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The Role of Social Capital on the Diffusion of Information Technology Based on Surveys and Participant Observation*

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I. Introduction

In our research we approach computer literacy and computer possession from two sides. The first key question of our research is: in what way does social capital influence the access to information technology? This question is closely connected to the plenary of the Hungarian Sociological Association conference, in particular to György Csepeli's lecture, who, as a sociologist and specialist in the field, has made attempts to provide an answer to the question what kind of factors shape information society. Based on empirical research, he examined what kind of roles income and education play in someone becoming a computer user. The points of view he analyzed in *Lazarsfieldian* terms were all analytical explanatory factors. In contrast to this, we conducted our research on the basis of relational criteria and we stressed the fact that besides material and spiritual resources computer knowledge depends on relationships and social capital. During our research we tried to operationalize and put this observation into figures, which in some way seems to be commonplace. We posed certain hypotheses, like how many friends and acquaintances in particular work fields one needs to have to become a computer user. Our causal explanations were tested in a sample territory. We think that if our propositions were to be revised on a larger scale, efficient political information would result. Our view is that personal advice may serve as a major means in building an information society.

Nowadays, in relation to information technology, many sociologists take for granted that the spread of computers is a diffusional process, expressed by a certain diffusional S-graph. We question this fact as well, so our second key question is the following: is the spread of information technology a diffusional process? If so, can it be predicted by a diffusional chart in Hungary?

To provide answers to our questions we carried out empirical research in the Kaposvár-area. We applied sociological and cultural-anthropological data-collection techniques. In this paper, we present the bibliography concerning the topic, our hypotheses, research results and, finally, the synopsis.

Methodology

The Information Technology and Local Society research project began in 2001 at the Department of Sociology and Social Politics at Budapest. The research focused on the diffusion of information technology and the digital gap. Our research team joined the research project in the summer of 2002 during a fieldwork.

In 2002-2003 we applied two data-collection techniques. Firstly, our questions referring to the social capital and diffusion of information technologies were introduced to a survey of a representative sample in the Kaposvár area.

Secondly, in a smaller sample area, at Cserénfa, we mapped out the ways and modes of computer and computer literacy diffusion by participant observation. During our fieldwork at Cserénfa we kept a fieldwork diary and made video recordings, which we utilized to make an educational film. The aim of the fieldwork was to clarify the results by revealing individual motivation besides quantitative methods.

During the analyses we utilize the results of both data-collection and participant observation techniques. We also adopted relational- and dynamic analysing methods. To describe and illustrate the social network in graphs we used UCINET and Net Draw programs.

The Site of the Field Work

To complete the survey data-collection at Kaposvár we did field work at Cserénfa. Situated twelve kilometers from Kaposvár, among the hills of Zselic, Cserénfa has 264 inhabitants. Since Cserénfa is a small village, the inhabitants work in Kaposvár or neighboring villages, and children go to primary school at a neighboring village, Szentbalázs.
A major development in the past few years at Cserénfa was the establishment of the telehouse in 2002. The telehouse works as a computer consultancy providing the possibility of

working on a computer and using the Internet. The telehouse also provides access to communications and other devices like a fax-machine, a copy-machine, a CD writer, and the means to acquire basic information on the ways of computer-usage within the framework of certain specialized courses.

It is possible that the village's dynamical development and the social network structure influenced many families at Cserénfa to acquire more PC's than in the neighboring villages.

II. The Role of Social Capital in Adopting Information Technology

We approach the first topic of our research – the reason people buy PC's and the acquisition of expertise – from a relational point of view. We examine in which way computer technology innovations are affected by the ego's social capital composition.

The term »social capital« is central to our research, however, contemporary scientific literature and its branches refer to it distinctly. It is essential that we should present the improvement of several theories regarding assets, while we designate the relevancy of the usage of our term.

Theoretical Framework of Social Capital

According to the classical economic approach, capital is one of the production factors, signifying the investment in trade and production. The term »capital« is meant in the sense of a part of the added value that results as a difference between the consumer value of goods (on the consumer market) and its value (on the trade market). At this stage the analysis is structural, focusing on classes and not on individuals. One of the main differences between the levels of society is the possession of capital.

The multilateral expansion of the term »capital« began in the 1950's and 1960's in the field of economics. The term »human capital« was further developed by James Coleman.[1] According to Coleman, human capital results from further education, and as the individuals acquire new skills and knowledge, the horizon of their activities expands. Coleman reflects on social capital as the result of changes in human relations in a way that they generate activities. In other words, he identifies social capital with some characteristics of social structure that can be used to serve the needs of the agents. One of the most important factors of its realization is trust, so, according to Coleman, social capital depends on the trustworthiness of the social surroundings, the extent of liabilities, information highways and efficiency of the relevant norms and sanctions.

In the 1970's and 1980's, capital logic was expanded to social and cultural resources, too. Mark Granovetter's ›embedded‹ concept became a focal term in social network analysis.[2] Regarding social relationships, he differentiates between »strong« and »weak« ties. Weakly embedded individuals in society (having weak ties) are most likely to mediate between social levels, or, if you like, using Granovetter's term they are bridges in society and they play an important role concerning information expansion. Weak ties help the individual's social advancement, expertise, in contrast with strong ties, which result through family, relative and friend relations.

From the 1990's on, Robert Putnam became one of the key figures in professional debates concerning the concept of social capital and its measure. Putnam[3] adopting Bourdieu's views, thinks that the criterion of social capital is reciprocation, mobilized by altruism in the short term, and self-interest in the long term. The »profit« may be promising in the short term, but sometimes delayed and probable. According to Putnam, social capital refers to the system of relations between individuals, trust, cooperation and reciprocation standing at its centre.

Adapted from Putnam, Barry Wellman and his co-authors[4] make up social capital from the following: network capital (certain friend, neighbor, family interactions, which give spiritual and physical support), participation capital (it contains the ability and intention of voluntary participation, as in political and charity organizations), communal duty (the social capital means far more than interpersonal action, because it also contains the motivation of belonging somewhere).

In regard to this point of view, we may suggest that the network component of the social capital dominates in our research, because we focus on its ways of influencing the individual's acquisition and application of computer literacy depending on the extension and content of his relations.

1 Coleman, James: Social Capital in the Creation of Human Capital. American Journal of Sociology 94 (1988), pp. 95-120 [Repr. in: Lengyel György / Szántó Zoltán (Eds.): Tőkefajták. A társadalmi és kulturális erőforrások szociológiája. Budapest: Aula 1998, pp. 11-45].

2 Granovetter, Mark: The Strength of Weak Ties. In: American Journal of Sociology 78 (1973), pp. 1360-1380.

3 Putnam, Robert: Bowling Alone: The Collapse and Revival of American Community. New York: Simon & Schuster 2000.

4 Wellman, Barry / Quan Haase, Anabel / Witte, James / Hampton, Keith: Does the Internet Increase, Decrease or Supplement Social Capital? Social Networks, Participation, and Community Commitment. In: American Behavioral Scientist 45 (2001).

In our study we apply the ego-net approach of social capital. According to the social network point of view, the two factors of connections are set aside: dots (agents, actors) and edges (relations between factors, actors)[5]. The points and edges define a certain connection which further constitutes a graph. Its characteristics can be analyzed by the concept of graph theory. The ego-net or ego-network is a primary network for an actor which shows all the connections of a specific actor.[6]

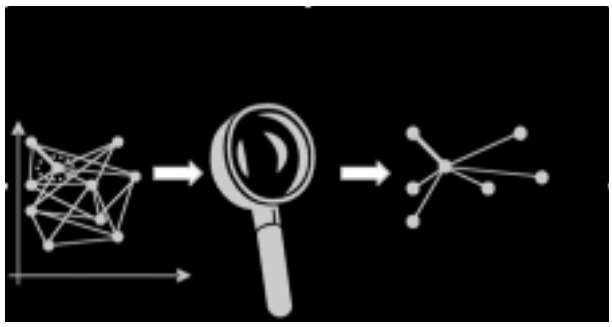

Chart 1: »The part in the whole.« The social network and the ego-network.

Hypotheses

The central question of our study is in what ways the structure of relations of individuals influences innovations like computer technology and the acquisition of expertise. In contrast with the analytical approach mentioned in scientific literature, we deal with relational data. Accordingly, we analyze the extension of ego-network, that is, the relations between the members of the community. Ego-network differs from social network in the sense that the former maps the individual's relations and the latter the relations of the social group. Our study concerning social capital poses nine hypotheses on the basis of nine causal relations.

