The impact of agricultural extension services: an empirical test through AKAP models[1]

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Abstract:

The functional repositioning of agriculture redefines the role of the farm, by introducing new possibilities of production and by fostering multifunctional activities. In this context, new tasks for agricultural extension services (AES) emerge, aiming at sustaining farm development along either sectorial or territorial paths. The aim of our paper is to analyze the attitude of Italian farms in gaining access to agricultural extension services. This is then described through the AKAP (Awareness, Knowledge, Adoption, Product) sequence. Our results confirm the validity of the model and the necessity to evaluate AES in each phase of the sequence, through an in-depth analysis of the possible motivation for not adopting them.

1.Introduction

The evolution of farming along the multifunctional paradigm has been followed by a review of the supply of agricultural extension services (AES). The evolution of extension is sustained by a parallel development of the agricultural policy during the last programming phases (2007/2013), aiming at empowering human capital and farms' attitude towards innovation. A wider package of measures concerning the supply of extension at farm level is foreseen by regions, jointly with financial resources being allocated in all Italian regions. Nonetheless, not always adequate levels of demand correspond to higher levels of investments in extension services, because of a set of causes that should be deepened. The purpose of our paper is, on the one side, to test whether such a renewed attention towards AES matches high levels of utilization of services on behalf of farms; on the other side, to try out if the use of services may foster change in farms' activity. After a synthetic theoretical excursus, we will analyze the demand for AES in Italy, by proposing a recently developed model of analysis and trying to link access to AES and introduction of innovation in farming activity.

2.Theoretical background

The role of services for the agricultural development has been recently reconsidered; their tasks are not limited to "traditional" agricultural activity, but it extends to a number of other interventions (Anderson, 2007), aimed at qualifying agricultural products, at fostering farm diversification and other strategies incorporated in the new philosophy of rural development and rural innovation (Labarthe, 2005a). Besides, recent environmental and sanitary compulsory standards have engendered "new needs for advice" (Labarthe, Laurent, 2009). As a matter of fact, the continuously shifting scenario settles new tasks for farmers and calls for a renewed supply of extension services. To cope with a more complex consumer of extension services, supply has changed: from the simple linear technological transfer, through approaches of facilitation extension, a recent holistic view is emerging, where interconnections among agents, farmers and socioeconomic and territorial characteristics are prevalent (Swanson, Rajalahti, 2010). Faced with these trends, recent rural development policies envisage an important role for extension and technical assistance to farms. To adapt processes of farms' boundary shift (Banks et al., 2002), rural development policy makes new tools available for farms. The true extent and the capability of AES to foster processes of agricultural adjustment along the aforementioned lines are an even more important object of study. Contrarily to what Hagerstrand (1952) fostered in the past, personal contact is not sufficient to spread information and

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innovation. The complexity of the process, the specificity of potential beneficiaries and territorial characteristics could give raise to profound differences in the propensity to adopt agricultural services.

The necessity to revise the system of agricultural extension to the new scenario has fostered pluralistic views of extension supply, as underlined in the recent Best Fit approaches (Birner et al., 2009), which contextualize the agricultural extension systems to induce higher participation on behalf of potential users: in this perspective, farmers are assimilated to "consumers" of services, who sustain costs, in terms of spending time and money to gain access to services (Charatsary et al., 2011). Consumption of services is not an immediate result of extension activity, but it takes long period during which, as said in Chantre et al. (2009), dispositifs d'apprentissage are at work. Entrepreneurial alertness, testing and validation are key steps of the process. AS a consequence, differences in the use of services are due to a set of motivation including farm's socioeconomic characteristics, path-dependency links and possible conflicts of interest along the agro-food chain, which could engender lock-in effects, like explained in most recent socio-historical approaches (Lamine et al., 2010) and, finally territorial difference in learning attitude, like theorized in learning regions approaches (Lundvall, 1992). Accordingly, the supply of extension services is not always corresponded by a stronger capability to consume AES on behalf of farms: as Anderson and Feder (2004) quote: "Good intentions clash with hard realities". Human and social capital, strong cooperation between public and private agents are necessary ingredients to promote a deeper dissemination of innovation (Swanson, 2008). Transmission of knowledge and information is not more considered as a linear an automatic process, as demonstrated by the numerous examples of failure in agricultural extension. As Knickel et al. (2009) point out: there is a gap between the need for change and farmers' willingness to adjust, and the insufficient capacities of innovation agencies and advisory services to effectively support changes. To avoid this, a rigorous system of evaluation should be encouraged, through which monitoring supply of extension: many systems of evaluation are useful even if lots of them are linked by the lack of data (Berriet-Solliec et al., 2011).

