Internet development as a change driver in rural areas: Potentials and pitfalls

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Abstract: *Agricultural growth is the key to rural system changes that include changes in both economic infrastructure and social conditions. The potential for rural areas to benefit from these changes is a persistent question. This paper examines data for the rural Greece concerning the internet subscription and internet access of households, farms and firms. In addition the present study examines the potentials and pitfalls of internet development in Northern Greece, and explores the factors that influence patterns of internet subscription by the population of the selected areas. The paper also presents data on aspects of digital infrastructure, including points of internet presence, internet service providers and digital subscriber lines, which suggest that there are major shortcomings in most Greek rural communities. Results showed significant relation between internet development and six separate prospective and desirable changes: (a) capacity for communication, (b) rural system change, (c) increased productivity, (d) social change, (e) demand for services by home-based rural businesses and (f) change in recreation. In the end, internet is not a 'quick fix' solution for rural development, and the desired improvements will be limited to a fraction of rural places.*

Keywords: *Binomial logit model, Change facilitation, Internet, North Greece, Rural development, Survey.*

Introduction

Unambiguously rural development is a persistent challenge everywhere, whether in advanced industrial economies or in less developed settings. Nowadays, the potential for rural areas to benefit from internet technology is a running question and one of the most modern subject matters of agricultural extension. Actually, internet technologies and information and communication technologies (ICTs) in general have been a double-edged sword for rural areas. Two main reasons can be identified as to why residents of rural areas take up internet. Firstly, internet can lead to improved productivity and therefore this might be important in achieving further growth in agriculture (Rolfe *et al.*, 2003). Secondly come the residents' expectations of the net benefits. These goals are not easily achievable. It is difficult to identify transactions that occurred electronically, or to apportion actions and transactions that have an electronic component (Fraumeni, 2001). Besides, many of the benefits and costs relating to information technology are not priced in markets. Non-priced benefits range from free products available on the internet to the social benefits in isolated areas due to e-mail access and social networking. Non-priced costs include the additional time spent on solving problems, and the potential for harmful events like virus infections or data loss (Rolfe *et al.*, 2003).

Recently, Hite (1997) introduced the concept of "rural penalty" which is the principal reason for rural development's special place within the boarder sphere of economic development. The main dimension of the "rural penalty" is a low density of population and therefore a low density of most markets, labour and most other resources. Drabenstott (2001) has identified five challenges that will be critical in shaping the rural economic outlook: (a) taping digital technology, (b) encouraging entrepreneurs, (c) leveraging the new agriculture, (d) improving human capital and (e) sustaining the rural environment. According to Malecki (2003) three of the five challenges are connected rather directly to the digital economy and the use of ICTs. Besides, in the face of these challenges and changes, rural areas look into the future and see both promise and peril. In particular, the internet diminishes, and often entirely erases, the stickler of space and distance. On the other hand, continuing population growth in rural areas, basically from new migrants, promises an upgrade of skills demanded fro the new economy. At the same time, the modern agriculture exploits new

technologies (GPS, GIS and internet) and assembles them into "precision agriculture" to optimize agricultural inputs to specific locations, perhaps with little involvement of farmers themselves (Tsouvalis et al., 2000).

Butler (1998) in an attempt to document the role of internet as a catalyst for change parallelizes the internet as the "Pandora's box". Greek mythology mentions that Pandora (meaning "all gifted") was the first woman on earth. The gods gave her gifts such as beauty and charm and also great curiosity. However, Zeus gave Pandora a box containing all the troubles and diseases that the world now knows. She was warned not to open the box, but curiosity overcomes her. Only hope remained inside the box as she quickly closed the lid again. Nothing happens unless the box is opened but the internet already exists and is being used in several motions including households, firms and farms. Although each individual has the option of deciding "what is in the box", it seems evident that once the box is opened, something will change but nobody knows if the change will be for the better or for worse.

The main aim of this paper is to examine to what extent internet development relates to fifteen significant desirable changes in NGs rural areas. In addition, this paper examines data for the rural Greece concerning the internet subscription and internet access of households, farms and firms and explores the potentials and pitfalls of internet development in the selected areas. Moreover, it explores the factors that influence patterns of internet subscription by the NG population and also presents data on aspects of digital infrastructure, including points of internet presence, internet service providers and digital subscriber lines, which suggest that there are major shortcomings in most Greek rural communities.