1. Our first hypothesis states that a larger ego network makes it easier to get a PC and to acquire PC- and Internet-specific expertise. Taking into consideration that children rely on their parents' relations, our first hypothesis claims that the personal relation network is influenced by the number of adults in a family. According to our assumption, if there are more adults, then it is easier to acquire computer literacy.
2. We found it important to examine how many close adult relatives an interviewee had. Granovetter emphasizes that extended acquaintance relations (weak ties) are favorable, whereas strong ties (relatives and friends) are unfavorable to a personal career. In terms of our hypothesis, the scale of close relative relations influences the probability of PC possession and PC literacy, however, we suppose this relationship is not always positive.
3. In terms of our third hypothesis the number of close friends influences the acquisition of a PC and PC-specific knowledge.
4. According to our fourth hypothesis, the more acquaintances one has, the more probable it is that they possess a PC. So, the fact that people keep in touch with a number of persons influences the obtaining of a PC. In the process of the survey, we tried to shed light on the problem whether those possessing a PC name more such persons than those without a PC do.
5. The composition of ego-network may also influence the acquisition of a PC and knowledge related to it. We coined a hypothesis that the teachers participating in one's ego-network influence the purchase of a PC and the development of PC- specific information.
6. A private enterprise demands innovative attitude on a large scale, because nowadays a computer is a basic existential instrument to many. In terms of our hypothesis the businessman acquaintance increases the possibility of the purchase of a PC.
7. In our seventh hypothesis we pose that the leader of a company in the ego-net has a positive influence on obtaining a PC and PC-specific knowledge.
8. The position of an »official« is a particular, contemporary term, observed at Cserénfa as well. The »official« term covers the collective name of employees in an administrative position in a state institution. According to our eighth hypothesis the »official« of the ego- network also influence positively the likelihood of a PC purchase.

5 Cf. Szántó Zoltán / Tóth István György: A társadalmi hálózatok elemzése. In: Társadalom és Gazdaság 1 (1993) and Wasserman, Stanley / Katherine Faust: Social Network Analysis. Methods and Applications. Cambridge: Cambridge UP 1994.

6 Szántó / Tóth 1993.

9. Besides the above cases PC purchase is also influenced by computer technician acquaintances.

During the survey analysis one column of questions refers to the extension and composition of the ego-network, as the explaining variant. We chose three questions from the questionnaire as the depending variant regarding PC possession and usage. The questions referring to PC possession and usage were not introduced by us.

Explanatory variables	Dependent variables
EXTENSION OF EGO-NET 1. How many adults are in the household? 2. How many adult relatives do you have? 3. How many close friends do you have? 4. With how many people do you maintain relations?	1. Do you know to use a PC at least at a basic level? 2. Do you have a PC at home? 3. Do you use internet or e-mail?
COMPOSITION OF EGO-NET 5. How many of these are teachers? 6. How many of these are businessmen? 7. How many of these are company leaders? 8. How many of these are »officials«? 9. How many of these are informaticians?	

Table 1: Explanatory and dependent variables

Research Results

The results on social capital influence on PC possession and usage were based both on the survey analysis and on participant observation.

The survey analysis of computer possession and its usage shows that in 2003 in the Kaposvár area 40,7% of the interviewees could handle a computer, 32,3% possessed a PC and 15,8% used the Internet. During fieldwork our discussions revealed that at Cserénfa many families could not purchase a computer due to financial problems, but at the workplace or in the telehouse they used it and could deal with it properly. It might appear peculiar to see the small number of Internet users, but one needs to take into consideration that in some villages of the area inadequate telephone lines makes it impossible to connect to the Internet.

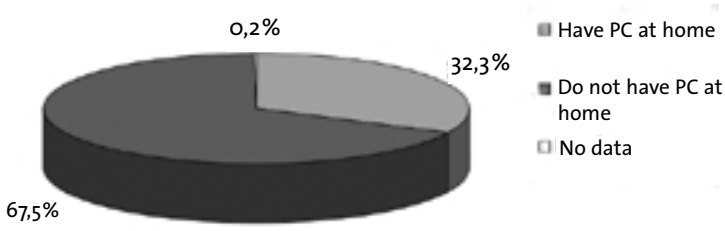

Chart 2: The frequency of PCs at home in the Kaposvár area

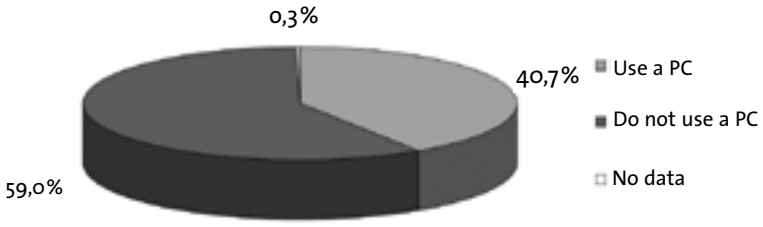

Chart 3: The frequency of PC users in the Kaposvár area

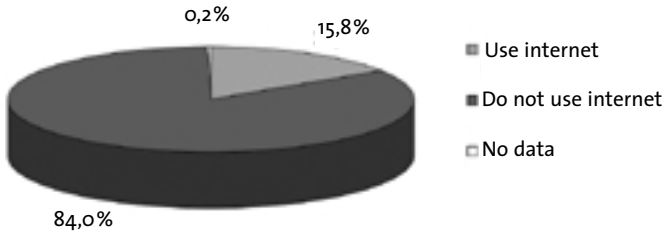

Chart 4: The frequency of internet users in the Kaposvár area

Based on 2003 survey data collection in the Kaposvár area, by Corvinus University Budapest

During our research, we dealt with the issues of possessing a computer and acquiring computer and Internet literacy. The analysis of these three factors could be realized only by surveys. In contrast with this, our field work at Cserénfa took as a starting point the question of computer possession or not.

Based on the cluster analysis of the answers regarding the extension of the ego-network we found out that the majority (regardless of one small number cluster) can be put into three groups:

1. *Traditional village social network*: This group has a strong social network with many friends and relatives. The average number of relations is 43. Twenty-one of them are relatives and 12 of them are friend relations. 4,8% of the interviewees had such an ego-network.
2. *Average networks*: In this group, people have an average number of relations. This is the group with at least nine relatives, a few friends and fewer acquaintances, altogether 26,6% of the interviewees .
3. *Marginals*: In the most common cases, the individual lives in a family with two adults, an average number of five close relatives, three close friends and eight acquaintances. Most of the people belong to this cluster. (Our results show that the interviewees name a round number of friends and acquaintances: 5, 10, 15 and 20 – this is to be noted later on. Most of them name four close relatives, five close friends and they keep in touch with ten.)

During the analysis process we utilized the results of the cluster analysis, correlation calculation and regression-analysis. In the case of regression-analysis we built in all the variants regarding the content and quantity of the relation-network. As a consequence, we could draw conclusions on their significance.

The Extension of Ego-Network and Computer Possession

1. *According to our first assumption, if there are more adults in a family, then it is easier to acquire computer literacy.*

   The interviews taken during the summer of 2002 showed that the purchase of a computer was an important decision due to financial contstraints or lack of appropriate technical knowledge. The adults in the family get to know certain pieces of information regarding the purchase of a computer through their personal contacts. Serious financial decisions are made by adults, so, in our case, their social capital is crucial.
   In the Kaposvár area two-adult families are the most common (80% majority), followed by multigenerational families (with three or more adults) and one-adult households.
   Our quantitative analyses show that a significant relation exists between the number of adults in a household and computer- and Internet-specific literacy. The rise of the number of adults by units results in an 8% rise of the possibility of computer possession, 4% rise of computer literacy and 3% rise of Internet and e-mail usage in the household. One can also notice that in the case of the possession of a PC the most significant factor is the number of adults in the household.
   The explanation of the causal relation may be due to social networks as well, in the sense that the adults discuss their experiences, so normal households possess more informa-

tion than deficient ones. There may be some other kind of latent reason as well; e.g. households with 2-3 working adults are better situated financially to buy a computer. We can not reveal these latent reasons, but we can state that the rise of the number of adults in a family has a positive influence on the purchase of a computer and computer literacy. Based on our personal experience we may claim that a PC is a form of property and its acquisition leads to serious material and other kinds of decisions. Further, based on the quantitative analyses we may state that there is a close connection between the possession of a computer and computer- and Internet-specific knowledge. Therefore, if an individual possesses either of these factors, it is highly probable that he will soon have the rest. During our fieldwork at Cserénfa we also found out that the purchase of a computer is a very serious investment. In most of the households the goal of the purchase was to help the expansion of the children's computer-specific knowledge. Some felt that the technical knowledge acquired at school can be widened at home with practice on the computer. Taking into consideration the financial situation, the families either bought a second-hand or a new computer, but most of them dealt with the idea that if once they invest in it, they should choose modern technology. In this case they asked for the help of an expert in this field. It was a general phenomenon during the fieldwork that although children prompted the purchase of a PC, adults bought the computer with the assistance of acquaintances. Along with our presuppositions it was proved that the parents used their personal relations to buy and install a PC. We also noticed that if a member of the household grew proficient in handling a PC, the rest supported its acquisition. Naturally, not every family had the appropriate financial frame to buy a PC, though a few who could deal with it planned to buy one in the near future.