In this paper the access of the agricultural extension is then described through the awareness-knowledge-adoption-productivity (AKAP) sequence, explained by Evenson (1997):

- *A: Farmer awareness*
- *K: Farmer knowledge, through testing and experimenting*
- *A: Farmer adoption of technology or practices*
- *P: Changes in farmers' productivity*

[…]

Awareness is not knowledge. Knowledge requires awareness, experience, observation, and the critical ability to evaluate data and evidence. Knowledge leads to adoption, but adoption is not productivity. Productivity depends not only on the adoption of technically efficient practices, but of allocatively efficient practices as well. Productivity also depends on the infrastructure of the community and on market institutions.

To promote knowledge transfer and impact on farm activity, extension services should affect farmers' advance through the sequence (Gandhi et al., 2009). Awareness and knowledge are key-phases of the sequence, where extension services can strongly impact on agricultural activity. As demonstrated in other studies, the AKAP sequence represents a good method to test agricultural extension service as achieving its ultimate goal in terms of economic impact by providing information and educational training to each step of the sequence (Kyaruzi et al., 2010): in fact it has been investigated to estimate the impact of extension services on agricultural productivity in developing countries. In our opinion it could be an interesting tool to analyze AES's impact on agricultural activity in developed countries. Coherently with the model, our hypothesis is that the simple awareness does not automatically engender adoption and product, due to a set of socioeconomic constraints which impedes a full adoption of AES. That brings us to analyze possible ties between each step of the sequence and the farm's socioeconomic characteristics.

Policy implications of the analysis through AKAP model are evident: firstly, if agricultural services differently impact on each phase of the sequence, according to Evenson's perspective, normative consequences follow, through which conforming all the sequence; secondly, if ties between use of services and farm's socioeconomic traits are evident, they have to be taken into account in defining a more penetrating policy for extension services in a more complex agricultural and rural scenario.

3. Materials and method

We concentrate our attention on the Italian agricultural sector: to apply the AKAP sequence, it is necessary to introduce a slight modification of the model, by declining the meaning of the term "product": in fact, coherently with the context of traditional application (developing countries), the original sense of product is the increase in agricultural productivity. On the other hand, in our case, we intend product under another perspective: by making reference to a renewed concept of innovation as a change in agricultural practices[2].

Accordingly, the model has been tested through a questionnaire to a sample of farms (n=2047) chosen from the database of the Italian Institute of Statistics, through a stratified sample with proportional allocation (Cochran, 1977); The sample comes from five Italian regions, characterized by high rate of expenditure in agricultural services foreseen in the regional plan for rural development. The geographical distribution of the regions is following:

North-east Italy	Veneto
North-west Italy	Piedmont
Central Italy	Lazio and Umbria
South Italy	Campania

The questionnaire was administered through telephone surveys, it is structured as follow:

Part I concerns general information about farm and its socioeconomic characteristics;
Part II investigates each step of AKAP sequence; more precisely: • awareness is detected through the "consciousness question"; it is explained by the percentage of farms perfectly awake about the presence of a system of agricultural extension services available to support farm activity; • knowledge is a encoded through the percentage of farms giving answer to "who" questions, that is a set of questions concerning: a. agents offering AES, divided up into public, private and not governmental agents; b. type of service (information, training, advisory) c. source of service (personal contacts, magazines, e-learning, etc.) • adoption is measured through the percentage of farms using one or more services; • product is coded in a different way with respect to previous investigations: product phase is measured through the introduction of changes in farm's activity, which involves a set of potential innovation (strategic, normative, technical, marketing, organizational, management, etc.), in the sense well expressed by Brunori *et al*. (2008) within the In-Sight research project.
Part III focuses on a set of questions related both to motivation for not consuming AES and on degree of satisfaction on behalf of actual AES's users. Finally, useful information to articulate the access to AES refers to the relational dimension of AES, as well explained by Labarthe (2005b): it concerns the personalization of the services and the frequency and duration of the AES relation.

The second step of our analysis concern the possible ties between AES and farm's socioeconomic traits, that means linking the first two parts of the questionnaire. To estimate the probability of a link between every phase of the sequence and farms' socioeconomic and territorial characteristics, a logit model has been proposed (Knoke, Burke, 1980): the model measures the probability of either awareness, or knowledge, or adoption or product as dependent from three key variables, farm structure, demographic factors and territorial localization.

[2]This viewpoint is in line with recent literature on the subject; to quote Knickel *et al*. (2009): *"innovation involves much more than technology; more and more it relates to strategy, marketing, organization, management and design. Farmers looking for alternatives to industrial agriculture don't necessarily apply "new" technology. Their novelties emerge as the outcome of different ways of thinking and different ways of doing things"*.