The contribution of the paper is a dual one. At a theoretical level, the paper yields the unambiguous result that internet development causes significant changes in rural areas. At an empirical or practical level, the paper illustrates how the theoretical findings can be translated into empirical actions and how Internet works as a catalyst of change through the employment of a binomial logit model which estimates the change direction of the main Internet subscription drivers.

This paper initially explores the linkage between Internet and rural development. It then moves on to describe the study area as well as to present the survey data and the binomial logit model's details. Finally, results are discussed and policy implications are deduced.

Linking Internet and rural development

In public discussion of regional development the term rural area is generally used as an expression for non-urban or peripheral regions (Dax, 1996). According to Hoggart (1997), as the differentiation between rural and urban areas as opposite types of spatial structure is vague, attempts to define the spatial category of rural area are bound to create methodological problems. Views on the issue and the indicators to be dealt with vary according to specific social groups, national contexts and personal attitudes.

This paper uses the OECD (1994) definition of rural areas. According to this definition, Greek rural areas are usually large and isolated areas of an open country, often with low population density (Michailidis et al., 2010). In this direction, Internet can play an important role in rural development. Actually, novel ICTs and especially Internet could probably connect many isolated rural communities providing wireless access to information networks, connecting students to educational resources not available at their local library and introducing small businesses to a wider pool of potential customers.

Recently, the discussion over several aspects of internet use in rural areas has gained much of the academic and policy interest (Lippert and Spagnolo, 2008; André et al., 2010). The importance of internet use to the quality of life of rural people is well documented whilst reduces isolation and eliminates much of the misery of rural living and hardships of rural entrepreneurship (Korsching, 2001; Sun and Wang, 2005; Akca et al., 2007). Moreover, there are several advantages realized by residents of rural areas with the use of internet and other ICTs. However, the real benefits of internet

can only be realized when their use is strategically aligned with the goals of the rural community, and when the residents are empowered in not only using internet, but also maintaining their own websites (Michailidis et al., 2010).

On the other hand, these benefits can be hindered by the various challenges that face the rural communities implementing ICTs - like the challenge of accessing reliable and affordable Internet connectivity. The agricultural extension services play an important role in this direction, helping the rural groups to overcome these challenges (Koutsouris, 2006). This is done through relevant training programmes where applicable, and in the case of connectivity, researching and providing information on the available useful options.

In addition, with the development of better farming methods, the increased use of capital in farming, the almost complete dependence on markets as a source of income and the emerging new technologies, the welfare of a modern farm depends primarily on how well the farm operator can grow and market his products (Kibwana et al., 2001). These issues can be complicated or simple to figure out for each farmer, depending on his farm management skills. Farm management can be achieved many different ways; however, the use of the Internet can help farmers manage their farms and market their products in a more efficient and timely manner (Rivera, 2000).

In particular, Greece is one of the most rural European countries and it is also one of the late adopters of a multi-sectoral approach to rural policy (Michailidis et al., 2010). According to Koutsouris (2010), Greek rural areas are lagging behind in the use of both PCs and the Internet. However, although OECD (2006) presents Greece at the end of the thirty countries list, with only 1.4 broadband subscribers per hundred inhabitants (year 2005) in terms of growing rates (from 2001 onwards) it is ranked in the 10th place. In fact during the last four years there is an increasing demand of the total DSL coverage in Greece (from 9% to 88%) and particularly in rural areas it risen from 0% to 55%, whilst the national broadband policy and measures it aims to cover 60% of rural territory and 90% of rural population. Nevertheless, there is still a lack of data concerning the internet subscription and internet access of farms, the potentials and pitfalls of internet development in rural areas and the factors that influence patterns of internet subscription by the local population.

