, a solution may be concealed to the above mentioned theories and practices. Without having evidence for the reasons that farmers do nothing on that issue and based on their initiative thoughts and ideas on ICTs, I conclude that theoretically the cooperation between local organization and farmers on the level of ICTs can provide and empower them with the suitable information in order to handle situations such as, problems with middlemen and the unsold crops.

In the case of the research issue and based on the researched subjects, the power to act and take advantage of the ICTs is evident. The involved stakeholders are eager enough to embrace information and communication technology in order to improve the agricultural works. It should be noted that, those ideas and thoughts are not from all the farmers and reflects a small amount of professionals, but is a good start in order to make a real difference.

All the propositions and suggestions, ideal and thoughts, could be posed as issues in a general meeting, all farmers and local organizations and municipality should participate. Also, they have to be valued in order to a future plan is made which will embrace foundations and practices for the initial implementation of ICTs, in order to become an integral part of the agricultural system. This plan should be holistic and adopted by all farmers, differently, this could cause problems in the community and would lead the no estimated results.

6.6 Summary

In this subchapter there is a connection of ICTs with the five concepts that came up from empirical findings. How the use of ICTs could benefit the current state of affairs? This subchapter shows how possibilities afforded by ICTs could help solve the problems that have been shown to exist without forget considering the risks.

Agriculture is one of the most important sectors of a nation and could benefit tremendously with the applications of ICTs, especially in bringing changes to socio-economic conditions of poor backward areas (Patel and Shukla, 2014, p.377). Since my research area is characterized as a poor area (Diamantakos, 1997) the use of ICTs could improve agricultural marketing and productivity and raise smallholder income.

Based on the World Bank (2009) farmers in rural areas usually face problems with failed crops while due to limited communications facilities, they sometimes are not able to solve the problems.
Patel and Shukla (2014, .378) state that farmers who rely on the use of ICTs could deal with a:

“numerous interconnected activities that are involved, such as planning production, growing and harvesting, grading, packing, transport, storage, agro and food processing, distribution advertising and sale”.

With the use of ICT all the farmers could learn about planning production in a different way which would benefit themselves, to gain knowledge about new ways of growing and harvesting the apple crops, to learn about new kinds of apples and the geographic places they are better to be planted. In addition, with the use of ICTs, there are a numerous of information and practices on new and more efficient ways of packing, grading the crops in order not to be affected. In addition, ICTs give the chance to the farmers look for new ways of selling and promoting their products, or to find more choices of intermediaries all around Greece, or even abroad.

In addition, based on ICTs, farmers might use market information to obtain higher prices and gain knowledge on managing sales and analyzing the marketing environment in order to take advantage of it. ICTs give also the potentialities to farmers to control for better traceability and compliance with quality and safety standards. One more prerogative that ICTs offer to farmers is the convenience to learn how to better the production management analyzing data for smallholders.

The use of ICTs could empower and benefit the way that the fruits are going to grow. Based on empirical findings on my research, the two main factors that affect the crops are the weather conditions and the farmers’ actions during the agricultural works. ICTs offer a lot of modes which farmers could learn about both weather forecast and new ways to implement to the farming works. Based on a research about Uganda and how the youth are making good money from ICTs, Writer (2015) describes an invention named «Akorion» operating by smartphones. This application provides extension services to farmers on topics such as better ergonomic practices on weather forecasts, market prices, digital financial services such as savings, transactions and credit and crop insurance (Writer, 2015).

To connect with the research, farmers could gain knowledge on the things they are interested in by the use of ICTs. As of the example of Uganda, in Greece also there are applications that predict the forecast specifically for each area. Farmers could be assisted by such applications in order to accomplish the best for the rural works. Also through ICTs farmers could enjoy several forums of their interests and following and participating to topics about the agricultural sector they are interested. On those forums there are plenty of information about other farmers’ experiences and knowledge, as a consequence farmers from the researched area could not only learn for example new ways of promoting and selling agricultural products but also to provide their knowledge to the forum for the distant farmers. In addition, with the use of ICTs farmers could continuously be up to date about communications and notifications for several programs by the Ministry of Rural Development and Food of Greece and the European Union. Following programs such as broad agricultural extension activities; developing farming system research and extension; having
location-specific modules of research (Meera, Jhamtani and Rao, 2004, p.1), the socio-economic factors would be effectively affected.

