

## Identifying the Barriers of Using Information and Communication Technologies in Agriculture Sector in Iran

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**Abstract:** Considering the increasing growth of information and communication technology and facilities provided for communities; this technology has been the main source of efficiency, social welfare and the power of human and institutions. Due to the fact that agriculture section and its sub-organizations have to use information and communication technologies; therefore, the present research is done based on the aim of identifying the barriers of using technologies of communicative information from the point of view of agriculture experts in Jahade Keshavarzi Organization of Ilam Province. It is an applied research and correlation is chosen as a research method. A questionnaire is used as a main tool. 109 experts from the Jahade Keshavarzi Organization of Ilam Province were chosen as a statistical society based on the stratified random sampling method regarding suitable assigning. Spss version 16 is used for statistical analysis. The results of the inferential statistics indicate that the two variables of cultural-social barriers and legal-political barriers explain the changes in the dependent variable (using ICT) with the rate of 19 percent.

**Key words:** Information communication technology • Agriculture experts • The barriers

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### INTRODUCTION

At the beginning of the third millennium and the beginning of the twenty-first century, the increasing growth of information and communication technology affected all aspects of human life and changed them. These changes in social, cultural, economical, political and educational and many other fields were dominant and provided rapid and irreversible changes in the world.

Today we live in an era that is called Information Age and this naming is in the following of rapid developments in the second half of the twentieth century in the fields of science and technology and lead to the establishment of the new community which is called information society [1].

At the present era, the information as a valuable, strategic commodity and the factor of development has acquired an important role among other power tools and step by step it has defined itself as the biggest factor regarding the power of countries and organizations. Considering the facilities that ICT provides for human, the access to experiences, patterns, thoughts and knowledge has been made easier. Nowadays, information and

communication technology has affected all levels of human life; moreover, its impact on modern societies, where production, process and distribution of information has become a major source of efficiency of welfare and the power of human and agencies, is even more.

ICT has provided new horizons of information society for human and it means the reconstruction and modernization of all the relevant processes with human life. Governments in many developing countries have used most of their power to exploitation and use the benefits and potentials of information and communication technologies with compiling national development plans.

Nowadays, information and communication technology has presented new horizons of societies with information and knowledge. Computers were used as educational instruments and also instruments to improve the educational management. The ability of learners and educators in more access to the sources leads to the increase of speed and depth of information. It also decreases the training costs and allows the students and learners to plan their own educations. Information technology has increased the value of learning process in educational centers.

The increasingly rapid changes in societies lead to the fact that education to have a different and complex role. Education, especially in the agricultural sector, is faced with challenges in creating sustainable agriculture and rural development. Agricultural education can play an important role in preparing farmers, researchers, students, educators and advocates to help the growing population and achieve greater self-sufficiency. Nowadays, ICT has presented a new horizon of communication from the information and knowledge based societies.

The Internet is a driving force for many advancements of education in developed countries and developing countries. E-learning is a learning based on communication technologies such as radio, television, communication equipments and computer networks, particularly the internet. This term includes a wide range of applications, including Web-based learning, virtual classrooms and information resources and virtual libraries. The possibility of presenting information in a form of a text, audio and video through internet web and providing the facilities of video conference and electronic communication leads to elimination of the hard walls of universities and schools and educational and research centers and leads to the creation of virtual university as a new word [2].

There are many problems and barriers in proper and suitable exploiting of information and communication technologies such as limited base of technologies, limitation in bandwidth of telecommunication, the lack of access to the internet and computer facilities in different areas, the lack of compiling the content of training for this kind of education, etc. They are introduced as the main barriers for exploiting the new technologies of information age. In most developing countries and even in developed countries, educators often do not have necessary skills to utilize modern educational technologies.

Promoting agriculture as an involved and responsible factor in educational processes has a special place in this category. Promoting organizations have mediation roles between communication technologies and technology, service and contact group providers. In doing this role, they should pay attention to the suitability of different technologies, the capability of access to the technologies of rural and of remote areas, adopting the relevant topics with benefits and expenses, assurance from the access of different cultures to technologies, language, society, age groups and gender issues [3].