Recently, Koutsouris (2010) outlined the main research findings of two recent papers addressing the issue of the illustration of ICTs by Greek farmers. The first one (Alexopoulos et al., 2010) aims at identifying the existence of a 'digital divide' within Greek rural areas while also explore which characteristics of rural inhabitants relate to the use of PCs and the use of Internet. On the other hand the second paper (Michailidis et al., 2010) aims at exploring farmers' use of ICTs and their views on preferred extension methods, utilising data from a large scale survey. Although both empirical findings are in line with previous studies, and support Rogers' (1995) socioeconomic generalizations about early adopters, further research is needed especially in the fields of a) exploring factors that influence patterns of Internet subscription and b) exploring the potentials and pitfalls of Internet development in rural areas. Thus, the existing methodology aims to cover this major research gap providing an alternative view of internet development as a catalyst of change in rural areas.

Study area

Northern Greece (NG) is comprised of three administrative regions: West Macedonia (RWM), Central Macedonia (RCM) and East Macedonia-Thrace (REMT). Figure 1 shows the location of North Greece Region as well as the three separate regions within the study area.

From a geographical point of view those three regions hold together a central position in the general area of Southern Europe as it represents the natural gate of Greece to the northern borders and especially to Albania, Bulgaria, Turkey and to the Former Yugoslavian Republic of Macedonia (FYROM). The landscape of the regions mainly consists of highlands (47.8%), forest areas (22.3%), rangelands (33.4%) and agricultural or fallow lands (26.0%) and they represent 41.2% of the total rural area of the country. The NG regions include an overall of 42,878Km^2 or 32.6% of the total Greek

extent (NSSG, 2003). More than 80% of that land is rural and more than half of the total population of the NG region lives in rural areas.

Figure 1. Greece.

Research Methodology

Data were gathered as part of a survey to people living in rural areas of the study regions collected through a mail-out/telephone response format. All surveys were mailed out in batches of 30 per week from January to July 2007. Respondents were contacted by telephone in the following week and asked if they would like to participate. Respondents could either complete the forms in their own time and return them by post, or reply by telephone. By July 2007, 920 responses had been received from 2,500 questionnaires issued. The re were another 13.4% of respondents who indicated that they did not use internet or other information and communication technologies and that the survey was not relevant to them, giving an overall response rate of 50.2%.

The survey was designed to monitor issues related to rural life and especially to internet use. Part of the survey was designed in order to elicit data on respondents' use of internet and their views on fifteen prospective and desirable changes, according to the literature (Moseley and Owen, 2008). Figure 2 presents the general methodological framework of data collection, statistical analysis and obtained results while summary survey data are presented in the following Tables 1-5.