Furthermore, ICTs offers plenty of choices and information about all the pesticides that farmers could use. As a consequence, farmers could search for effects and what use of them to different crops and contexts in order to avoid a pesticide that can be harmful to the crop or to use a pesticide that can empower the fruits.

As mentioned earlier ICTs can provide a lot of choices through which farmers can promote and sell their products. In Greece there are several movements about skipping intermediaries and sell the products direct to the market. Since this is a new action and some farmers have already tried. With the abovementioned statement, it is highlighted that the farmers have the choice to avoid selling products to the intermediaries and sell it via ICTs, but the result is unsure.

In addition, since intermediaries are more expert at selling the products they have the knowledge of exploring better new markets and possible buyers. For intermediaries is more easy to search for a buyer abroad than the farmer who are not familiar with that sector.

Farmers in the research are most familiar with the some stages of the agricultural marketing while to some other they have insufficient knowledge.

From empirical findings came up that there is an amount of crop that intermediaries do not want to buy, but farmers want to sell it, even in lower price. Farmers with the use of ICTs, could find buyers who are interested to buy such crops, for example making apple juices or apple pies. In addition, farmers with the use of ICTs could find organization to sell their product or donate the crops in order homeless people or refugees can take advantage of it.

O’Donnell (2013) underline that there is no single, best ICT solution for all the circumstances. As a consequence, O’Donnell mark that technology is not a solution on its own, but it can be used as a tool in order to help and better to achieve our objectives. For the case, ICTs can offer choices and possibilities which farmers can rely on, in order to improve and enhance the agricultural marketing and find solutions to current or upcoming problems.

Lastly, apart from the solution that ICTs may provide to the problematic area, our concern should not move on without considering risks emerged from the implementation of ICTs. As it is said before, people is technologically not advanced since the were lack of technological infrastructure since 2016. In addition, based on the findings, there is a negative feeling of using technology in cases that has to do with money. Also, the majority of people have finished only the primary education.

Since, technology embraces some more complicated issues and parts than searching on the internet or create a social media profile, the awareness of the different and several, both good and bad uses of technology, perceived from the farmers should be in the core.
6.7 Reflections

The research was conducted under a field of work, as the research approach has been influenced by the ethnography and the methods. The intention was to gain deeper knowledge both for the context of the researched area and for the relationships between me as a researcher and people who took part in my research. The fact that, I grew up at this area, gave me the prerogative to already have relatives and other kinds of relationship with the people who live there. Although, dedicated time to the researched was interesting enough, for examining the issue based on certain methods and methodology, in order to reach the initial research question that is stated at the start of my thesis. Although the previous experience on agriculture, thus my dad is a farmer, I had never spent time in another farmer’s agricultural land. This gave me the opportunity to examine and compare what kind of activities take place in rural farms and how farmers react when they have to face an issue. Their acceptance to have me with them for a certain time of period was a catalytic part for the foundation of the work.

In spite the fact that contract farming is an unclear procedure according to this case, I strongly believe that the relationships among the main stakeholders (farmers and intermediaries) are affected by having contract farming or not. This concept assisted the research to draw their interactions and interrelationships with each other related to the rural sector and gain knowledge on how contract farming can better or not those relationships.

I started with the interviews. After completed the first interview I realized the weakness of some questions, so I had to change them and continue with the second form of the interview guide. While I was reformulating the interview guide I thought to conduct the first part of my observation method. My intention was, farmers would not be influenced by the questions. I wanted intentional actions be avoided. Having finished the first part of observation, I continue with the second form of interview guide.

During the first part of observations and more specific at the second session I noticed a negative feeling that farmer had for his mobile phone, since he was always leaving it far away from him. So, I asked him the reason he was doing it.

Another reason of doing that was to gain time. Since I had to reformulate the interview guide, I needed time. Observation was an enough time period for me. My thought was that, farmers do not have much time, so I wanted to be precise, typical and accurate, in order to avoid wasting their valuable time. Also, I wanted to be sure that the questions were reformulated in such a way that, questions were simple, touchable easy to response and not provoke anxiety and stress. In addition, my interview’s questions should be formulated in the appropriate way and language, since the participants are professionals and experts on their field.

Furthermore, my schedule was organized to have one part of observation. While I was studying about previous research on the issue and having the result of the interviews, I thought to have an observation between intermediaries and farmers. The only thing that I could do was to ask from two farmers that I have close relation to take me to the discussion. The discussion was a negotiation about the offered price by the intermediaries to the farmers about the apple crop of this year. This gave me an
insight view and integrated overview about this action, gathering both advantages and disadvantages of the negotiation.