In recent years, the development of information technology, regarding the problems like access, connection, literacy, content and expenses, has been seen in almost all areas of rural life in countries and leads to the basic communication progress, specially telecommunications, challenges and chances [4].

Ahmed Pour in a study entitled " Designing the system of E-learning in promoting the agriculture of Iran" explains the barriers in the development of e-learning as follow:

Protective barriers (the lack of appropriate supportive services, the lack or shortage of incentives, the lack of support for maintenance of facilities), technical (the lack of access to computer, the lack of access to phone, the lack of access to internet web), computer skill (the lack of sufficient skill in using hardware, the lack of sufficient skill in using software), cultural (the negative approach of people to E-learning, the negative approach of organizations and institutions to E-learning), financial (the lack of enough budget to apply E-learning, the lack of enough budget to purchase hardware facilities, the high cost of internet) [5].

Omidi in a study titled "Designing the pattern of information and communication technology to educate insurance agents" mentioned the factors of financial, technical, trainer, learner, organizational strategies and technical experts as affective factors in designing education system of ICT. In addition, the results of factor analysis of the existing challenges in this system have been classified as the four factors of human, organizational, social and technical [6].

Frempong in his research in order to analyze the challenges of inducting ICT in the promotion of developing countries that follow the using of effective methods of promoting information for many farmers demonstrated that regarding the high willing of agriculture promoters in using ICT, providing computer hardware and software content and training the agriculture promoters are the most important barriers of using these technologies [7].

Kiplang in his study entitled: "Will the promotion of agriculture by using information communication technologies (ICTs) be a fresh start?", mentioned the barriers of using ICTs as the weakness in infrastructures in the field of telecommunications and electronically and digital facilities, the high expenses of telecommunication, the lack of access to modern technologies, inconsistency of credits for projects, inadequate investments, the lack of awareness in instruments and applications, the lack of

how and technical content relevant knowledge, the lack of laws and government policies to support and use these technologies, the lack of job training and educational programs, the lack of commitment and willingness of some stakeholders [8].

The main goal of this research is to identify the barriers of using ICTs from the point of view of agricultural experts in Jahade Keshavarzi organization of Ilam province. Specific objectives are as follow:

- Explaining the economic barriers in applying information and communication technologies (ICTs).
- Explaining the legal-political barriers in applying information and communication technologies (ICTs).
- Explaining the social-cultural barriers in applying information and communication technologies (ICTs).
- Explaining the educational barriers in applying information and communication technologies (ICTs).
- Explaining the underlying barriers in applying information and communication technologies (ICTs).

#### **MATERIALS AND METHODS**

The aim of this study is application because its results can be used in planning and decision making based on the collecting non-experimental (descriptive) data and it is based on the correlation method. The statically population of this research included 109 people of agricultural experts from the organization of Jahad Keshavarzi Organization in Ilam province that were selected based on the stratified random sampling method with suitable assigning. In order to answer the research question and the expected purpose, a questionnaire designed as a main instrument of the research and all these questions except the personal features of the experts (gender, the place of performing the course, educational major, etc) designed as a 6 score Likert range including 8 sections. To verify the validity of research instruments, questionnaires were given to the supervisors, advisors and experts in this field and in order to assess the reliability of this test, the primary test obtained through 25 questionnaires and Cranach's alpha coefficient was calculated at 87%. In this study, with using descriptive statistics, indices of central tendency (mean and median and placebo) and dispersion indexes (variance and standard deviation) were calculated and evaluated. In inferential statistic, for determining the correlation and the meaningfulness relationship among variables step by step the Pearson

correlation coefficients and multi-purpose regression test were used and the statically analysis were utilized after extracting data through the computer software of Spss version 16.

#### **RESULTS**

The results of the study indicate 69.7 percent of respondents were male and 30.3 percent of respondents were female. The results of the analysis of the marital status of the respondents indicate that 78.9 percent were married and 21.1 percent were single. The results of the analysis of the educational status of the respondents indicate that 8.2 percent have Diploma, 14.7 percent have collage degree, 60.6 percent have BA and 21.1 percent have MA.