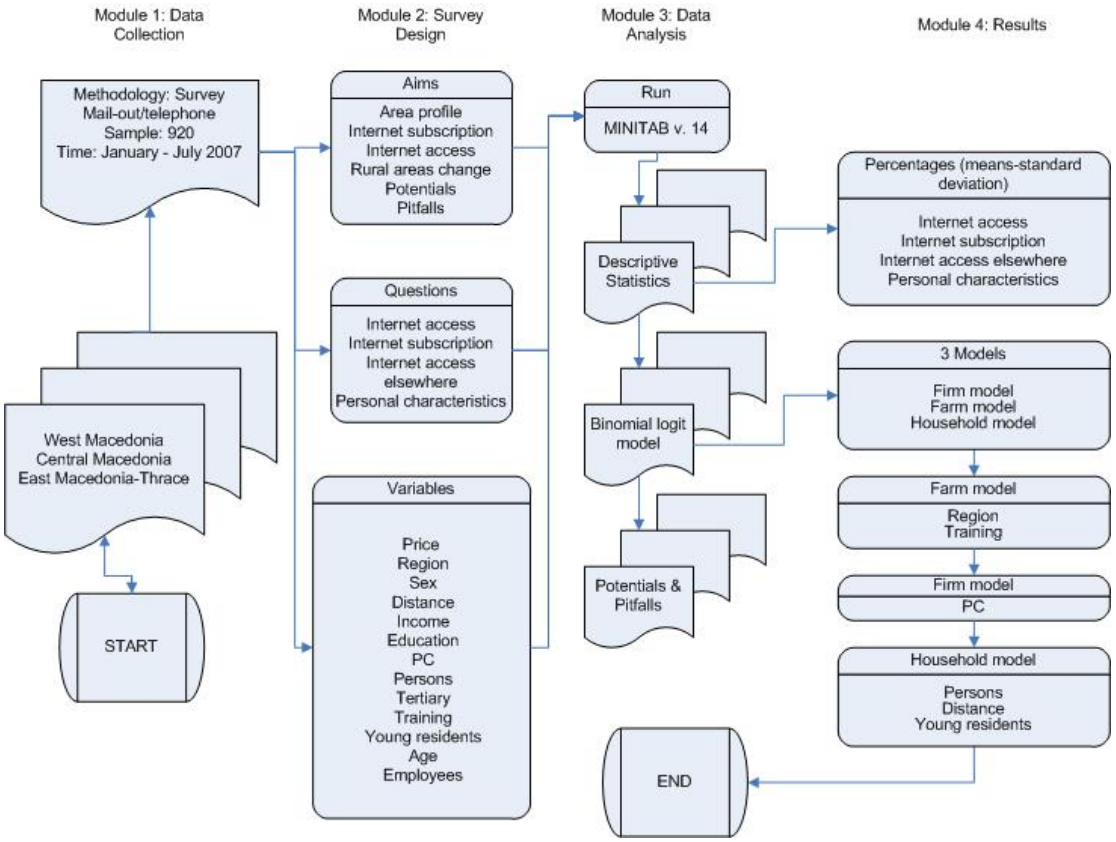

Figure 2. Methodological Framework.

Study Results

Table 1 presents the NG household profile. In particular it shows that 44.3% of the NG households receive an income from farming and 58.1% of the residents belong to the full time farmers. Besides, the average distance of the households from urban areas is 36.5 kilometers while each household comprised of 2.7 persons and receive 1,048€ median monthly income. Further details providing by the Table 1 show that NG regions are rather young, with median population ages of 34 years. In addition, 80% of the residents are male, 55.4% of them are married while the median population receive almost 12 years of education.

Table 1. Household profile.

Region characteristic	RWM	RCM	REMT	Total
Households				
Average size (persons)	2.9	2.6	2.8	2.7
Median monthly income (€)	954.0	1,112.0	1,019.0	1,048
Average total income from farming (%)	54.3	38.5	46.2	44.3
Farming full time (%)	66.4	49.1	64.3	58.1
Average distance from urban area (km)	38.1	33.2	39.4	36.5
Residents				
Average age (years)	39	33	35	34
Male (%)	70.6	77.7	86.7	80.0
Average years of education	10.3	12.6	10.9	11.5
Married (%)	62.5	53.0	55.0	55.4

Table 2 presents the main household characteristics of Internet subscription. In general, according to Madden and Coble-Neal (2003), Internet subscription is influenced by income, age and geographical location. High income households (more than 25,000€) are 3.25 times more likely to have internet subscription, while households with a resident less than 18 years of age and households near urban

areas (less than 10km) are 1.75 and 1.22 times more likely to subscribe, respectively. On the other hand, REMT is in the second position while RWM is in the third one. Further, detail for RCM region contained in Table 3 shows data of internet service providers and points of presence (Independent Broadband Review, 2010) and the numbers are higher than the rest of the selected regions.

Table 2. Internet subscription (%).

Household characteristic	RWM	RCM	REMT	Total
Income				
Less than €12,500	11.4	8.6	12.7	10.7
€12,501-€25,000	19.7	18.7	21.2	19.8
More than €25,001	34.2	33.8	36.1	34.7
Age				
A resident aged under 18 years	35.4	48.2	41.6	43.4
No resident aged under 18 years	27.3	28.4	19.6	24.7
Location				
Near urban area (less than 10km)	21.5	23.7	13.4	18.7
Far away from urban area (more than 10km)	16.8	21.2	11.1	15.3

Data on internet activity by geographic region are presented in Table 3. The percentage of subscribers and the rest of the data present a significant variation among the three regions. In general, RCM is in the first position presenting an important subscription growth during the last year (12.0%).

Table 3. Internet access.

Internet connection	RWM	RCM	REMT	Total
Households subscribing (DSL)	21.9	37.0	27.1	30.5
Households connecting to internet (dial up)	4.4	6.0	5.8	5.6
Recent subscribing (less than 1 year)	7.5	12.0	8.1	9.7
Internet service providers (ISPs)	5	7	4	7
Points of presence (POP)	142	525	213	880
Subscribers	35	148	68	251

According to the descriptive statistics analysis, presented in Table 4 households and firms are more likely to be internet subscribers when compared to farms. It is very important to point out that bivariate data arrays and pair-wise correlations are employed in order to isolate factors that may allow discrimination between internet subscribers and non-subscribers.