During the interviews I realized that all farmers have a common language and perception of the issues. As you see, in the empirical findings section, all the farmers’ response with the word “we”. This seems to be a very important way for them. They probably use it, because they have a team spirit and they are a community that everyone has the same rights and all the voices could be listened. In addition, this came from one more situation, the fact that people who are more engaged with technology want to help those who are not keen on it. This keeps them tight hard and for that reason they can accomplish the goal for whatever they choose.

One the other hand, they also have their own views on issues and actions. Based on their different backgrounds and experience, the responses and comments were different. This was helpful for me, in order to examine the society through the several views and different thoughts.

They gave me the impression that they felt convenience and calm. Since, I was not an unknown person to them, they felt trust about both for the methods I used and for the responses and comments they made.

Storytelling method came last. Facts from real life that happed to farmers were like signature to my research. Both of all the participants were fluently to describe events that provoke any kind of difficulties. Based on the way they told me the stories and the intense passion they add, I felt that they had the need of someone ask about that and then just listen to their stories. Maybe for them was a relieved part, to know that someone knows about their problematic situations they face.

Since, I always knew that farmers were not obliged to take part in my research; I felt surprise about their will to participate. The farmers accepted me as a researcher, and they were professional with me. They were always open to ask the upcoming questions and to explain me something I had not understood. For instance, some of them, after completing the interviews told me, not to hesitate contact with them if I wanted to ask something more or to ask explanations for something.

From my conducted research I realized that farmers need motivation in order to start a new thing. They need to believe in something or someone and this trust be forever and not for some time of period.

This research brought me more closely to the agricultural sector. I caught myself, very often, to contemplate all those things I did, people I met, knowledge I gain, in order to not only complete my thesis, but also to hear the farmers and assist them in the way I could. Even though, my knowledge on farming was quite good, I personally took motivation in order to think of dealing with the agricultural sector, on the research level, in the future.

Despite the fact that, I mostly knew the farmers, I was totally unaware of the methods I used, in practice. I had the theoretical background and it was time to put them in action. Always the unknown provoke us with fear. So, I was kind of stressed and unsure about the process and results I would collect. Also, I was thinking of the
farmers and my intention not to bother them, but I was lucky. None of them, act to me in a bad way or talked to me abruptly.

All of them are interested to know about the fate and development of my work and some of them characterized as a worthy piece for their area. For sure, I fell very grateful for all the knowledge they gave me and in relation to the methods I use I realize how important is the examination of an issue in order to analyze it and try to response. Without a doubt, the intention for development both from the researcher and the researched subject in combination with the selected methods could lead to significant results.
7. Conclusion

This chapter is dedicated to the conclusion of the research, while there are suggestions for further research and study.

Developing countries’ access to ICTs has increased with the rapid development of technology in the last decade. Some sectors have been affected in a higher level and some others in a lower level, but there is still room to improve, specifically in rural areas.

Have to be underlined that ICTs, not only provide profitable opportunities to the agricultural sector but also play a critical role within the society, since other sectors are affected as well. ICTs still remain a crucial and important issue not only for the developed countries but also for those countries which now are less competitive and innovative in order to get advantage of and improve their efficacy within several sectors.

In the researched area, the lack of using ICTs may be a disadvantage for the entire environment. Other instances, for using ICTs in the agricultural sector may empower and strength may be considered as plans and actions to follow in order to accomplish the goal. It should be mentioned that ICTs are not the only way to solve the problem for selling the crop that remain at the agricultural land, but other ways could be found through systematic research and analysis of the facts.

The suggestions that are presented to the research are the farmer’s thoughts and ideas, which with a researched point of view were clearly stated in this thesis. Relying onto the empirical findings, the research topic is affected by a numerous of factors, such as the economic recession, weather conditions, human factors, the intermediaries’ and farmers’ way of thinking, the contract farming stage and the existing ICTs’ applications within the agricultural sector. Those factors could be considered as inspiration for further research and designing methods, since it is assumed as an initial stage to provide solutions.

The ethnography as a research approach provides the change to have a deeper knowledge of the researched area, combining the general environment; including the socio-economic environment, with the immerse contact with people who live to the agricultural region. The research fits in this area with these measures and features. The same research by another researcher, to another place, another time, with different participants, will have totally different results and consequences.