2. *According to our second assumption the number of close relative relations influences the acquisition of a PC and computer literacy.*

The analyses lead to the conclusion that in the Kaposvár-area the number of close relatives does not explain the purchase of a computer and the acquisition of PC-specific knowledge. In other words, the relatives do not have an important role in the diffusion of PC's and relative skills.
During our fieldwork we found out that computer and computer-related information spread in an ›diffusion-of-innovation‹ manner. If we can really speak of a diffusional process, then its participants are not the »strong ties« but the actors of »weak ties« or other formal characters such as media or educational institutions. This fact was verified by the results of the fieldwork. We noticed that those families who have outward social capital are more innovative. So, we can draw the conclusion that at Cserénfa the outward social network explains the people's innovative tendencies and not the extension of relatives. During our discussions with the inhabitants of Cserénfa it was made clear that many gave their old computers as a present to their relatives, but they did not use them. The villagers also revealed that a small number of PC-owners bought PC's under the influence of relatives. Both cases show that at Cserénfa the diffusion of computers was not due to the relatives.

3. *According to our third hypothesis, the number of close friends also influences the purchase of a computer and the acquisition of specific knowledge. As Granovetter mentioned, it is weak ties and not strong ties that favor the adoption of innovation.*

In this case our results can be interpreted in two ways: either there are overlaps between groups of relatives and friends or a third factor influences both groups. In the first case we may state that the circle of friends and relatives sometimes overlap: many good friends become relatives (brother-in law or godfather) and close friends may become close relatives. In the second case we may claim that a traditional village social network exists, based on extended strong relations (friends and relatives). Whichever interpretation we may adopt, it is true that strong relations (friendship and relatives) are similar to each other. This is verified during the regression-analysis.
Based on our experiences at Cserénfa we have to emphasize another factor: localism. It created a strong connection between people, besides friends and relatives. Our first

impression was that the inhabitants of Cserénfa lacked a strong local identity, but during the fieldwork we grew to know that they were very much attached to the village. They did not allow an investor to create a fishpond to attract tourists, believing that »Cserénfa should be owned by its people«. The preservation of identity and its transmission was supported by the authorities, millennium feasts, village memorial days and even the telehouse seemed to serve this aim. The telehouse at Cserénfa was opened in August 2002 and we experienced that local children between the ages of 8 to 16 regarded it as a »modern playground«: they lived the experiences of computer games brought in from outside of the village here.
To put it simply, we may state that those inhabitants who have extended outward relations are likely to possess a PC. The majority of the villagers is attached to Kaposvár, situated 12 km from Cserénfa, in different respects, among them the acceptance of a computer being mainly due to workplace, educational institutions and personal relations.

Structural Equivalence

4. *According to our fourth hypothesis an extended ego-network influences the acquisition of a computer and of computer-specific knowledge.*

To our surprise, the data showed that the extension of the ego-network does not have a significant influence on the access of a computer and the acquisition of computer-specific knowledge. An explanation of this phenomenon may be that an extended circle of acquaintances is not only a characteristic of actors in the Kaposvár-area, but also of non-intellectuals mobile in their own social group.
We presented above that the local society may be categorized into three groups of ego-networks: the traditional village social network, average networks and the most common marginal networks. We found out that inhabitants who belong to the second group are more likely to have access to a computer and to acquire specific knowledge. Extended traditional relations hinder the adoption of innovation, as do marginalized situations and few relations. The surprising results drew our attention to structural equivalence, that is, the analysis of relational patterns similar to each other.
The next illustration – created during the fieldwork – shows who influenced whom in the village to buy computers. Our question was: »Who usually helps you...?« The participants are shown with dots, the relations with lines. The direction of the lines shows the direction of consultation. We illustrate the participants outside the territory with black dots and the inhabitants of Cserénfa with red dots.

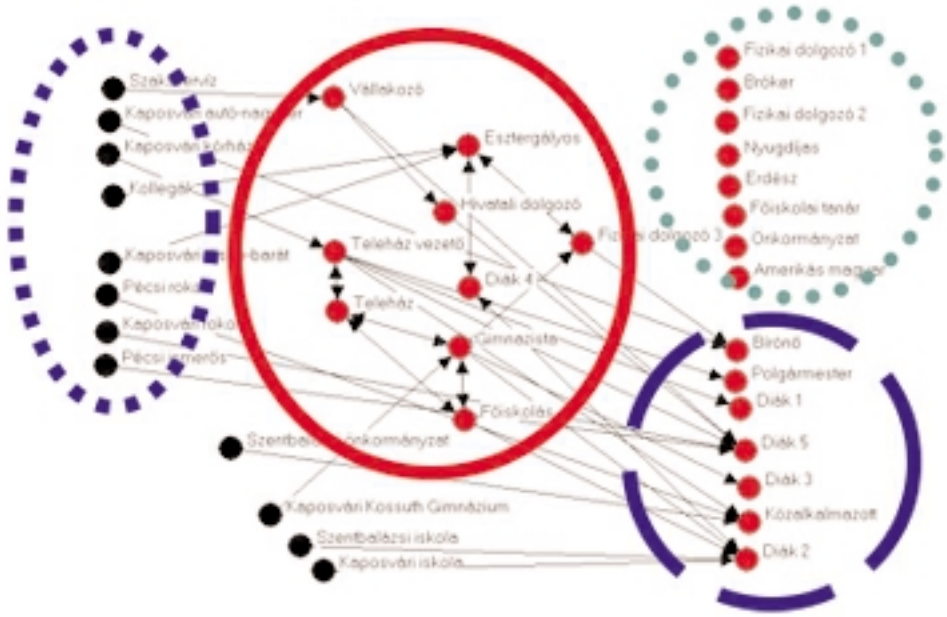

Chart 5: Structural equivalence groups at Cserénfa 2003
Questions: With whose help did you buy the PC? Who usually helps you with problems related to your PC? On the basis of participant observation at Cserénfa.

The figure shows four structurally equivalent groups.

1. *The isolated*. A part of the inhabitants of Cserénfa are isolated (they do not help other villagers and do not reveal who they turn to for advice). They are shown in the top left corner. Supposedly their relation-network is far more extended, but does not originate in Cserénfa, so we could not reveal it with our methodology of participant observation.
2. *Net advice seekers*. From among the rest of the participants seven are advice seekers. They can be seen on the left side of the illustration similar to the isolated ones on the right.
3. *Net counselors*. The figure on the left shows those to whom many turn for advice, but they themselves never get or seek advice. It is surprising that many ideas, suggestions and computer technical support reaches the village from the outside. The net counselors are all from outside the village and most of them are occupied in institutions.
4. *Mediators* or *brokers*. Much information regarding computers originates from workplaces, acquaintances and educational institutions. This knowledge reaches the village indirectly or directly through personal connections. We can see seven such mediators in the centre of the illustration. The leader of the telehouse plays a major role. His knowledge results from his previous workplace, where she »experimented« with computers. Three younger members also have an outstanding role – »businessman«, »secondary school boy«, »college student«. They transmit their knowledge to a small number of the group. No wonder these participants have the highest characteristic of in-between-mediation among the ego-networks. The institutional participants in transmission of knowledge and those participants outside the village suggest that the purchase of a computer and the acquisition of computer-technical knowledge cannot be regarded as a diffusional process, since the transmission of innovation does not happen between participants, but only between certain institutional participants and their actors.

We expected the confirmation of the results of our fieldwork from UCINET CONCOR analysis, but this algorithm provided us with sketchy results in our models, that is, the four groups can be interpreted similarly, but there are no overlaps among them. We think that the CONCOR algorithm is insensitive to the direction of relations. In our interpretation the direction of consultation is important. Further, we would like to adopt a new structural algorithm, which helps us to group the direction of relations.