Table 4. Subscription per responded type.

	Subscribers		Non-subscribers		Total
	Number	%	Number	%	%
West Macedonia					
Firm	4	11.4	28	22.4	12.5
Household	16	45.7	25	20.0	39.0
Farm	15	42.9	72	57.6	17.2
Total	*35*	*100.0*	*125*	*100.0*	
Central Macedonia					
Firm	44	29.7	56	22.2	44.0
Household	36	24.3	58	23.0	38.3
Farm	68	45.9	138	54.8	33.0
Total	*148*	*100.0*	*252*	*100.0*	
East Macedonia-Thrace					
Firm	22	32.3	68	23.3	24.4
Household	18	26.5	68	23.3	20.9
Farm	28	41.2	156	53.5	15.2
Total	*68*	*100.0*	*292*	*100.0*	
Macedonia-Thrace					
Firm	70	27.9	152	22.7	46.1
Household	70	27.9	151	22.5	46.3
Farm	111	44.2	366	54.7	30.3
Total	*251*	*100.0*	*669*	*100.0*	

Table 5 indicates numbers and percentages of farms, firms and households, per geographical region, which have internet access elsewhere. Almost 40% of households and farms and more than 20% of firms are least able to seek alternative local access (for example through an associates, from work or utilize internet cafes).

Table 5. Non-subscription by access elsewhere.

	Access elsewhere		No access elsewhere		Total
	Number	%	Number	%	%
West Macedonia					
Firm	12	19.4	16	21.3	*42.9*
Household	22	35.5	15	20.0	*59.5*
Farm	28	45.2	44	58.7	*38.9*
Total	*62*		*75*	*100.0*	
Central Macedonia					
Firm	13	12.0	43	27.4	*23.2*
Household	24	22.2	47	29.9	*33.8*
Farm	71	65.7	67	42.7	*51.4*
Total	*108*		*157*	100.0	
East Macedonia-Thrace					
Firm	7	10.9	61	29.8	*10.3*
Household	14	21.9	31	15.1	*31.1*
Farm	43	67.2	113	55.1	*27.6*
Total	*64*		*205*	100.0	
Macedonia-Thrace					
Firm	32	13.7	120	27.5	*21.1*
Household	60	25.6	93	21.3	*39.2*
Farm	142	60.7	224	51.3	*38.8*
Total	*234*	*100.0*	*437*	*100.0*	

Internet subscription model

Following, multivariate econometrics is employed to relate factors that influence patterns of internet subscription by the NG population. This is achieved by using MINITAB for Windows, release 14.1.3 (MINITAB inc., 2006). Internet subscription is treated as a separate decision process. Subscription is

analyzed using a discrete choice model that relates the subscription probability to factors of Table 6. In particular, a binomial logit model identifies the importance of determinants of NG internet subscription by sample strata (Madden and Coble-Neal, 2003). This model, first applied to the demand for higher education (Cramer, 1991) and afterwards to educational choices (Radner and Miller, 1970; Bishop, 1977; Jimenez and Salas-Velasco, 2000) can be seen as a special case of general model of utility maximization. Here it concerns those aspects of the economics of Internet subscription choice that are regarded as important.

Assuming that a resident of a rural area can choose one of the two available options (1=Internet subscription, 0=Internet non-subscription), his/her (designated *i*) choice of the first option, implies that: $U_{i1}>U_{i0}$, where U_{i1} and U_{i0} are the utilities that *i* associates with a subscribing and non-subscribing decision, respectively. The utility U_{ij} that the alternative *j* gives to the individual *i*, is composed of two parts: a systematic term, which depends on an attributes vector *X* (stochastic ability, social background, etc.) and a random one ε*ij*: $U_{ij} = \overline{U_{ij}} + \varepsilon_{ij}$. But utility U_{ij} is not observable. What we observe is decision Y_i, which is worth 1 if the individual *i* choose to adopt and 0 if s/he chooses not to adopt. If a rational individual chooses the alternative that gives her/him the greatest utility, then: $Prob[Y_i = 1] = Prob[U_{i1}> U_{i0}]$ and $Prob[Y_i = 0] = Prob[U_{i0}> U_{i1}]$. McFadden (1974) proves that in this case the probability that rural resident *i* chooses alternative 1 is $\Pr ob[Y_i = 1] = \frac{e^{X_i'\beta}}{1+e^{X_i'\beta}}$

This would be the reduced form for the binomial logit model, where the X_i' row vector of explanatory variables for the i^{th} individual contains the independent or explanatory variables (including also a constant) and where we assume that the non-observed *ε's* follow a distribution of logistic probability.