The research has not implemented the Participatory design method, but considering this method as an idea through the stages; it forms a number of features related this case. Relative and similar researches, dedicated to the Greek farmers and more specific to the apple Greek farmers in the Greek context, are not available.

After using the methods for collecting the data, participants might be inspired and provided with a motive to have their own movement for gaining the lost ground, with the assistance of ICTs. Starting dealing with the issue from inside, with real interesting and will, farmers can provide significant propositions as solutions to their issues.
In additions, this research shows the future co-operation between farmers, the local organizations and municipality in order to design some most comprehensive, integrated and complete ideas and solutions for the local apple community. People, without exception should take advantage of these designing.

Agricultural is a sector that could still accept new ways of practices and applications, either based on ICTs or based on other innovations. There is always space and ways to avoid the negative effect of the environment and turn those negativities to priorities, prerogatives and advantages for the common good of the area.

7.1 Recommendations

ICTs can strongly support some of the processes in agricultural sector and provide adequate assistance to the farmers. ICTs can act as a bridge between the traditional and the new modern ways of information systems.

Applications of ICTs in order to support the agricultural sector and rural development as a result of the data processing within the case of Pouri:

- Economic development of agricultural producers. ICTs can play a prominent role of selling the crops. Farmers may have the ability to communicate not only with the intermediaries but directly with the market or the customers.
- Community development. ICTs can provide farmers with knowledge and applications that they are aware of. They can gain knowledge for new pesticides and their impacts on apple farming, to learn about new tools that could assist farmers with their works at the apple farms and to search for everything they are interested in.
- Research and education. As it is mentioned before, in case of Pouri, there is a number of farmers that have inadequate knowledge of ICTs. A cooperation between municipality and local association of farmers may organize some educational programs, seminars or workshops, in order farmers getting used with the use of technologies in several parts. Those seminars could provide examples of the right and false use of technologies in order participants are aware of risks and dangers, giving emphasis to the security and privacy. In addition, in the seminars, they may learn how to avoid the “noise” of the internet.
- Sell more of their crops. It is stated that a great number of the producing crop remain unsold at the agricultural farms. ICTs can provide farmers with plenty of choices of using this kind of crops in different sever ways. It can be sold, directly from farmers, to patisseries or factories that make jam and juices. Also, it can be donated to some of Non-Governmental Organizations in order be distributed to people need it, as the apple is one of the most nutritious fruit.
7.2 Contribution of the Study
Firstly, this research suggests ways that with the use of ICTs can provide solutions to the issues rose, concerning people of a geographical context in the middle of the economic recession. Economic crisis and austerity, sometimes, could function as key components to make improvements and enhancements to the current way we act or live.

Moreover, this study has also shown the cooperative spirits among farmers, their intention to assist their fellows and themselves as well. From the empirical findings, there are suggestions expressed from farmers which reflect their creativity and their innovative thought that they have. In addition, a more closely collaboration with the local municipality should provide a further assistance to improve this context in general.

In addition, the use of ethnography methodology contributes to the better of collecting the data and understanding the current situation of the farmers’ environment.

Furthermore, the farmers benefit they took from the collecting methods, they may use it to benefit the local community as well. After completed the data collection, farmers have a clearer view of the implementation of the ICTs in their field.

Finally, this research case has contributed towards supporting the farmers who live in this specific area, learning about the abilities of the use of ICTs in their field, how to engage the old current methods with future new methods in order to improve the buying and selling process of the agricultural products (apples) and why not to expand other activities. Lastly, this research has contributed to the ways that farmers, without looking to the current economic situations, can find solutions to the problems they face.

7.3 Further Research
The agricultural sector is one of the most valuable sectors in Greek economic development. This research showed us that in the researched area of Greece, there are people who either have basic knowledge on ICTs, or advanced knowledge on ICTs, or none knowledge on ICTs. But the most important of all is the will and intention of farmers to learn and embody the technologies in their lives.

Since some ideas came up from the farmers’ thoughts, views and motivations, and since they are the experts who have a comprehensive and authoritative knowledge and skills on their rural field, apple farmers should be determined to any future procedure in order the ICTs be part of their working life, within the agricultural sector.

The research has no use of participatory design as an action or method, but it is used as an idea for further information. In addition, based on the farmer’s conclusions, motivation is always a significant part for something new and unknown.