The results of the analysis of the work experience of the respondents in service centers demonstrate that 36.6 percent with the frequency of 40 have 1 to 5 years of working experience. The results indicate that 78.7 percent of respondents have internet access at home and at work. The results of the analysis of the participants' English language proficiency indicate that 58.7 percent of the respondents have medium proficiency in English, 20.2% have low proficiency and 9.25 percent have very low proficiency.

The point of view of the respondents about applying ICT indicates that 74.31 percent of the respondents believe that the amount of using this technology is too much; however, 25.68 percent of them do not have such a belief.

The results of the Table 1 indicate that the use of electronic magazines has the highest priorities among experts; on the other hand, the use of multimedia software has the lowest priority among them.

The data indicates that 73.83 percent of the respondents believe that the legal-political barriers are one of the most important barriers, but 27.17 percent do not have such a belief.

In order to prioritize the ideas of the respondents about the legal-political barriers of applying ICT, the coefficient of variation statistic is used. The data from the Table 2 indicates that the lack of administrative, legal and political requirements in presenting services is the highest obstacle in applying this technology. However, the government bureaucracy and the lack of legal paradigm of support among experts are identified as the least important obstacle.

Table 1: The prioritization of the respondents' ideas in applying ICT

Items	Median	Mean	Standard deviation	Coefficient of variation
Computer	2	2.28	1.177	0.417
Electronic publications	3	2.68	1.199	0.417
Telephone	3	2.80	1.235	0.441
Systems of information management	2	2.06	1.219	0.454
Fax	2	2.08	1.218	0.499
Internet and its equipments	2	2.08	1.233	0.592
Workshop	2	2.08	1.240	0.596
Pager	3	2.08	1.177	0.603
Multimedia software	2	2.11	1.279	0.606

Table 2: Prioritization of the ideas of the respondents about the legal-political barriers in applying ICT

Items	Median	Mean	Standard deviation	Coefficient of variation	
The lack of administrative and legal requirements	2	2.35	1.025	0.436	
The existing policies in presenting services	2	2.12	0.928	0.437	
The lack of low and governmental policies to support and apply this technology	2	2.22	1.026	0.462	
The shortage of strategic, executive and operational plans and their exact operation in the agriculture field	2	2.06	0.969	0.470	
The weakness in policies and operational lows	2	2.28	1.176	0.515	
The lack of suitable criteria for measurement	2	2.50	1.349	0.539	
The lack of legal paradigm for supporting Administrative bureaucracy	2	2.14	1.174	0.549	
Administrative bureaucracy	2	2.28	1.338	0.586	
Administrative bureaucracy	Median	Mean	Standard deviation	Coefficient of variation	Prioritization
The resistance against changes in working condition	3	3.12	1.280	0.410	1
The lack of belief about the efficiency of using new technologies	3	2.73	1.132	0.414	2
The existence of some cultural and social norms in different levels of institution	3	2.62	1.099	0.419	3
The increase in the amount of work in case of using these technologies	3	3.17	1.298	0.421	4
The low risk of experts in accepting innovation	3	2.79	1.323	0.474	9
The lack of the culture of correct use of ICT among experts	2	2.32	1.100	0.474	9
Beliefs about using these technologies	2	2.62	1.286	0.490	10
The lack of belief about the positive application of computer and internet	2	2.54	1.270	0.500	11
The lack of giving value to the experts in learning and applying technologies	2	2.55	1.284	0.503	12

Table 3: Prioritization of the ideas of respondents about the cultural-social barriers in applying ICT

Items	Median	Mean	Standard deviation	Coefficient of variation
The resistance against changes in working condition	3	3.12	1.280	0.410
The lack of belief about the efficiency of using new technologies	3	2.73	1.132	0.414
The existence of some cultural and social norms in different levels of institution	3	2.62	1.099	0.419
The increase in the amount of work in case of using these technologies	3	3.17	1.298	0.421
The low risk of experts in accepting innovation	3	2.79	1.323	0.474
The lack of the culture of correct use of ICT among experts	2	2.32	1.100	0.474
Beliefs about using these technologies	2	2.62	1.286	0.490
The lack of belief about the positive application of computer and internet	2	2.54	1.270	0.500
The lack of giving value to the experts in learning and applying technologies	2	2.55	1.284	0.503

The data indicates that 51.40 percent of the respondents believe that the social-cultural barriers are one of the most important barriers; however, 48.59 percent of them do not have such a belief.