These variables are synthetically illustrated in following scheme:

Farm structure[3]			
• *Not-competitive farms* • Farms with reduced equipment; • Self-consumption farms, with low market orientation	*Farms with precarious competitiveness (or with aided competitiveness)* • Diversified farms, farms with low input agriculture and high positive externalities • Necessity to get a public support to reach economic equilibrium	*Competitive farms* • Full-time, industrialized farms, high equipment of factors, • farms with intensive agriculture • Market oriented production	
Demographic factors (age of the family members involved in agricultural activity)			
Average age < 40	40 < Average age < 60	Average age > 60	
Territorial localization **(four areas predicted by the national strategic plans)**			
Urban poles	Areas with intensive agriculture	Rural intermediate areas	Rural marginal areas

As a consequence, we propose four equations for each step of AKAP model; the equation describing estimation function is following:

$$Y = \log it(x) = \ln[odds(x)] = \beta_0 + \beta_1 X_1 + ... + \beta_k X_k$$ where:

- Y represents dichotomous independent variable (presence of: awareness, knowledge, adoption, product),
- β_i are estimated coefficients (through maximum likelihood method)
- X_i are explicative categorical variables

4. Results

Table 1 evidences the main characteristics of the chosen sample, with particular reference to the territorial localization, farms structure (measured by the degree of competitiveness) and life cycle of farm family members.

Tab.1 – Characteristics of the sample

	Regions					
	Piedmont	**Veneto**	**Umbria**	**Lazio**	**Campania**	**All**
NSP area						
Urban poles	84	36	.	42	215	377
Intensive agricolture	127	368	.	109	171	775
Intermediate rural areas	148	92	121	181	80	622
Rural marginal areas	57	31	34	39	112	273
All	416	527	155	371	578	2.047
Degree of competitiveness						
Less competitive farms	95	81	57	149	201	583
Farms with precarious competitiveness	96	65	58	95	146	460
Competitive farms	225	381	40	127	231	1.004
All	416	527	155	371	578	2.047
Life cycle of family farms						
Age <=40	227	322	67	177	327	1.120
40<Age<60	57	82	16	37	84	276

[3] See Sabbatini (2008) for a detailed description of the types of farms.

Age>=60	132	123	72	157	167	651
All	416	527	155	371	578	2.047

4.1 AKAP sequence

Figure 1 illustrates the results for each phase of AKAP sequence and shows a declining trend, moving from the stage of awareness to the adoption and product stages.

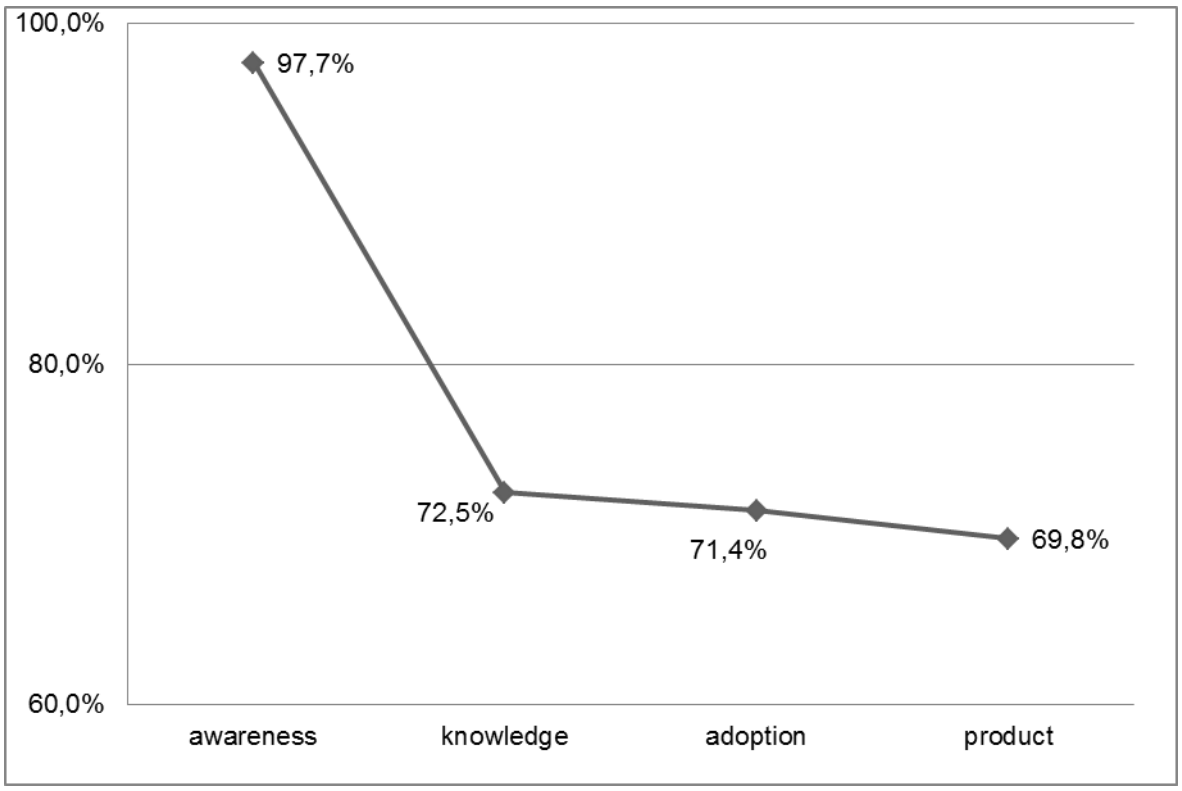


Fig.1 – AKAP sequence in the Italian farms

First impression from the graph is that Evenson surely is right when saying "awareness is not knowledge or adoption…". A declining trend characterizes learning dynamics and AKAP model emphasizes the peculiarity of each phase. Almost all farms, in fact, are aware about the supply of services for farm development. However, the percentage dramatically reduces in the case of knowledge and adoption, where the share is respectively equal to 72,5% and 71,4%. Finally, few less than 70% have introduced change in farm activity. Previous data evidence the aggregate situation, while further information could stem from the differentiation of knowledge and adoption into three main sources: information, training and advisory:

a. three different channels of information have been defined: specialized magazines, internet, participation to fairies or else;
b. training courses and sessions, seminars and training days fall in training;
c. advising is provided directly on farm, through back-office or by telephone.

Results articulated in this way 4are presented in table 2.

Tab.2 - The differentiated AKAP sequence

awareness	97,70%									
	INFORMATION				**TRAINING**			**ADVISING**		
	magazine	*internet*	*faires*	*else*	*courses*	*seminars*	*training days*	*on farm advising*	*counter advising*	*telephone advising*
knowledge	66,9	27,0	38,2	11,2	49,1	23,7	18,3	54,9	38,5	35,4
adoption	55,0	30,0	30,4	11,7	42,6	19,6	17,1	51,9	36,4	29,5
product	68,80%									

The table gives the opportunity to discriminate our results on the basis of sources of information, training and advisory services. Magazine, courses and on farm advising are the prevailing adopted forms of services.

Types of change are presented in figure 2; many farms have introduced more than one change, among different typologies: organizational change and change imposed by compulsory norms prevail on other type, like simply technical, structural or trade changes.

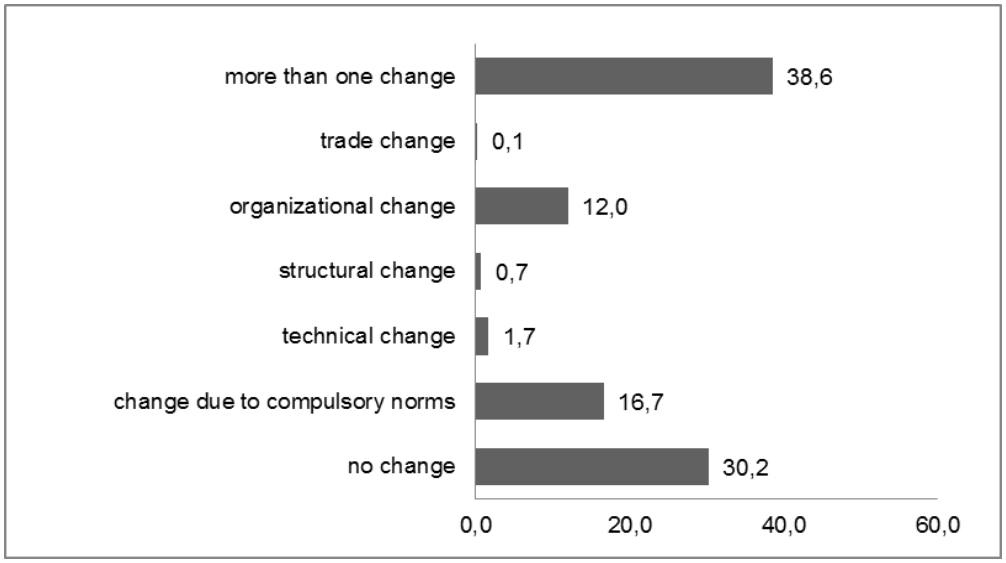


Fig.2 – Type of change introduced

A very interesting result comes from the analysis of connections among duration of contacts and introduction of farm change, which stimulate to think about the role of the reciprocity relationships with AES suppliers. Figure 3 evidences the percentage of farms having introduced changes as related to duration of contacts with AES. As evident, the presence of long-lasting relationships among supplier of services and beneficiaries, gives raise to higher probability to introduce change. This is particularly true in the case of information and advising. In both cases personal contacts are relevant in performing farmer's attitude towards innovation: convention of reciprocity, trust and higher skills stimulate human capital and encourage previously descripted types of change. A less lasting access to services means lesser opportunity to modify farm activity: the percentage of shifting farms dramatically reduces to percentage of around 5% (8% in the case of information services), in case of use of services from less than 5 years.