Moreover, my focus was on the agricultural crop and, in particular in the apple crop. Regarding on examining what is happening to the other agricultural communities around the world can empower the value of the research. In addition, analyzing
instances from developing countries and from countries that now starts to use ICTs in the agricultural sector may be provided important knowledge.

Agricultural sector may give a numerous of advantages and prerogatives both to the farmers and the crop, but to the economy and the society as well.

Also, farmers could apply those initiatives not only for apple crops but to all of the agricultural products they produce. This might be expanding beyond the agricultural product and embrace the floricultural sector, to name a few.

Last but not least, Information Systems (IS) in association with farmers’ thoughts provide the incentives in order someone to implement those ideas. The study of that field in combination with the studies of other fields should enrich, improve and enhance the quality and values of such suggestions.
V. Lists of References


Διαμαντάκος, Ν., 1997. Πουρί, το πολύδροσο χωρίο του Πηλίου. Έκδοση Κοινότητας Πουρίου
VI. Appendix A
First Form of Interviews

1. Are you satisfied with the current way of promoting and selling your agricultural products?

2. Do you feel comfortable to make a step forward and sell or promote your agricultural products in a different way than intermediaries?

3. ICT offers an abundant of possibilities. Do you mind that this is the time for farmers to use the conveniences that technology offers?

4. Another important part of ICT is the internet. We have heard a lot of about internet connections, internet transactions and internet payments. Do you feel trust for making and completing such actions by yourself?

5. Is there anything else you feel to underline or express desires and thoughts that you want to share with me according with the agricultural sector?
VII. Appendix B
Integrated form of interviews

1. What time of period do you sell your agricultural products?

2. Who are the buyers of your produce?

3. How do you describe the relationships between farmers and intermediaries in your area?

4. Please highlight some of situations that cause problems to the quality of produce and the impact that had on the agricultural marketing?

5. Could you please describe the previous year’s agricultural marketing of your produce?

6. ICTs and internet are in our everyday lives. How about using ICTs to the agricultural marketing?

7. Which is the best for you the ideal process of marketing your products?

8. Is there anything else you feel to underline or thoughts you want to share with me related on the issue?
Appendix C
Informed Consent Form

Research Topic
Using ICTs to empower and enhance the agricultural sector

Researcher
Thomas Chiotis, Master Program in Information Systems, Linnaeus University

Purpose of the Research
The purpose of this research is first to examine the current situation based on which farmers promote and sell the agricultural products. Then, to explore the relationships between farmers and intermediaries and the interactions between those two stakeholders and finally to think about the consequences that farmers go beyond their standards and use ICTs in order to empower the existing process of agricultural marketing or investigate new ways of marketing their crops.

Description of the Research Process
In a first place I will observe the relationships and farmers’ interaction with the ICTs related with the agricultural work. Then, I will form my interviews in order to gain information about the farmers’ experience and thoughts regarding promoting and selling farming products.

Lastly, I will listen to narrative stories in which farmers express several and different situations related both to the nature of ICTs and marketing.

The Benefits of the Research and the Benefits to You
Agriculture is one of the sectors facing an important problem due to the economic recession and the fact of the competitive environment. This research that will take place in a rural area of Greece trying to draw a picture of all the possible issues trying to address the road for providing solutions. The research, also, may benefit other researchers to other places conduct similar studies even for different products.

The farmers will be of benefit by the research, because through the methods they will take incentives about using ICTs in the rural sector, while they will address their thoughts and views on the issue. I as a researcher will be benefited as all of the above mentioned will strengthen my work and make it more completely.

Risk and Discomfort
The participants’ names as well as any other personal information of them will not be referred in any part of the research and will not be mentioned in the thesis document. As well as, personal information and sensitive data will not be revealed to third parties in order to ensure their privacy and avoid personal information leak.

Participant’s Rights
Not participant’s elements will be included in the study. First priority is the participant’s comfort. The participation is not mandatory and the participants are not obliged to participate. They are allowed to withdraw or pull out at any time they feel without making available any justification or explanation for this movement. Contact
details will be given to the participants in order they feel kind of secure and to feel free to communicate at any time they want for more details or specifications. The results of the analysis and data of the collecting methods will be available to all of the participants if they ask for it. (Upon request).