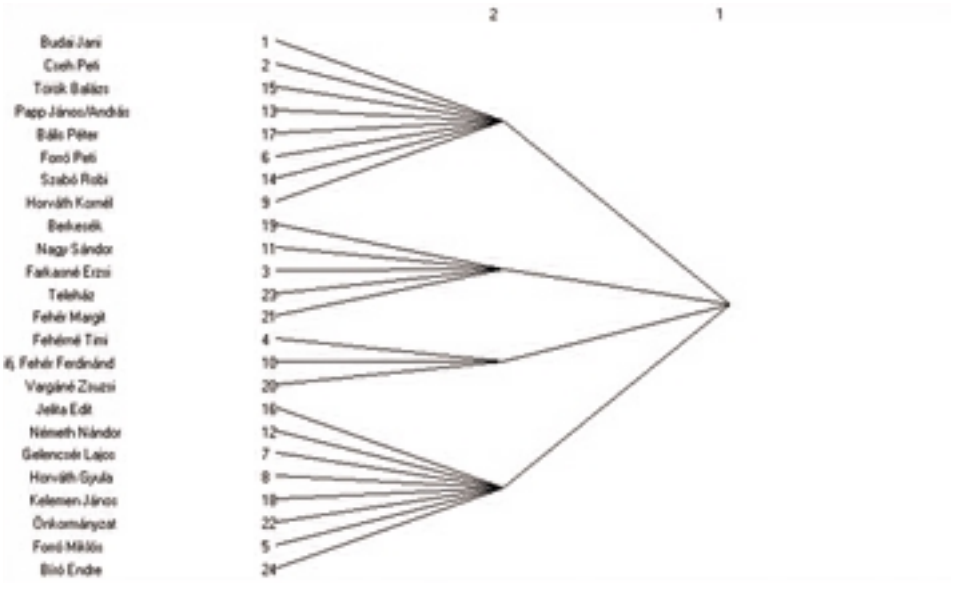

Chart 6: Structural equivalent groups in CONCOR

Who Do You Have To Get On Well With?

Based on the fieldwork and the questionnaire survey we found out that the adoption of innovation nowadays is not defined by the extension of ego-networks, but by indirect, personal relations to certain participants in an institution. In regard to this, it is of utmost importance to consider the following question: what kind of relations do we need to have to be easily integrated into informational society? We look into some such relations below.

5. *Educational society had the first possibility to acquire computer technology specific knowledge, since most of the schools today have computers and access to Internet due to official state policy and some special training in schools.*

   According to our fifth hypothesis, teacher acquaintances in the ego-network have a positive influence on the purchase of a computer and the acquisition of computer-specific knowledge. Our research results show that there is a strong correlation between the teacher acquaintance and the possession of a PC and the knowledge to deal with it. A teacher in one's ego-network increases the possibility of PC purchase and the acquisition of PC-specific information by 3%. It is interesting to acknowledge that the teacher acquaintance has a positive influence on the acquisition of Internet information, since in the area telephone lines are not suitable for internet access. We drew the conclusion that the acquisition of computer specific information is not connected to a place or location (somebody using the net at Kaposvár and teaching at Szilvásszentmárton.)
   During our field work at Cserénfa computer proprietors did not mention that they acquired certain information from teacher acquaintances or the idea of getting a computer originated from them, as there was no school in the village. Instead of these facts, many mentioned the role of schools. To our expectations we found out that school children directed the idea of a computer towards their parents, but during parental sessions at schools the parents themselves were faced with the idea coming from other parents or the teacher.

6. *In our sixth hypothesis we analyzed the fact whether a businessman acquaintance has an influence on the purchase of a computer.*

   Distinct statistics show contradictory results. It is possible that the businessmen, despite the fact that they are innovative due to their activities, have little time to pass on their expertise to friends. So, if businessmen have certain possibilities, they still lack enough time to achieve results in the circle of their acquaintances.
   At Cserénfa, most business households had a computer. In some cases, it was used by the children of the proprietor of the business. The businessmen at Cserénfa know about the Internet and its use, mainly from the telehouse. The direct effect of their innovative attitude cannot be measured by their followers or imitators but by their own behavior: some businessmen use the Internet and e-mail at the telehouse.

7. *In our seventh hypothesis we stated that the leader of a company in an ego-network influences the possession of a PC and specific knowledge.*

   Our analysis shows that a managing director acquaintance increases the possibility of PC possession by 9,5%, increases PC specific knowledge by 6,6% and Internet knowledge by 4,8%. This can be explained by the fact that supervisors believe it natural to have a PC and to acquire technical knowledge. Supposedly, one who has a supervisor acquaintance – as did only few people in the model – will be familiar with computer use.
   The interviewees at Cserénfa did not know any managing directors.

8. *According to our eighth hypothesis the »official« participant of ego-network has a positive influence on the purchase of a computer.*

   Based on our research results the relation is strongest between »official« acquaintances and Internet-specific knowledge. However, there is a close connection between computer

possession and knowledge as well. An »official« acquaintance raises the possibility of computer possession by 1%, computer knowledge by 3% and Internet usage by 3%.
The explanation is that in recent years computers have been introduced into offices in a larger number, which also motivated the acquisition of computer-specific knowledge.
Our fieldwork at Cserénfa supported our research: officials play a major role in the transmission of scientific knowledge. In the village we talked to one official, a civil servant and the leader of the telehouse with whom we also »logged on to the net« (Graph No. 4) All of them learned to use a computer at their workplace. The civil servant and the official had a computer (although not a personal computer, but a computer at their workplace) available to them for domestic use due to an application and the office provided Internet access to them. The »official« passes on his knowledge to a student, the civil servant to none – this will probably change as they come to possess certain information. One of them is responsible for his acquaintances' duties: he will type in official letters and print them out himself. The leader of the telehouse has a major role in transmitting information. Four persons think he is an important source of help, two suggest the telehouse as a source of consultation. This number would be higher if we conducted participant observation not only in the circle of computer owners.

9. *Our ninth hypothesis states that computer possession is influenced by acquaintances, who are experts in computer technology.*

Our research only partially confirmed this assumption. On the one hand, it turned out during statistics analyses that there was a close significant relation between computer literate acquaintances and computer possession. In the regressive model with multiple variants these acquaintances have an important role.
On the other hand, during our field work some signs pointed to the conclusion that computer literate persons do not always have a computer-specific cultural capital transmission role. During our field work at Cserénfa, we found that computer literate people do not always transmit their knowledge. Such persons are under-socialized and have only a few relations. Among 22 computer owners we found eight such persons in contrast to seven who passed on their knowledge. This is also supported by the fact that the inhabitants of Cserénfa could not tell precisely who owned a computer and were misinformed on the first person who had a computer in the village or to what extent they could handle it.
To the question who had the first computer in the village, two-street Cserénfa provided two different answers: a college student and a businessman who had obtained their PCs in 1996. They were not the first ones, there was one intellectual working at Kaposvár who had his PC earlier in 1992, but others also had one previously. The difference is that the knowledge did not reach the villagers from the early PC proprietors – so they did not realize the existence of a PC in the village – whereas the persons above consulted two or three other villagers, so the latter were at least aware of the former.
The result of participant observation provides the explanation that a computer-owner acquaintance does not always pass on his knowledge and one cannot really turn to him for assistance.

First Summary: What Kind of Social Capital Supports IT Access?

The first key question of our study was in which ways social capital influences computer possession and computer-specific knowledge.

Based on our research results, we may propose that the extension of one's ego-network does not always influence computer and technical knowledge acquisition. Some ego-network characteristics (like over-extended networks with strong relations, or marginalized situations) do not favor the adoption of innovation. The size of the household suggests a positive effect (the more adults there are in a family, the more likely it is that they have a computer and can deal with it). But in this situation the effect mechanism is not clear: do more employees provide a better financial situation or do they have a more extended social capital.

The composition of the ego-network (who you need to get on well with) can be more easily analyzed with the collected data. It is mainly teachers, officials, directors and computer lite-

rate people who influence the individual's computer possession and his knowledge positively. In contrast, there was no evidence found during the analyses of a positive influence by businessmen acquaintances.

We can draw the conclusions that the »quality« of relations is more likely than the »quantity« to influence the adoption of innovations. This means that it is not important how many acquaintances one has, but that the circle of acquaintances should be heterogeneous, it should contain teachers, supervisors and officials and persons who do not belong to the individual's social group.

Our results show that no significant connection can be seen between the extension of the social network, computer possession and computer literacy. This is to support the fact that we are not talking of a diffusional process, since the transmission of innovation is due to relations outside the village or between certain institutions and not to personal relations in the territory.[7] As a consequence, it is indispensable to deal with the question of the diffusion of innovations in the next part of our study.

7 Cf. Letenyei, László: Helyhez kötött kapcsolatok. Közgazdasági Szemle 49/10 (2002), pp. 480-497 and Letenyei, László: Rural Innovation Chains. In: Review of Sociology 7 (2001), pp. 85-100.

III. Is the Spread of Computers Diffusional or Not?

From fieldwork we found out that the number of computer owners or computer literate people grows. The penetration of computers and the extension of their use increase year by year. This improvement in scientific literature is identified with the increasing section of the diffusion of innovations. In this way, according to Bornschier[8] the expansion of Internet possession is part of a larger phenomenon, along with the diffusion of PC's, phone lines and Internet-client computers.

It was made clear at the analysis of social capital that the adoption of innovation is not defined by the dimension of ego-network extension but by the existence or non-existence of indirect personal relations to participants of institutions. We had the possibility to conduct an analysis where we could observe on a small model the characteristics of the diffusional process of computer spread and computer-specific knowledge expansion, which can be confirmed by the survey based on the small-area representative model. However, it is necessary for us to present the theoretical framework of diffusional innovations to support our research question.