In order to prioritize the respondents' idea about the cultural-social barriers of applying ICT, the coefficient of variation statistic is used. The data in Table 3 indicates that the resistance against changes in work conditions and the lack of efficiency in using new technologies are

the main barriers in applying these technologies; however, experts' lack of attention to the learning and applying technologies and the lack of belief to the positive effects of applying computer and internet among experts are identified as the least important barriers.

The data indicates that 75 percent of the respondents believe that the economical barriers are one of the most important barriers; on the other hand, 25 percent of them do not have such a belief.

Table 4: Giving prioritization of the ideas of respondents about the economical barriers of applying ICT

Items	Median	Mean	Standard divination	Coefficient of variation
The lack of necessary budget for updating the experts' information	2	2.04	0.998	0.489
The shortage of budget for holding educational classes	2	2.13	1.045	0.490
The lack of financial sources for providing the expenses of keeping and maintaining the equipments	2	1.96	0.975	0.497
The shortage of providing enough expenses for providing the content of the course for training period	2	2.16	1.164	0.538
The lack of enough financial sources for wireless communication, ADSL	2	2.13	1.174	0.538
The lack of financial resources for purchasing hardware and software equipments	2	1.87	1.011	0.540

Table 5: Prioritization of the ideas of the respondents about the educational barriers in applying ICT

Items	Median	Mean	Standard divination	Coefficient of variation
The lack of accepting the electronically training and learning system by managers	2	2.27	0.993	0.437
The lack of holding educational courses during the educational period	2	1.88	0.878	0.467
The lack of enough ICT knowledge among managers	2	2.00	1.275	0.474
The complexity and different conditions in sub-organizations of knowledge and information about agriculture	2	2.48	1.370	0.487
The lack of familiarity of trainers with the new electronically systems of education	2	2.07	1.047	0.505
The lack of enough ICT knowledge among experts	2	2.14	1.331	0.555
The lack of existing the equal condition in deprived and non-deprived areas	2	2.29	1.217	0.565
The low In-service training necessities of ICT	2	2.48	1.377	0.572
The lack of suitable information and its irrelevance with the issues and problems	3	2.66	1.2970	0.637

Table 6: Prioritization of the ideas of the respondents about infrastructural barriers in applying ICT

Items	Median	Mean	Standard divination	Coefficient of variation
The week attention of the managers to the development of ICT	2	1.76	0.864	0.490
The problems of communication lines	2	1.84	0.908	0.493
The lack of suitable plan to promote the quality of education in service	2	1.93	0.980	0.507
The lack of access to the new suitable technologies	2	1.93	0.988	0.511
The lack of defined action for communication and information development	2	2.16	1.234	0.571
The weak quality of centers presenting services	2	1.93	1.104	0.572
The lack of suitable plan to decrease the expenses	2	2.14	1.259	0.588
The low amount of access to the hardware facilities	2	2.19	1.430	0.653

Table 7: The results of Pearson correlation test

Independent variables	Dependent variables	R	Meaningfulness level
Legal-political barriers	Applying ICTs	-0/432**	0/000
Cultural-social barriers	Applying ICTs	-0/415**	0/000
Economical barriers	Applying ICTs	-0/250**	0/009
Educational barriers	Applying ICTs	-0/144	0/136
Infrastructural barriers	Applying ICTs	-0/257*	0/011

\*\*In the level of 99 percent

\*In the level of 95 percent

Table 9: Variable co efficiencies entered the regression equation in the second step

Variable	B	Standard error of measurement	Beta	T	Sig
Social-cultural barriers	0.282	0.219	0.247	2.238	0.027
Legal-political barriers	0.288	0.131	0.243	2.203	0.030
Constant	0.835	0.296	-	2.819	0.006

In order to prioritize the ideas of respondents about economical barriers of applying ICT the coefficient of variation statistic is used. The data in Table 4 indicates that the lack of necessary budget for updating the information of experts and the lack of necessary budget

for holding educational classes are the two of the most important barriers in applying ICT; however, the lack of financial sources to purchase hardware and software equipments are identified as the least important barriers among experts.