More specifically, the dependant variable "subscription", splits the sample in two subgroups: (a) internet subscribers (=1) and (b) internet non-subscribers (=0). The selection of the 13 independent explanatory variables of Table 6 was based on prior analysis of ICT networks while it is adapted to the research area particularities (Rappoport et al, 1998; Kridel et al, 1998; Madden et al, 1998; Madden et al, 2000; Madden and Coble-Neal, 2003).

Table 6. Model variables and description.

Variable	Description
Price	Cost of internet access (monthly estimations)
Region	1=RCM, 0=otherwise
Sex	1=Male, 0=Female
Distance	Distance between respondent residence and the nearest urban place (in km)
Income	Annual income
Education	Years of general education
PC	Number of personal computers installed
Persons	Number of persons residing in the households
Tertiary	1=degree qualified, 0=otherwise
Training	1=vocational qualification, 0=otherwise
Young residents	Number of residents aged under 18 years
Age	Respondent's age
Employees	Number of persons employed full time

Model results clearly demonstrates the importance of sample stratification as the drivers for internet subscription are significant different for these strata (Table 7). For example, the *farm model* suggests subscription is driven by "region" and "training" variables thus focusing on the development of the infrastructure and the role of education and communication in rural areas.

Table 7. Model estimates.

Stratification/ Variables	Coefficient	t-ratio
Firms' model		
Constant	-1.12	-3.52
Price	0.03	0.08
Training	0.01	0.47
Employees	0.01	0.59
PC	**0.21**	**2.74**
Observations	*70*	
Households' model		
Constant	-0.18	-0.83
Persons	**0.23**	**1.82**
Distance	**0.25**	**1.76**
Young residents	**1.24**	**3.12**
Income	0.01	0.81
Observations	*70*	
Farms' model		
Constant	-0.51	-0.93
Region	**1.07**	**1.64**
Distance	-0.11	-1.98
Training	**1.46**	**2.78**
Persons	0.01	0.89
Observations	*111*	

In particular "region" demonstrates the subscription differences among the three regions whereas "training" indicates the capacity to understand and operate relevant technology. On the other hand, for firms the only significant driver is "PC" which most likely captures information need. The explanation of household subscription is more complex and related to "young residents", "distance" and "persons" variables. The importance of presence of a resident under 18 years old in the household model implies the increased value of internet for young population. On the other hand, taken together increasing distance from the nearest urban area and the number of residents appear to swell local populations of subscriber interest.

Internet – a catalyst for change

The most interesting part of the survey is the unity which explores the internet development as a change driver. Table 8, as part of the questionnaire, presents fifteen different probable changes (Moseley and Owen, 2008) as a result of internet development. Respondents were then asked to indicate their agreement or disagreement to the prospective changes giving an internal value for each one of them. The mean value of the total sample for the fifteen prospective changes ranks them according to the following Table 8.

Mean values and changes ranking clearly demonstrate the potentials of internet development as there is a strong and positive relation between internet development and six separate prospective and desirable changes: (a) capacity for communication, (b) rural system change, (c) increased productivity, (d) social change, (e) home based rural business and (f) change in recreation. Moreover, respondents support that internet development rather enforces secondarily cultural change, agricultural growth and increased tourism.

On the other hand, the same table also demonstrates the pitfalls of internet development in rural NGs areas according to the reverse ranking of desirable changes. In particular, the main pitfalls of internet development as a change driver are the following ones: (a) significant delay in demographic change, (b) very low levels of e-education access and use for rural population, (c) strong statistical relation between internet use and time waste, (d) great hysteresis of e-government policies growth and (e) very low relation between internet use and personal mobility.