**Access to Interviews, Observations and Narrative stories.**
The collection of data will be accessible only by the researcher and the supervisor/ professor of the thesis work without any personal details of the participants. The data will be used only for the thesis’s progress and will be deleted after the completion of the research.

**Consent**
I understand and agree with the all of the above statements.
Yes ☐ No ☐

I understand that my participation is not obligatory and I can leave from the research procedure any time I feel so.
Yes ☐ No ☐

I understand that I have the right to ask the researcher to remove any data provided by me.
Yes ☐ No ☐

You are allowed to use the information that will be provided by me in the context of the research thesis.
Yes ☐ No ☐

I agree to record our interview
Yes ☐ No ☐

Date and place of interview: _____________________________________________

Participant's name and signature:

Researcher's name and signature: Thomas Chiotis
### IX. Appendix D

**Example of Coding**

<table>
<thead>
<tr>
<th>Strong beliefs to the intermediaries’ way</th>
<th>Against intermediaries</th>
<th>Relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop of a common policy- support equal parties</td>
<td>Agreement among intermediaries and farmers</td>
<td></td>
</tr>
<tr>
<td>Meet once in a year</td>
<td>Bad way of negotiations</td>
<td></td>
</tr>
<tr>
<td>Bad way of negotiations</td>
<td>Negotiations with common goals</td>
<td></td>
</tr>
<tr>
<td>Negotiations without considering the other part</td>
<td>Negotiations based mostly to the prices</td>
<td>Negotiations</td>
</tr>
<tr>
<td>Farmers trying to get the best price</td>
<td>Intermediaries offer prices that interest themselves</td>
<td>Intermediaries</td>
</tr>
<tr>
<td>Offers for the inferior part of the apple crop</td>
<td>No offer price for the superior crop only</td>
<td></td>
</tr>
<tr>
<td>Fear of not having many offers</td>
<td>Fear of not sell the agricultural products if farmers do not accept the offer</td>
<td></td>
</tr>
<tr>
<td>Happy/disappointed based on the acceptance of the offer</td>
<td>Responsible of the acceptance of the offer</td>
<td></td>
</tr>
<tr>
<td>Feel weaken that should accept the offer</td>
<td></td>
<td>Acceptance</td>
</tr>
</tbody>
</table>
X. Appendix E  
Invitation Letter for Participation in my Research

Invitation!

What is this about?  
It is about farmers and intermediaries. It is about agricultural sector and the Information Communication Technologies. This is a research for the ways we can empower and enhance the rural sector and farmers of our area.

Me and You  
I grew up to this community and I feel I belong here. I want my research improve the every days life of farmers. My intention is to work with the farmers of the area.  
Since you belong here you are the direct involved parties, while my research is relevant to you.

How we work together?  
There will be some rounds of several methods. The methods are interviews, observations and narrative stories.

Interviews- With interviews, my intention is to draw the current situation of promoting and selling the agricultural products

Observations- In this part, I will visit some farmers at the agricultural land in order to observe their relationships with any kind of technology.

Narrative stories- With narrative stories, my intention is to listen to some interesting events that took place in the past concerning the agricultural sector and farmers were affected by.

How you get contact with me:  
Thomas Chiotis  
Mob. +306932323093  
E. thomashiotis@gmail.com

Please, feel free to contact with me for further information and questions.

The research will last till 30 August 2016
XI. Appendix F
Declaration Form

Linnaeus University
Sweden

Declaration – Submission of the Thesis

This form should be included in the thesis. Before you sign please see
http://refero.lnu.se/english/what-is-plagiarism/ where you found information about
plagiarism and check also the Harvard System of referencing
http://libweb.anglia.ac.uk/referencing/harvard.htm

Name
THOMAS CHOTIS

Course

Course Code

DEGREE PROJECT MASTER LEVEL
512.506

Did you write the thesis alone or in cooperation with someone? Tick one of the
boxes

X I am the sole author of the thesis.
□ The thesis is co-authored with other students, and together we are
responsible for the entire project.
□ The project report is co-authored with other students, and I am
responsible for part of it. The parts I am responsible for are
specified in the project report.

I declare that in my/our thesis, I

1: did not re-use my previous work without referring to it
2: did not use others work without referring to their work (e.g. course literature,
scientific publications, other types of articles, web sites or lecture material)
3: use the references and quotes in a proper way
4: included all references and resources in a reference list

I am aware that not citing and using references in a correct way may be considered
as plagiarism

Signature

Date

93 May 2017