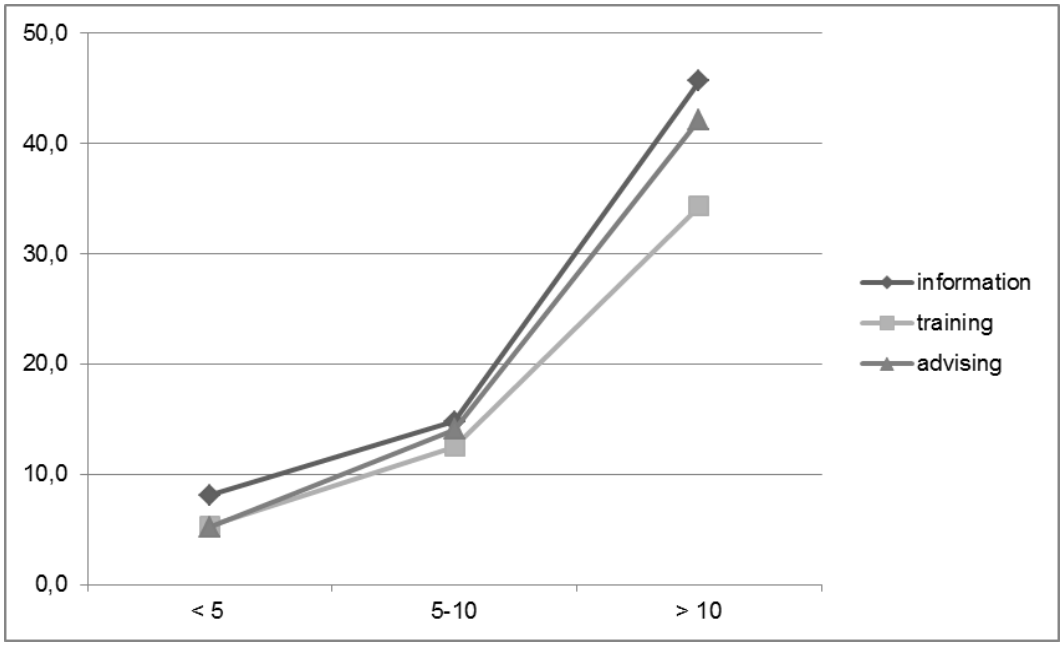


Fig.3 – Duration of services and introduction of innovation

4.2 Why do farmers not consume AES?

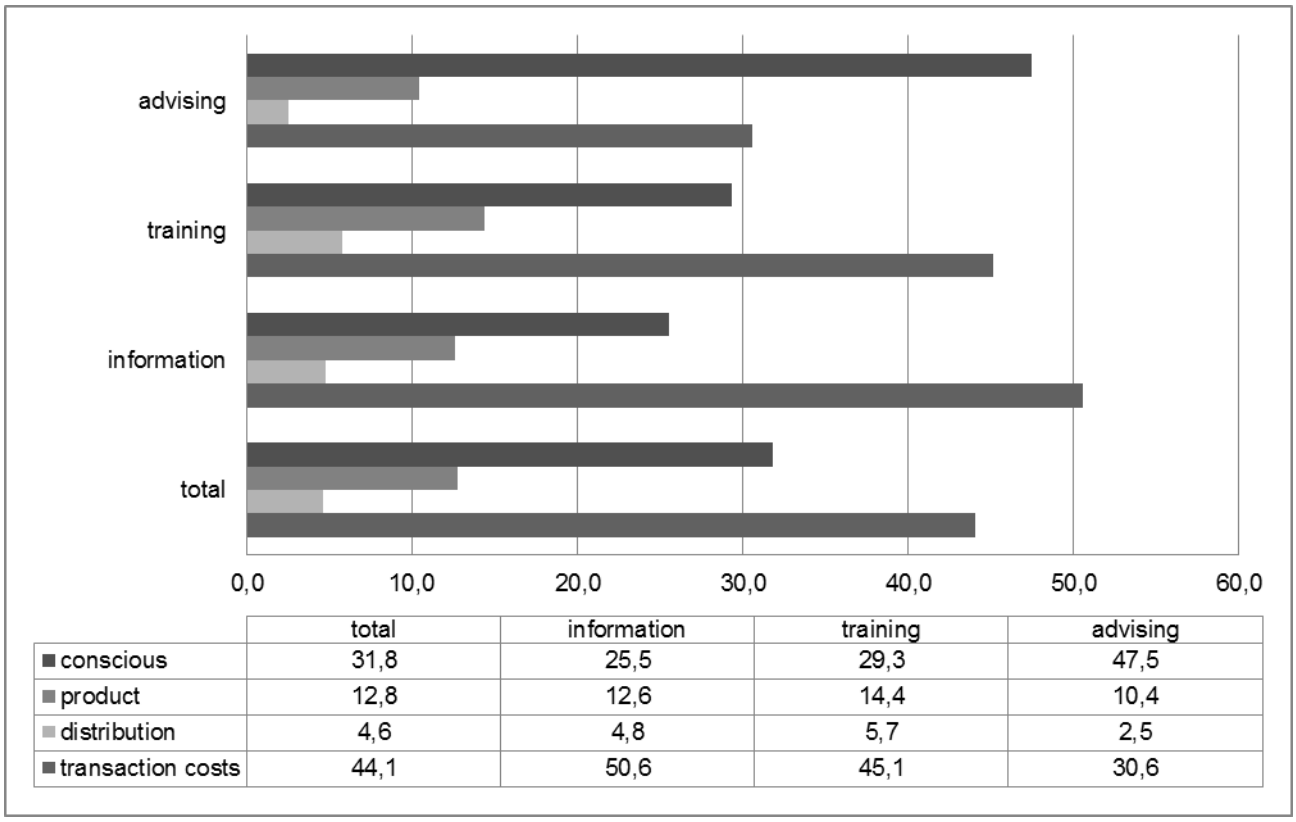
Final helpful information to deeply analyze access to AES, has roots in the motivation for not consuming AES. Individuation of what we call “learning gaps” is a good tool to indirectly evaluate the supply of AES. These learning gaps could be attributed to a number of factors:

- transaction costs gaps, which include a set of causes that increases the costs of access to AES. Typical examples of these costs are opportunity costs (for example: time available), difficulties to reach sites (above all in the case of training courses or in the case of counter services). Other transaction costs are due to informational asymmetries among potential users;
- distributional gaps, if the AES is not distributed throughout the territory;
- product gaps, if supplied service is not perceived as useful or adequate by farms. In a lot of cases personnel employed is not enough prepared to provide for good services;
- conscious gaps, which involve those farmers not interested in using AES in a conscious way: self-regard is a typical example, above all in elder farms.

Figure 4 illustrates results, by showing the percentage of motivations for not consuming services articulated on the base of type of service. Transaction costs seem to be the highest cause of not consumption in the aggregate, immediately followed by the conscious gaps. Just under half of farms (44,1%) does not adopt AES because of high transaction costs: these are particularly high in the case of information and training, where it reaches percentages of, respectively 50,6% and 45,1%; less relevant, even if considerable is the case of advisory services, with 30%.

Conscious gaps are the second cause for not consuming AES: a little less than a third of companies do not consciously consume agricultural services, as a consequence of their selfishness or for motivations strictly linked to their socioeconomic traits. The percentage rises to 47,5% in the case of advisory services, which are not well perceived on behalf of farms. Less evident are the values in the case of training (29,3%) and information (25,5%).

Product gaps, due to the perceived inutility or dissatisfaction about AES, reach approximately 13%, with peaks of 14,4% in case of training. Finally, distribution gaps is the less important motivation (4,6%), with a peak of 5,7% in case of training. The highest level of diffusion of AES is for advisory services which reach the majority of farms distributed in rural territories.



	total	information	training	advising
conscious	31,8	25,5	29,3	47,5
product	12,8	12,6	14,4	10,4
distribution	4,6	4,8	5,7	2,5
transaction costs	44,1	50,6	45,1	30,6

Figure 4 – Learning gaps

4.3 Satisfaction about AES

A final question has been proposed to farmers, concerning degree of their satisfaction about AES. Results are showed in table 2. A first consideration concerns typology of AES: individual and collective. Individual services seem to be more performing than collective ones: as a matter of fact, 58,3% of farmers declare that they fully satisfied about advisory services; 46% gives a good judgment, 12,3% considers services as excellent. Another 27,4% is enough satisfied and, finally, just 14,3% is not fulfilled about them. In the case of information 2/3 of farms are pleased about AES, with a higher percentage of unsatisfied farms (24,2% against 14,3). The majority of the opinions expresses a sufficient (35%) or good (34,1%), while only 6,7% considers them as excellent. Similar results interest training services: 1/5th of farms are not satisfied, while the majority of them communicate good opinions, more precisely sufficient (37,2%) and good (38,2%); 4,2% is very happy about AES.

Tab.2 – Farmers' satisfaction about AES (%)

	information	*training*	*advising*
excellent	6,7	4,2	12,3
good	34,1	38,2	46,0
sufficient	35,0	37,2	27,4
poor	24,2	20,5	14,3

4.4 The logit model

To test probability to use services on the basis of farm's socioeconomic traits, a logit model is proposed. The application of the logic model to the AKAP sequence represent, on the one side a good tool to confirm its utility, on the other side to excavate the relevance of farm's types in gaining access to AES. The estimated model could be considered as acceptable with the exception of the awareness phase of the sequence (table 3), where the results are not significant. This result is probably due to the very high unbalance in the percentage of answers (97% of awareness, as showed in figure 1). On the whole, as was expected, in each phase, the presence of young family farms with high levels of competitiveness give farms higher probabilities to get in touch with supply of AES. A less relevant role is played by territorial factors.