The data indicates that 70.37 percent of the respondents believe that the educational barriers are the one of the most important barriers; however, 29.63 percent of them do not have such a belief.

In order to prioritize the ideas of the respondents about the educational barriers in applying ICT, the coefficient of variation statistic were used. The information in the Table 5 indicates that the lack of acceptance of electronically training and learning systems by managers and the lack of holding educational courses during the educational periods are one of the most important barriers in applying ICT; however, the lack of suitability of the information and the lack of their relevance with the issues and problems among experts are identified as the least important barriers among experts.

The data indicates that 82.07 percent of the respondents believe that the infrastructural barriers are one of the most important barriers; however, 17.93 percent of them do not have such a belief.

In order to prioritize the ideas of the respondents about the infrastructural barriers in applying ICT, the coefficient of variation statistic were used. The data in Table 6 indicates that the week attention of managers to the development of ICT and the problems of communication lines are one of the most important barriers in applying ICT; however, the lack of suitability of the information and the low amount of access to the hardware equipments and the lack of suitable planning to increase the expenses of having communication among experts are identified as the least important barriers among experts.

The Pearson correlation coefficient is used to test the correlation of the variables in the study. The results of the Table 7 indicate that there is a negative and meaningful relation among the legal, political, cultural, social, economical, educational and in applying ICT with 1 percent error.

In order to test the application of ICT, the multi-purpose regression is used. It is important to note that the step by step method of regression with the use of SPSS is used to reach the equation. After entering all the independent variables with the meaningful correlation, the variables of cultural-social barriers and low-political barriers remained in the equation. These variables have the ability to explain the 19 percent of the changes in the dependent variables.

The variable entered the equation in the first level was the barriers of cultural-social. It means that this variable have had the highest effect among other

variables. In this level, the coefficient correlation was  $R=0.390$  and the coefficient of changes was  $R^2= 0.152$  and the coefficient of explaining the decreases were calculated as  $R\text{ square}= 0.144$  and the received F from the analysis of variances is equal to  $F=18.323$  and the meaningfulness level of 99 percent is a meaningful and reliable model. Based on the cultural-social barriers, only about 16 percent of the barriers of applying ICT can be explained.

In the second stage the variable entered in the regression was the legal-political obstacle. In this level, the correlation coefficient is equal to  $R= 0.437$  and the coefficient of variation  $R^2 = 0.191$  and the coefficient of adjusted determination with  $\text{Adj } R\text{ square} = 0.175$  has been calculated and the value of F from the analysis of variance with and the significant level of 0/000 and with 1 percent error is  $F =11.934$  which is a meaningful and reliable model. Based on the variable of legal-political barriers only 16% of ICT application barriers can be explained.

## **DISCUSSION AND CONCLUSION**

The data indicates that 73.83 percent of respondents believe that legal-political barriers are the most important barriers; however, 26.17 percent of them do not have such belief. Among the 11 variables related to the legal-political barriers, the lack of administrative-legal requirements in applying ICT is the most important barrier; on the other hand, the present in providing services and the lack of laws and government policies to support and apply these technologies are the next priorities.

Nowadays, according to the experts' idea in administrative units, administrative and legal requirements for the use of information technologies in the same field were not predicted and the use of these kinds of new technologies depends on the willing and interests of the same administrative unit. The government has not announced a clear strategy to support and apply these technologies. The government should attempt to take serious action to monitor the implementation and use of these technologies through the reduction of the administrative bureaucracy, clarifying the general policies and applying clear policies to efficient use of new communication technologies. Olorube et al, Kiplang and Ahmed Pour have confirmed this fact in their studies [9, 8, 5].