8 Bornschier, Volker: Generalisiertes Vertrauen und die frühe Verbreitung der Internetnutzung im Gesellschaftsvergleich. In: Volken, Thomas (Ed.): Elements of Trust: The Cultural Dimension of Internet Diffusion Revisited. Electronic Journal of Sociology 2002. Av. at: www.sociology.org/content/vol1006.004/volken.html

Theoretical Framework of Diffusion of Innovation

Information technologies and Internet spread called forth a new paradigm. In a small area, computer technology and Internet serve as an innovation. Information technology expansion in our study is regarded as a kind of innovation-diffusion. For the purpose of the current research we referred to any computer and Internet related knowledge as »innovation«. »Innovation diffusion« is a type of process when computer related scientific knowledge is transmitted from one person to the other.

The concept of technical and economic innovation in economic scientific literature became popular as the keyword of Schumpeter's study *The Theory of Economic Development*.[9] Schumpeter differentiated between five types of innovation: new product, new process of production, source of acquisition or the establishment of a new organization.

The innovative processes and their effects on economic growth as well as the pattern of the process stand at the centre of economic interest. It seems that Karshenas and Stoneman rightly state that technological diffusion research was not as popular in the scientific literature as research and development were.[10]

In contrast to economic approaches, economical-anthropological and sociological studies made the diffusion of innovations the focus of their attention. They referred to the diffusion of innovations as a process when the innovations became well-known in a social group.[11] Authors regard the diffusion of innovation as a sociological phenomenon, because it could be analyzed by referring to a social group. They used to say that the connections between people will determine the speed of the spread of innovations.[12]

The first diffusion analyses came from the field of economic sociology. The first synopsis of diffusion research history was compiled in 1963.[13] Maybe one of the most popular of diffusion research nowadays, was conducted in the field of public health, analyzing the diffusion of a

9 Schumpeter, Joseph A.: The Theory of Economic Development: An Inquiry into Profits, Capitals, Credit, Interest, and the Business Cycle. New Brunswick: Transaction Book 1983 [1911].

10 Karshenas, Massoud / Stoneman, Peter: Technological Diffusion. In: Stoneman, Peter (Ed.); Handbook of the Economics of Innovation and Technological Change. Cambridge: Blackwell Publishers 1995, pp. 265-297; Dosi, Giovanni: Innovation, Organizationn and Economic Dynamics: Selected Essays. Cheltenham: Edward Elgar 2000; Conlisk, John: An Aggregate Model of Technical Change. In: Quarterly Journal of Economics 104 (1989), pp. 787-821.

11 Ames, I.A.: Cooperative Extension Service 1955. In: Rogers, Everett: Diffusion of Innovation. New York: The Free Press ²1983, p. 5.

12 Valente, Thomas W.: Network Models of the Diffusion of Innovations. New Jersey: Hampton Press 1995.

13 Katz, Elihu / Levine, Martin L. / Hamilton, Herbert: Traditions of Research on the Diffusion of Innovation. In: American Sociological Review 28/2 (1963), pp. 237-253.

new medicine, Tetracycline, in the society of doctors.[14] In the 1980's, many statements were made on the topic of diffusion.[15]

In the 1990's, a series of network-oriented articles were published on the theme of diffusion of innovation. The network researchers were partly interested in modeling the diffusion of innovation. An excellent review of the recent models is presented by Valente.[16] Thanks to the methodological development the new methods and models have been introduced in different areas and fields: diffusion of information, diffusion of political opinions and/or organizational forms, or regional planning. The major part of these studies is focused on the estimation of the diffusion processes: »How do information diffusion times and centrality measures depend on a series of network measures, such as degrees, bridges, etc?«[17], »How are distances and relations between actors likely to influence the growth and spread of social movements?«[18] and »How can policy-makers stimulate innovation?«[19]

The question of the social effects is also an important field of research. Castlefranci[20] approached the problem as a socio-cognitive dispute. Strang and Macy[21] studied the adaptive emulation in the case of success stories. Steyer and Zimmermann[22] examined the mutual effects of the diffusion and social networks on each other.

> Members have common goals and identify with the collective of the organization. Thus, they are more likely to support one another and more likely to exert social pressure on one another to adopt an innovation. While these processes have been noted, they have not been characterized under a general theoretical framework.[23]

The problem of innovation-diffusion is also dealt with separately by the methodological books on social network analysis.[24]

We overview the models of innovation expansion based on Valente.[25] He discusses them in four groups: structural diffusional network, relational diffusional network, threshold models and critical mass models. The common factor of all models is the empirical S-shape graph which shows the spread of innovation and describes the expansion of innovation in a society: slow initial increase, sudden boost, then slow progress again, and finally completion.

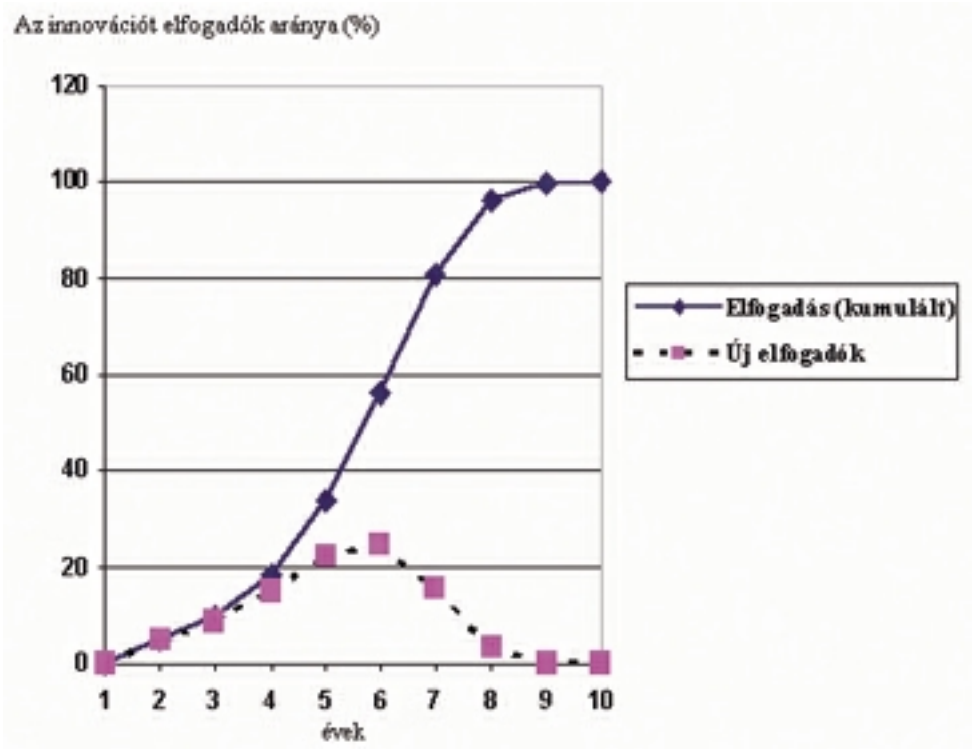

Chart 7: The empirical curve of diffusion of innovations
Based on Valente 1995 and Letenyei 2000

14 Coleman, James Samuel/Katz, Elihu/Menzel, Herbert: Medical Innovation: A Diffusion Study. New York: Bobbs Merrill 1966.

15 Granovetter 1973; Brown, Luis: Innovation Diffusion: A New Perspective. New York: Methuen 1981; Mahajan, Vijay/Peterson, Robert A.: Models of Innovation Diffusion. Newbury Park: Sage 1985; Fliegel, Frederick C.: Diffusion Research in Rural Sociology. The Record and Prospects for the Future. Westport, Conn.: Greenwood Press 1993.

16 Valente 1995; Valente, T.W.: Models and Methods for Innovation Diffusion. In: Carrington, P./Scott, James/Wasserman, Stanly (Eds.): Models and Methods in Social Network Analysis. New York: Cambridge UP [in press].

17 Buskens, Vincent/Yamaguchi, Kazuo: A New Model for Information Diffusion in Heterogeneous Social Networks. In: Becker, Mark/Sobel, Michael (Eds.): Sociological Methodology. Oxford: Blackwell 1999, p. 282; Chattoe, Edmund/Gilbert, Nigel: A Basic Simulation of Information Diffusion. Paper presented at the IMAGES Meeeting, Saint-Sauves D'Auvergne (m6), March 16-18, 1998; Abrahamson, E./Rosenkopf, L.: Social Networks Effects on the Extent of Innovation Diffusion: A Computer Simulation. In: Organization Science 8/3 (1997), pp. 289-309; Steyer, Alexandre/Zimmermann, Jean-Benoit: Etude empirique de l'influence sociale dans les phénomènes de diffusion - l'exemple du câble et du fax en France. In: Economie et Prévision 135/4 (1998).