Tab.3 – Logit model for awareness

AWARENESS	*estimation*	*standard error*	*chi-squared Wald*	*Pr> chi-squared*
Intercept	3.8693	0.5606	47.6434	<.0001
NSP ZONES				
A	-0.1462	0.4256	0.1180	0.7312
B	0.3540	0.4379	0.6535	0.4189
C	0.8529	0.4556	3.5048	0.0612
D	*	*	*	*
DEGREE OF COMPETITIVENESS				
not competitive farms	0.5810	0.4029	2.0800	0.1492
farms with precarious competitiveness	-1.0636	0.3943	7.2764	0.0070
competitive farms	*	*	*	*
DEMOGRAPHIC FACTORS (family farms average age)				
41-59	0.3475	0.4768	0.5314	0.4660
> 60	-0.2584	0.4795	0.2904	0.5900
< 40	*	*	*	*
ODD RATIO				
A vs D = 0.864				
B vs D = 1.425				
C vs D = 2.346				
Not competitive vs competitive farms = 0.559				
Farms with precarious competitiveness vs competitive farms = 0.345				
41-59 vs<40 years = 1.416				
60 vs < 40 years = 0.772				

The econometric model for the second phase (knowledge), presented in table 4, reveals that territorial localisation is not significant in describing the probability to be aware; with the exception of the C zones (rural intermediate areas), the other territories show not acceptable index of significance. Farms operating in intermediate rural areas get more probabilities (67%) to know services with respect to marginal rural areas. On the other side, farm structure and demographic factors are relevant and significant. From the structural perspective, a strong correlation between knowledge and competitive traits of the farms are evident. As one moves towards less competitive typologies of farms the knowledge is less probable. More precisely, less competitive farms gain a lower probability of knowledge equal to 57% with respect to competitive ones, while precarious farms evidence higher probability but even inferior to competitive farms (42%). As regards demographic elements, the localisation in mature and old phases of the life cycle makes the knowledge less probable. With respect to younger family farms, the probability of gaining knowledge is 60% lower for old farms, while the mature families has more probability, even if it remains lower (30%) than younger farms.

Tab.4 – Logit model for knowledge

KNOWLEDGE	*estimation*	*standard error*	*chi-squared Wald*	*Pr> chi-squared*
Intercept	1.7054	0.2119	64.7575	<.0001
NSP ZONES				
A	-0.1690	0.1720	0.9646	0.3260
B	0.0438	0.1611	0.0738	0.7859
C	0.5181	0.1632	10.0764	0.0015
D	*	*	*	*
DEGREE OF COMPETITIVENESS				
not competitive farms	-0.8564	0.1254	46.6445	<.0001
farms with precarious competitiveness	-0.5515	0.1385	15.8509	<.0001
competitive farms	*	*	*	*
DEMOGRAPHIC FACTORS (family farms average age)				
41-59	-0.3764	0.1759	4.5764	0.0324
> 60	-0.9389	0.1843	25.9552	<.0001
< 40	*	*	*	*
ODD RATIO				
A vs D = 0.845				
B vs D = 1.045				
C vs D = 1.679				
Not competitive vs competitive farms = 0.425				
Farms with precarious competitivenss vs competitive farms = 0.576				
41-59 vs<40 years = 0.686				
60 vs < 40years = 0.391				

The adoption phase endorses previous considerations (tab.5). Estimations are not significant for territorial factors with the only exception already seen for knowledge phase (rural intermediate areas). The aptitude of competitive and younger farms to get involved in AES is confirmed: older and less competitive are the farms, the less the chance of consuming AES. Probability for not competitive farms to get involved in AES is 60% lesser than competitive one, while for farms with precarious competitiveness it is 48% lesser. Besides, for mature family farms this probability is 34% lesser, while for older ones it is of 62%. A relevant aspect of the adoption phase is that, With regard to the previous phases of the sequence, moving from knowledge towards adoption implies a reduced percentage on behalf of older and less competitive farms. This evidence is confirmed in the next step of the sequence, product.

Tab.5 – Logit model for adoption

ADOPTION	*estimation*	*standard error*	*chi-squared Wald*	*Pr> chi-squared*
Intercept	1.7828	0.2171	67.4289	<.0001
NSP ZONES				
A	-0.1233	0.1727	0.5099	0.4752
B	0.1136	0.1622	0.4903	0.4838
C	0.6491	0.1651	15.4622	<.0001
D	*	*	*	*
DEGREE OF COMPETITIVENESS				
not competitive farms	-0.9297	0.1278	52.9229	<.0001
farms with precarious competitiveness	-0.6519	0.1409	21.3929	<.0001
competitive farms	*	*	*	*
DEMOGRAPHIC FACTORS (family farms average age)				
41-59	-0.4119	0.1821	5.1136	0.0237
> 60	-0.9680	0.1901	25.9393	<.0001
< 40	*	*	*	*
ODD RATIO				
A vs D = 0.884				
B vs D = 1.120				
C vs D = 1.914				
Not competitive vs competitive farms = 0.395				
Farms with precarious competitiveness vs competitive farms = 0.521				
41-59 vs<40 years = 0.662				
60 vs < 40 years = 0.380				

In the product phase, the statistics are similar to the previous phases, even if, in this case, territorial significance is higher for urban poles and, on the other side, the model is less significant for mature family farms (tab.6). With respect to competitive farms, the probability for less competitive to introduce changes in farming activity is 75% lower the lowest percentage in relation to the other phases. For farms with precarious competitiveness the percentage is 52%. From a demographic point of view, younger farms demonstrate their higher propensity to introduce farm changes, above all with respect to older farms.