Education is definitely effective in a practical and visual way in every major rather than the deterministic teaching of some data for memorization and it attract the

people's confidence easily. Garcia *et al.*, (2004), Cox and Madramootoo (1998), Omid (2008), have confirmed this in their investigations [10, 11, 6].

Generally and habitually, allocating budget is related to the actions that usually have immediate and tangible results. Considering that education inherently has long-term and delayed results, expenditures in its related matters is often faced with resistance. The expenses of providing and also maintaining the necessary equipments to hold educational classes for experts and also the trainers fee is high. The relevant policy makers, planners and executors should take this matter into the consideration. This fact should be considered that the benefits of updating the relevant experts' information are more important than the expenses used in this matter. On the whole, it should be attempt to present education as one of the most important infrastructures of human development and the financial matters should not be converted to a barrier in performing this matter. Ololube *et al*; Grady and Dyer and Esfandiari have confirmed it in their studies [9, 12, 13].

Experts' direct interference in education courses, the need to learn these new methods and the practical encouragement of experts involved in innovative e-learning are the next priorities. It causes to remove educational barriers largely in this area and update education of experts to be converted to an inevitable necessity and the priority of managers. Multilateral cooperation of agricultural knowledge and information sub-organizations, the experts' electronic technology and the managers of the relevant unit of are necessary for this important matter. Grady and Dyer and Kotrlík have confirmed it in their studies. The data indicates that 82.07 percent of respondents believe that infrastructure barriers are one of the most important barriers; on the other hand, 17.93 percent of them do not have such a belief [12, 14].

When managers are aware of this fact, they attempt to access the experts to the new suitable technologies through the use variety of solutions such as in-service training plans, optimizing the speed of the Internet, providing the hardware and software equipments, improving the quality of service providing centers and allocating the necessary funds to implement these objectives. Frempong (2006), Grady and Dyer (2006), Dromgool and Bolemane (2006 and Kyplang (2003) have confirmed it in their studies.

The results of the correlation coefficient among the legal-political barriers, cultural-social and economic barriers indicate that there is a significant positive relationship among the aforementioned barriers and the

application of ICT in the level of 1 percent error. Moreover, the results of the correlation coefficient indicate that there is a significant positive relationship between the infrastructure barriers and the application of ICT in the level of 5 percent error.

In fact, the effective and appropriate activities to eliminate the above-mentioned barriers can be effective in increasing use of ICT among the experts of Jihad Organization in Ilam province. Gelb *et al.*, (2008), Garcia *et al.*, (2004), Kiplang (2003), Kotrlík *et al.*, (2000), have confirmed it in their studies.

According to the findings and results of the investigation and in order to remove the barriers to increase the application of information technology among the experts Jihad Organization in Ilam province the following suggestions are presented. Regarding the results of the prioritization of the legal-political barriers, it worth for the government to have a serious miniaturization to the performance and use of these technologies through the reduction of administrative bureaucracy, the determination the general policies, per formation laws and clear policies.

Since the resistance of experts in accepting these technologies is considered as one of the most important barriers of education and the negligence of managers in holding these educational periods has sparked this matter; therefore, it should be attempt to participate the experts in the educational periods due to the need of learning new ways and to know E-learning at the top of their agenda. Multilateral cooperation of the knowledge and information sub-systems and the managers of the relevant units are necessary to accomplish this matter.

The lack of adequate infrastructures is a major barrier in the way of educational goals. Managers, regarding the development of ICTs, should carefully think about the necessary actions to create interest among the experts in learning new educations. Human development in the world and new ways of communication such as Internet is quickly presented in other areas of the world and everyone will be prepared for it in a short time. The lack of attention to the human communication and improvement of communication lines is the important factor of development. When managers are aware of this fact, they attempt to access the experts to the new suitable technologies through the use variety of solutions such as in-service training plans, optimizing the speed of the Internet, providing the hardware and software equipments, improving the quality of service providing centers and allocating the necessary funds to implement these objectives.

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