Table 8. Internet development as a change driver

Change	**Mean** (1=strongly disagree, 2=disagree, 3= neutral, 4=agree, 5=strongly agree)	
Demographic change	1.3 (S.D. = 0.4)	*Pitfall*
Agricultural growth	3.8 (S.D. = 1.0)	*Potential*
Rural system change	**4.3 (S.D. = 0.6)**	***Potential***
Social change	**4.1 (S.D. = 0.7)**	***Potential***
Cultural change	3.9 (S.D. = 0.8)	*Potential*
Personal mobility	2.7 (S.D. = 1.4)	*Pitfall*
Capacity for communication	**4.5 (S.D. = 0.3)**	***Potential***
Government policies	2.6 (S.D. = 0.9)	*Pitfall*
Increased productivity	**4.2 (S.D. = 0.7)**	***Potential***
Home based rural business	**4.1 (S.D. = 0.5)**	***Potential***
Increased tourism	3.5 (S.D. = 0.5)	*Potential*
e-education	2.2 (S.D. = 1.1)	*Pitfall*
Time gain	2.6 (S.D. = 1.4)	*Pitfall*
Recreation	**4.1 (S.D. = 0.2)**	***Potential***
Other changes	1.8 (S.D. = 1.3)	*Pitfall*

Conclusions

This study has examined the recent conditions of internet growth, subscription and access in rural areas in northern parts of Greece. For this purpose a sample of 920 individuals – residents of NGs rural areas - is stratified so as to allow for separate consideration of the subscription profiles for farms, firms and households. Results suggest tertiary, education and training have little impact on internet subscription, except the farm model which suggests subscription is driven by training variable. Besides, it appears that internet subscription is largely determined by the number of PCs installed for firms and by the isolation from urban areas, the number of residents and the presence of a resident under 18 years old for households.

The present study has several important theoretical implications as its results supported the basic argument of the thesis that internet development causes significant changes in rural areas. Basically, the study results strongly show that growing internet has negatively influenced the communication process of both individuals and farmers-professionals. On the other hand, rapid technology evolution such as the internet “explosion” extends the access to urban and international markets and has been responsible for moderate to high degree of rural systems changes. Besides, rural areas in NG have experienced noticeable improvements in living conditions due to rapid growth of internet access and use. Finally, three accessory reasons can be identified as to why residents of rural areas take up internet. Firstly, internet can lead to improved productivity and therefore this might be important in achieving further growth in agriculture or rural business. Secondly, internet development increases the demand for services by home-based rural businesses and thirdly, there is a strong relation between increased internet use and access to new recreation opportunities.

On the other hand, from a practical point of view, to identify the reasons driving residents of rural areas to get internet access or not is important generally for the rural society, policy makers and to related economic sectors. Policy makers will be able to assess the feasibility of internet development and choose the appropriate subscription strategy in order to achieve the improvement of internet access in rural areas and generally to enhance rural development. On the other hand, farmers will be able to evaluate the relationship between internet access-use and their income, and have a clearer understanding of the consequences of any kind of agreement that would affect the status of their current farm activity.

The main input of this piece of work into the design of new policy measures mainly relates to the determination of factors that models the subscription probability by sample strata. Therefore, it may be assumed that policy initiatives based on strategies of group segmentation and differentiation might be more effective and less expensive than generic policy measures.

Nevertheless, the observations made in this study provide the stimulus for further research, which could extend the investigation to more representative samples including other regions or countries.

This can be proved very useful in justifying the interesting results of the current study and hence made safe generalizations. Besides, further research is still needed along the lines of diffusion theory, its extensions and the technology acceptance model (Koutsouris, 2010) as well as to the actual use of the internet connection.

Concluding, internet is only one piece in the more complex puzzle of rural development. Because the issue is wrapped up in human capital, it is far more than a relatively simple infrastructure supply issue. That's why Malecki (2003) mentions that internet is a part of a complicated process that goes beyond "rural" and "urban". Consequently, although internet is not a 'quick fix' solution for rural development and although it is true that all things can be done without the internet (Warren, 2007); and in many rural areas still are, the internet allows everything to happen more flexible and with lowest costs. It's up to us to determine if we will use it and how will we use it and what actual tasks we will be dealing with in our farm, in our business and in our social networking.

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