Tab.6 – Logit model for product

PRODUCT	*estimation*	*standard error*	*chi-squared Wald*	*Pr> chi-squared*
Intercept	1.8784	0.2176	74.4982	<.0001
NSP ZONES				
A	-0.4539	0.1719	6.9751	0.0083
B	0.2840	0.1640	2.9987	0.0833
C	0.3782	0.1617	5.4706	0.0193
D	*	*	*	*
DEGREE OF COMPETITIVENESS				
not competitive farms	-1.0408	0.1260	68.1838	<.0001
farms with precarious competitiveness	-0.7420	0.1378	29.0024	<.0001
competitive farms	*	*	*	*
DEMOGRAPHIC FACTORS (family farms average age)				
41-59	-0.4338	0.1820	5.6821	0.0171
> 60	-1.1590	0.1890	37.6233	<.0001
< 40	*	*	*	*
ODD RATIO				
A vs D = 0.635				
B vs D = 1.328				
C vs D = 1.460				
Not competitive vs competitive farms = 0.353				
Farms with precarious competitiveness vs competitive farms = 0.476				
41-59 vs<40 years = 0.648				
60 vs < 40 years = 0.314				

As a matter of facts, the transition towards down phases implies strong reduction in the estimated probabilities on behalf of farms with similar characteristics. As a consequence, the econometric model confirms the results of the sequence, as presented in figure 1.

5. Conclusions

The paper has tried to add some reflections to the crucial theme of understanding the way farmers use agricultural extension services and, thanks to them, they introduce changes in farm activity. The process of adoption of agricultural extension services shows some complexities, which have been analyzed in the present paper, starting from the hypothesis that, as already said by regional economists, Hagerstrand's (1952) idea of spreading innovation through simple contact is not acceptable. In this perspective, Evenson's AKAP sequence could represent a very useful tool of analysis, which permits to intercept a set of variables influencing the consumption of agricultural services. In our opinion, the considered model should be taken into account in future researches on AES, to fully understand the processes influencing learning dynamics in different types of farms. To get more detailed information about possible ties between awareness-knowledge-adoption-product and farms' socioeconomic traits, a logit model has been tested.

Some interesting remarks emerge from our analysis: a first element is the high awareness about AES: without any reference to farms' socioeconomic traits (as logit model has confirmed), the majority of the investigated farms are conscious about the existence of AES. However, knowledge and adoption are strongly reduced to 1/3rd of total potential demand. This percentage markedly reduces in the other steps of the sequence: to deepen this information, the research has investigated the articulation of AES for each field of activity (information, training and advising), so showing high differences among different source of service; relational aspects are relevant in fostering access to AES, as already demonstrated in Labarthe's analyses (2005a; 2005b). The logit model suggests a second element of reflection: farm's structure and life cycle of family farms can considerably interfere in the use of AES, by reducing it in older and less competitive farms.

As a consequence, different performance in each step of the AKAP sequence is related to socioeconomic characteristics of the farms. Besides, the research has clarified other possible causes for not using services: product gaps, transaction costs are relevant motivations that impede a full consumption, as underlined in recent studies conducted in both developed and developing countries (Charatsary *et al*., 2010; Davis *et al*., 2009).

How the results could be used by AES providers to increase AES consumption? The followed approach of analysis gives suggestions about the necessity to both raise perceived benefits from AES and to reduce economic and physical distances between suppliers and consumers of services. A diversification of portfolio of possible delivered services could involve higher participation on behalf of certain farms working within not professional and market circuits. As a consequence, a more "democratic" participation to AES on behalf of all possible types of farms is a necessary condition, to avoid what has been called in literature a "result paradox": get more those farms who least need (Benvenuti, 1991). This is, of course, not easy: Lamine *et al*. (2010) clearly evidence the difficulty to escape lock-in effects inherent in path-dependency scheme, above all in homologated agriculture. However, a more articulated and farm-specific supply of services, jointly with a territorial spreading, which could reduce farms opportunity costs, should encourage higher participation. In many cases supplied services are not adequate to potential users and, in some cases, they are offered by not prepared personnel. A final consideration concern the type o farm excluded from the access, not competitive and with precarious competitiveness, which have more attitude to produce multifunctional goods. Due to the particular nature of the agricultural activity, these farmers who cannot afford a full consumption of AES should be favored in receiving a "minimum" amount of services, which assume, in this perspective, the nature of a public good (Umali and Shwartz, 1994). This bring us to open new field of analysis and stimulate further researches concerning governance mechanisms and efficacy of AES; more precisely, an interesting field of research could be related to the progressive disengagement of the State and to the contractualization processes involving the governance of AES (Labarthe, Laurent, 2009). The clear dichotomy of access to AES reinforces this feeling and stimulates further analyses. As a matter of fact, a lot of work remains to be done; in this paper we hope to have given new insights to reduce farms' learning gaps and to foster a deeper participation in extension programs.

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