18 Hedström, Peter: Contagious Collectivities: On the Spatial Diffusion of Swedish Trade Unions, 1890-1940. In: American Journal of Sociology 99/5 (1994), pp. 1157-1179; Hedström, Peter/Sandell, Rickard/Stern, Charlotta: Mesolevel Networks and the Diffusion of Social Movements: The Case of the Swedish Social Democratic Party. In: American Journal of Sociology 106/1 (2001), pp. 145-172.

19 Christopoulos, Dimitros C.: Innovation within Networks: Policy Implications for Regional Planners. Paper presented at XXI. Sunbelt, INSA, Budapest 2001.

20 Castlefranci, Cristiano: Towards a Cognitive Memetics: Socio-Cognitive Mechanisms for Memes Selection and Spreading. In: Journal of Memetics – Evolutionary Models of Information Transmission 5: http://www.cpm.mmu.ac.uk/jomemit/2001/vol5/castelfranchi_c.html

21 Strang, David/Macy, Michael W.L.: In Search of Excellence: Fads, Success Stories, and Adaptative Emulation. In: American Journal of Sociology 104/1 (2001).

Valente cites Granovetter in regard to the starting point of structural diffusion networks. Granovetter thinks that persons who have expanded weak ties – people weakly embedded in society – are competent to mediate between groups within the society. In this way they transmit innovations.

The proposition of relational diffusion network models is that the speed of the spread of innovation is influenced by the personal relations of the members of society. Four subgroups can be mentioned: the opinion leader model (even public information first reaches people who form opinions, then in a second step the rest of the members of society), the model of group-participation (within certain groups some pieces of information spread quickly), the model based on the density of personal social network (it appraises the expansion of innovation based on the dimensions of ego-network) and finally the model of personal involvement (focuses on the question whether the ego-network contains points where innovation has already been used).

Valente's idea is that thresholds and critical mass models belong to different schools but have a common root. In the sense of threshold-models the individual's threshold of the adoption of innovation equals the proportion of innovation users by which the individual tends to adopt innovation.[26] The model of critical mass has a similar approach: it analyzes how many members who are open to innovation are needed in a network in order not to break the process of innovation.[27]

Our research regarding the diffusion of computers abounds in keywords like »innovation« and »diffusion«. We may use the term »innovation« in connection with the possession of a computer and the acquisition of specific knowledge to the extent that besides containing innovative factors, it is appropriate in Schumpeter's interpretation as well, that is, it can introduce new technologies or make it possible to introduce previous technologies to the new market.

The concept of »diffusion« is much more precise: diffusion in scientific literature refers to the phenomenon when participants using innovation pass it on to participants who are as yet unaware of innovation. In our present case – regarding the fact of PC's in certain households and the expansion of specific knowledge – we may refer to diffusion when members who are already competent users and PC owners pass on the need for computers and for appropriate knowledge to the rest. An alternative to diffusion is vertical, formal transmission of innovation based on a hierarchy.

In our study we cite Letenyei[28] and differentiate between »innovators« and »imitators«. An innovator is a person who introduces a new technology, he uses it for the first time in an area. An imitator is a person related to innovators, who uses the same computer to acquire specific knowledge. An innovator serves as a gate: innovation reaches the area through him.

Hypotheses

To answer the second key question of our research we strive to achieve a practical result: we attempt to appraise the speed of the expansion of computers and computer-related knowledge. In order to achieve our proposition we suppose that the expansion of the computer and related knowledge may be modeled with the diffusion of innovation.

Within the framework of the fieldwork we interpret the terms »innovation« and »diffusion« as presented in the theoretical part of the study. Both interpretations need empirical confirmation. Our first interpretation refers to innovation:

1. Is the computer and computer-related knowledge an innovation in the area of Kaposvár? To answer this question we had to reveal the motivations of computer purchase and the acquisition of computer-related knowledge. If the motivation is truly innovative, then we might suggest that computer purchase and the learning process may indeed be regarded as innovation. Contrary to this case (e.g., if computer games are the first priority) then the computer may not be regarded as innovation.

Our second interpretation refers to diffusion:

2. Can the S-graph of the spread of computers be confirmed empirically? If yes, is this really the result of diffusion? In other words: Did participants already familiar with innovation pass it on to the rest?

22 Steyer, Alexandre / Zimmermann, Jean-Benoit: Externalités de réseau et adoption d'un standard dans une structure résilaire. In: Revue d'Economie Industrielle, 76/2 (1996), pp. 67-90.

23 Frank, Kenneth A. / Topper, Andrew G. / Zhao, Yong: Diffusion of Innovations, Social Capital and Sense of Community. Paper presented at Sunbelt XX., INSNA, Vancouver 2000, p. 2: http://www.msu.edu/user/k/e/kenfrank/web/default/htm

24 Cf. Knoke, David / Kuklinski, James H.: Network Analysis. Newbury Park: Sage 1982; Wasserman, Stanly / Faust, Katherine: Social Network Analysis. Methods and Applications. Cambridge: Cambridge UP 1994.

25 Valente 1995.

26 Granovetter, M.: Threshold Models of Collective Behavior. In: American Journal of Sociology 83 (1978), pp. 1420-1443.

27 Valente 1995.

28 Letenyei 2002.

If the answer to both of our questions is yes, meaning the spread of computers and computer-related knowledge may be regarded as innovation diffusion, then the process may be modeled and further appraised by one of the diffusion models.
Based on the interpretations we formulated two hypotheses:

1. The expansion of computers follow the S-graph explained by a diffusion process.
2. The expansion of computers and the acquisition of scientific knowledge originate from weak relations (»bridges«) from outside of the territory. Innovation reaches the area through knowledge.

During the analysis of the spread of computers we used the answers to two questions: first we asked since when the household has possessed a computer, and second when the first computer reached the area. Using the representatives of the sample, we could draw conclusions referring to the Kaposvár area concerning the spread of computers.

During the process of survey in the area, one column of questions aimed to reveal the interviewees' ego-networks. We tried to put this complex of questions into operation through one point of view: the composition of related persons.

To map the motivations of transmission-adoption we proposed two questions: The first analyzes the effect of personal relations, the second researches user motivation, that is, the purpose of purchase: what was the exact reason the respective household made the decision to buy a computer?

Research Results

We will now present the results of the survey and those of participant observation. We follow the order of questions during the interpretation of the survey. Finally, we present the mutual supportive network at Cserénfa based on participant observation.

The First Computer in the Village

During diffusion research, it is crucial to know the date of the first innovation and the person of the innovator.

During our survey, 77% of the interviewees could not provide an answer as regards the first computer in the area. When interpreting the 139 answers, we found it more appropriate to search for the reasons of the »I don't know« answers. The results show that the majority of the inhabitants have no idea when the first computer arrived in the village and who the first owner was. In larger villages, it is acceptable that the news of innovation spreads rather slowly. However, it is surprising that in a village with a couple of hundred inhabitants information does not spread in a way we expected. We tried to find reasons for it during participant observation.

At Cserénfa the inhabitants could not tell us precisely who had a computer then and they were misinformed about the first person to own a computer in the village and the persons who were computer literate. To the question: »How many families do you think own a computer?« (We think 22 households) the answers extended between two and fourteen families. One interviewee named a person who actually did not have a computer.

The reason of the high rate of »I don't know« answers and the reason of the misinformation could be the fact that the inhabitants of Cserénfa although living in only two streets do not really keep in touch. We suppose the geographical location of an area is important even in a small community. Our analyses showed that in the two streets the interviewees had different persons on mind as first computer owners: in one street they named a college student and in the other a businessman, both obtained their PCs in 1996. In reality an intellectual of Cserénfa working at Kaposvár already had his PC in 1992. The answer to this discrepancy was provided by the computer consultant network of the village: while the intellectuals are situated on the periphery (they do not provide computer technical knowledge to the villagers or receive any from them), the named persons have offered consultation to a few people, so the villagers were aware of them. Another technical reason is mistrust. One of our interviewees, who has owned a PC for a week said that besides his two neighbors who advised him in com-

puter usage, nobody else knew about his PC, which was o.k. He would prefer others not to come over and use the PC. He was also careful as someone else's PC (who lived in the edge of the village) had already been stolen.

Since When Have the Inhabitants of the Kaposvár Area Had PCs?

205 of all the households interviewed in the Kaposvár-area (32,4% of all the interviewees) had PC's and 197 answered the question asking since when they have had a computer. The first computer was obtained in 1985, but most bought computers in 1998 (30 persons) and in 2002 (29 persons). Further, a little less than half of the inhabitants (46%) bought computers before 1999, and 54% after 1999 along the upcoming years.

Average	1998
Modus	1998
Value	197
Missing value	435

Table 2: Since When Have the Inhabitants of Kaposvár Area Had PCs?

By analyzing the chart we may see that the frequency and the cumulate graph corresponds to the generally accepted S-graph in innovation diffusion theories.

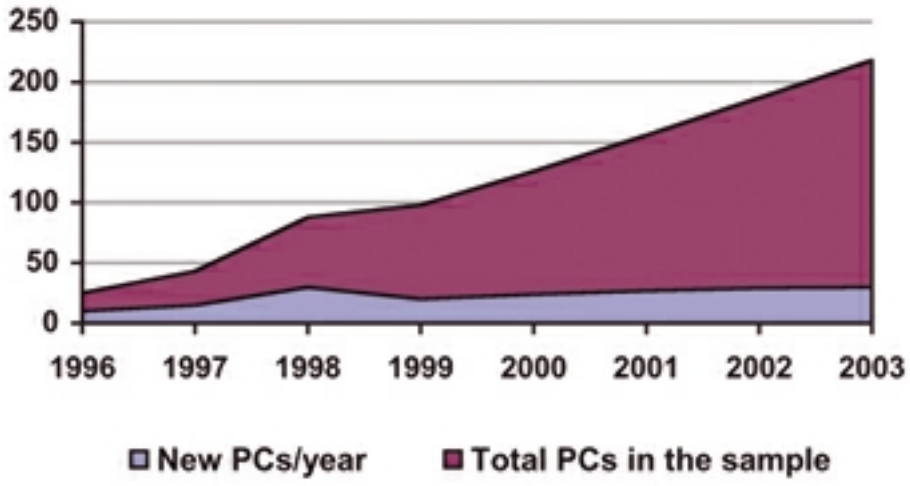

Chart 8: The Spread of PCs in the Kaposvár Area. By 800 representative sample in Kaposvár area

Taking into consideration the frequency graph, we may predict that computer diffusion is still in the initial exponentially increasing stage. In the next few years, a faster increase and then a slower one may be expected.

Within the frame of participant observation we collected data on households having a computer, so in this way we got to know when the first computer was bought.

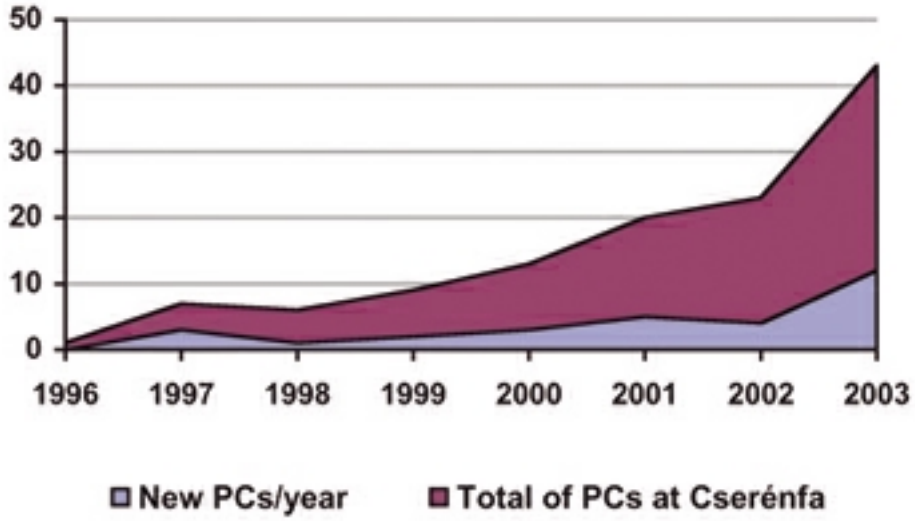

Chart 9: Spread of PCs at Cserénfa. Based on participant obeservation, 2003

The spread of computers at Cserénfa – similar to the data of Kaposvár area – reminds us of the initial data of the diffusional S-graph. At this stage, the expansion of diffusion shows exponential increase, the number of new computer owners increases year by year. Taking a look at the graph, we may draw the conclusion that a classical diffusional process exists in the village. The general opinion prevails that the village still stands in the preliminary stage.

As more and more households possess PCs, more people can transmit specific knowledge, so the number of PC buyers will eventually rise. This tendency – after the end of the increase period – will slow down in the future, and innovation will be accepted.

Who or What Was the Incentive for PC Purchase?

During the questionnaire of surveys, 343 persons – more than half of the interviewees –, who do not have a PC and do not plan to have one, we were not asked the above question. The several valid answers are shown in the graph (with the omission of the »I don't know« category). Unfortunately, the rigid questionnaire did not allow other types of answers, so we do not know what the most important variant shows. Most (38,3%) replied that they decided to buy a PC influenced by the school. The interviewees valued the effect of the school higher than the effect of personal, relative, acquaintance and other types of relations.

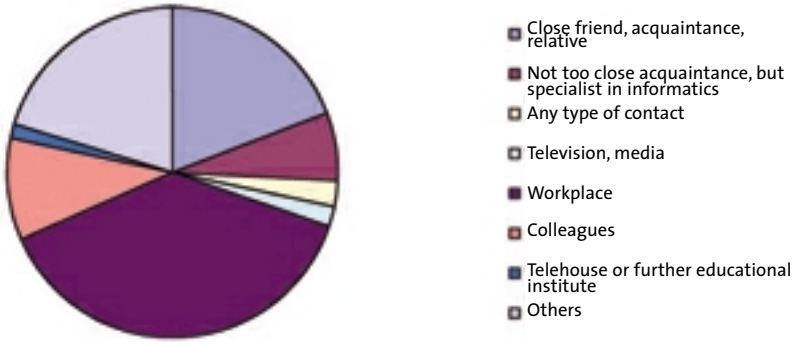

Chart 10: Who/What Was the Effect for PC Purchase in the Kaposvár Area . Based on surveys in Kaposvár area, 2003

From a different point of view, we may group the answers in two. The first contains alternatives characteristic to personal relations (close friend, computer literate acquaintance), the second contains the possibilities of relating to an institution (TV, media, school, workplace, colleagues, telehouse, specific programs). Aggregating the two, we arrive at the following results (we left out other type of answers, as we cannot interpret them from this point of view):

	Division (%)
Personal or relational effect	35,7
Institutional effect	64,3

Table 3: The personal versus the institutional effect in the Kaposvár area. Based on surveys in Kaposvár area, 2003

The content of the chart from the point of view of our research is very important: it contradicts the theory that the spread of computers is a diffusional process. A common feature of diffusional processes is that participants open to innovation are willing to pass it on to the rest. In this case we are dealing with a different situation: some institutions, like school, and to a certain extent the workplace pass on the need for computer technique and the acquisition of proper knowledge, realizing a kind of one-way communication.

The question may arise that the institution itself or its participants are the incentive. If a member of a family buys a PC on the incentive of his colleagues, or if the child suggests its purchase to the family influenced by his peers or teachers, then we may speak of motivation based on personal relations. The analysis of this question will not be dealt with in this study. However, we think that the effect of the institution still remains the same if the individual gets in touch with it through relatives, friends, colleagues or peers.

The major role of the school supports our idea that the motivation of investment is mainly due to children and their interests. We could not analyze the fact whether the child really needs a computer to make progress at school or – because there is computer technical education at every primary school – he or she gets to know computer games and motivates his or her parents to buy one. In any case it is certainly advantageous for the student to put into practice at home the theory taught at school. He or she can have access to it any time and develops his or her knowledge even while playing.

The category of »close friend, acquaintance, relative« ranked third place. This supports our result that the use of a computer expands to a lesser extent due to strong relations.

The result shows that TV and media have a lesser influence on the expansion of information technology, while it seems institutions play the primary role in forming opinions.

During the participant observation at Cserénfa we tried to find out why people bought PC's and who they were influenced by. Twelve of 22 PC owners said they needed one for their work, so their workplace motivated them for the purchase. Besides workers among them, we may find brokers, businessmen and economists as well. The rest of the households did not give any information or they simply marked the school as a motivational factor. They did not mark personal relations (e.g., my relatives had one, the idea came from them), – which would have contradicted our previous assumptions.

The telehouse plays a particular role in developing the need for PC purchase. Youngsters often come together to play there. From this circle, only a few bought PC's, so they did not appear in our model.

The inhabitants revealed some interesting information regarding PC purchase. It was not likely – as we expected – that a second-hand PC got to the household, they all bought their PC's in shops. Before the purchase, they inquired about it, often seeking advice from acquaintances. These were people outside Cserénfa: colleagues at Kaposvár, relatives from Pecs, friends at Szentbalazs. Information regarding PC usage did not spread within the network, they rather reached the village from outside in different ways to every household. We can state that the computer did not reach Cserénfa through an innovator, so we cannot speak of imitators within the local network. The experiences of participant observation stand in line with the data of surveys: despite the fact that computer usage expands in the area in the

shape of a diffusional S-graph, we cannot speak of a diffusional process as the participants are not influenced by each other, since institutions motivated them for the purchase. The role of personal relations is also diminutive in obtaining of the PC's, but the PC buyers rely on personal relations to acquire specific knowledge.

Motivations for Computer Purchase

The last question tried to reveal the motivations for computer purchase. The question was posed to those who have basic motivation. Most replies outlined the children's unequal opportunities and studying as first and second motivation. Parents also think it is important to buy a computer so that their children keep up with computer technical development.

During our fieldwork at Cserénfa most parents from among the group who use their computers at their workplace said that the computer will not change their lives, only their children's lives. The purchase of a computer can be seen as an investment. First as computer game players then as serious computer users, the children will join the company of users all over the world. Two ten-year old boys and a mother thought that a computer was necessary for studies, six children marked games as a motivational factor. This does not mean that in other households they disregard playing on the computer. On the contrary, they mostly play on the computer. It is natural that somebody wants to play with a new device. The question remains, whether the current players soon experience its other ways of usage. In the circle of youngsters, girls use Microsoft Word to type in letters of invitations and other small things. Supposedly they would need this program later on in their studies as well.

Computer Technical Advisory Network at Cserénfa

During our survey we tried to answer the question from where the users acquire specific knowledge. We would expect that in a village according to innovation diffusion theories, knowledge spreads from house to house as in a local community. The fieldwork at Cserénfa contradicted the expectations of the diffusion theory. Within the local community we may speak of diffusion when children exchange game programs and music files. Knowledge of more serious programs comes from outside: acquaintances from Kaposvár, relatives, colleagues or people who met at a place of entertainment.

With regard to geographical distances, one advantage of the community is that it is local. It would be less costly to go over to the neighbor for some information, than to travel to Kaposvár or call Szentbalázs. Still, this last attitude is most common. Theoretically, the explanation for this is that the villagers do no trust each other's knowledge, hence they turn to outside advice. Our experiences do not support this theory. There are some computer literate inhabitants and almost each family mentioned someone whose knowledge they could

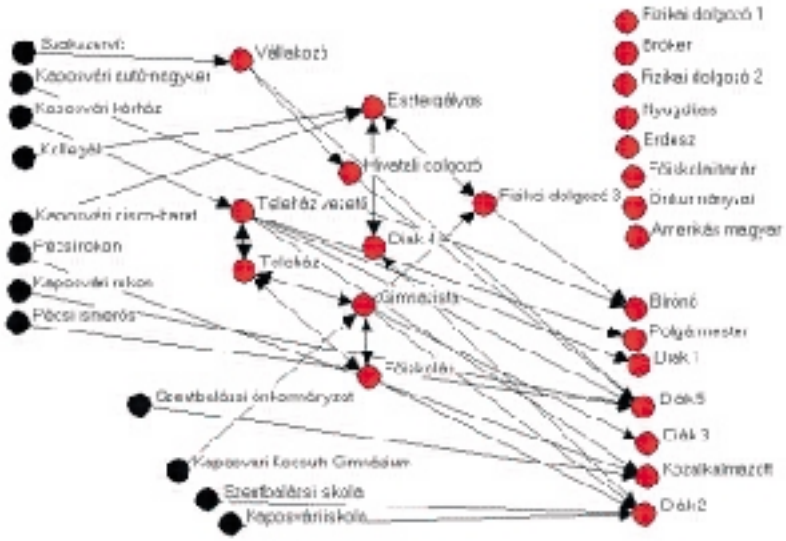

Chart 11: Informatical consultation's social network at Cserénfa

rely on so we cannot speak of distrust. We think some long time relations characterize the community: they ask guidance from those people whom they turned to for the first time, even if this is not an effective solution from a rationalist point of view.

The chart above shows who turns for consultation to whom. The interviewees are anonymous, only their occupation is mentioned. The chart does not show the relations outside the village. The arrow on the chart shows an open asymmetrical relation: it is directed from the consultant to the advised person, based on the latter's designation.Eight persons, one third of PC owners are isolated, that is they do not have consultants in the village, which is quite surprising in a community of 270 inhabitants with 22 PC owners. Most computer-related knowledge reached the community from different workplaces and educational institutions.

On the basis of the results we may state that at Cserénfa the social network do not have a strong centralization figure. We need to refer to Thomas Valente once again, namely that diffusion may be observed among the members of society. We think that the spread of computers in the community cannot be viewed as a diffusional process, because the need for computers does not come from and is not passed on from user to user, rather it originates from institutional participants.

Second Summary: How Do Computers Spread?

The second question of our study was whether the spread of computers can be seen as a diffusional process of innovation. In other words: Can computer purchase or the acquisition of specific knowledge be explained by relational data?

Our research results show that the computer purchase and the acquisition of knowledge related to it is not influenced by relations between people. Certain institutions play a far more important role (workplace, school, telehouse).

In our study we also concentrated on the transmission of innovation and the motivations behind its adoption. This question was answered by participant observation. It is characteristic of innovations that, because they bring economic growth, with its transmission one's own profit grows smaller: the more people live with the opportunities gained from innovation, the more they share the profit. This makes the diffusion of innovation slow down a bit. This does not refer to computers: the profit of the innovation transmitter does not become less if the neighbor also buys a computer. According to current countryside practice a computer does not serve as a working tool, it is rather for fun, for children and for the next generation. The computer can also be viewed as a modern toy, which later turns into a device serving more serious aims. Cserénfa did not receive computers from one particular innovator, nor did the adoption of previous technologies come along this route. In this sense, since there was nobody to turn to, we cannot speak of imitators within the local network. Most households gained information from elsewhere.

The results of active participation overlap with the results of quantitative research done in the area: The purchase of a computer and knowledge related to it is not generated by personal relations, rather by institutions, like the Széntbalázs Primary School and certain workplaces. The graph showing the spread of computers can be seen as corresponding to the S-graph occurring in certain theories as a starting point. Based on this, we can claim that computer spread is in the initial, exponentially growing stage, which later will turn into a slowly increasing process. We doubt whether we can speak of diffusion, since the relation between participants does not play an important role, rather participants of institutions serve for this purpose.

To answer our research questions:

1. The spread of computers can be seen as an innovation, its purchase is an investment in the future to ensure the next generations' equal opportunities.
2. The spread of computers cannot be viewed as a diffusional process (the participants do not transmit specific knowledge and the need for a computer to each other).

It is not a diffusional process, so in this sense it is undesirable to predict the next stages of the process with diffusional models.

29 Valente 1995.

IV. Summary

Our study focused on two main research questions:

1. How many and what kind of acquaintances does an individual need to have to possess a computer and knowledge related to it?
2. Can the S-graph suggesting innovation diffusion be applied in the case of the spread of computers? Can the spread of computers be regarded as a diffusional process of innovation? If yes, can it be predicted by a diffusional model?

Our research questions were examined in a sample area with two methods: a sociological survey and anthropological participant observation.

Examining our first question, we found that the number or in other words the »quantity« of an individual's social relations has a diminutive influence on computer purchase and the acquisition of related knowledge. The »quality« of the relations is far more important from the point of view of IT usage: a teacher, a businessman or an official may have a major influence in increasing the individual's need for a computer and the acquisition of scientific knowledge. It is interesting to notice that acquaintances connected in some way to an institution have an effect on IT usage from the individual's point of view.

Our research shows that the build-up of information society depends on material and spiritual relations as well as good relations. We believe that an important means to shape information society is relational consultation.

This observation leads us to the second question of our study: What kind of role do social relations play in the diffusion of innovation?

According to Valente[29] we refer to a diffusional process when during an expansion innovation is passed on from users to adopters. The spread of innovation can be predicted by several models, their common trait being the S-graph. The cumulated graph showing the spread of computers is the same as the S-shape of the exponentially increasing phase of diffusion. After meticulous analysis, we have to state that there is no diffusional process in this case, because innovation is not transmitted by participants open to new technology. Knowledge is passed on through certain institutions (schools, workplaces). Institutions play a key role in the diffusional process and the shape of exponential increase – however, we do not know the effects of the mechanism yet.

Western scientific literature has more empirical examples to the function of diffusional S-graph in other cities. We find two possible answers for the distinction:

1. It may be probable that the diffusional graph may function in the case when people do not transmit knowledge, firstly, it is passed on by institutions. We may think that IT does not necessarily need a critical crowd to adopt the innovation and make sure its expansion.
2. It may be so that in Hungary the build-up of the information society has a separate route than abroad. In Western societies we may speak of a real diffusional process, in Hungary one is faced with a more centralized process in which the state – and to a lesser extent the significant participants of economy – play a focal central role via educational institutions and local government.

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