

**SOCIAL SCIENCE RESEARCH
ON TECHNOLOGY AND THE ELDERLY
– DOES IT EXIST?**

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1. INTRODUCTION

In early 2002, the Institute for the Study of Ageing and Later Life asked the undersigned to study, from a social science perspective, the conditions and assumptions associated with the development of a program area focused on technology and the elderly. The social science perspective will thus contribute, along with technical and medical research perspectives, to the development of this area.

The background for this is that technology issues were cited as being both relevant and groundbreaking in the justification for establishing the theme. Technology issues do not yet constitute a separate program, but have been partially integrated into existing programs. It was thus considered that a research survey would clarify the social science perspective on technology and the elderly, and show whether the research which is currently available is sufficient for preparing such a program.

As this report indicates, there is reason to assume that a research area concerning technology and the elderly with a social science orientation will not create itself. Here we find no given delimitation toward which to incline, which is probably also the reason why no research institution has as yet taken upon itself the task of delimiting this area.

2. THE EVOLUTION OF RESEARCH ON TECHNOLOGY AND THE ELDERLY

2.1 Technology aspects moving toward establishment

As an area of research, technology and the elderly can best be understood through its historical evolution. It is a relatively new field. The extent to which it can be viewed as an established area of research, or perhaps more aptly a potential such area, constitutes the primary issue addressed in this paper.

Although technology issues are well established in a number of disciplines and research directions, they have not yet found their natural place among researchers examining ageing and the elderly. Many disciplines and research directions currently include the particular study of the problems associated with ageing as part of their activities. Biologists study the physical changes associated with ageing, economists study the role of the elderly in social economics, social psychologists study role changes, etc. The American sociologist Robert Atchley has pointed out how a number of sciences address four aspects of ageing in this regard – the physical, the psychological, the psychosocial and the social, which are referred to collectively as gerontology (Atchley 1997).

Another approach to categorisation views gerontology as a collective term for research on the elderly from social science, behavioural science and cultural science perspectives, while geriatrics covers the medical aspects. It must also be noted that many other researchers in both the social sciences and technological fields are engaged in research on ageing and the elderly without considering themselves to be gerontologists and geriatricians. One example is the research being conducted at the Institute for the Study of Ageing and Later Life at the University of Linköping's Norrköping Campus, which began two years ago and is supported by technical research, different types of disciplinary research, and gerontology.

Regardless of categorisation, no research orientation which relates technology to ageing and the elderly has existed until quite recently. From having constituted a particularly marginalised issue which was noted in isolated cases, the elderly became a central theme in connection with the development of information and communications technology in the 1990s. The issue of the elderly and technology had been noted earlier at a few conferences and in connection with evaluations of security alarm systems (Robinson et al 1983, Ström & Ottosson 1986, Grip 1978, Wallengren & Samuelsson 1988, Socialstyrelsen 1976). Visions of the role of the elderly in the IT society were articulated in a number of policy documents which put the issue on the political agenda and resulted in funding for research and development (Bangemann 1994, IT-kommissionen 1995, Regeringsprop 1995, Handikappinstitutet 1997, Datainspektionen 1995). Part of the reason for paying such close attention to the elderly in the context of a technological society concerns the need for markets in which to sell the new technological advances. But another part is due to increased awareness of a growing elderly population in the Western world, and to assumptions about the problems associated with this increase.

The term “gerontechnology” was coined in the early 1990s in connection with these developments. Gerontechnology, which derives from a Man-Machine perspective, is intended to compensate for human deficiencies and prevent ageing-related effects. Social science researchers are contributing their knowledge in collaboration with researchers from natural science backgrounds, applications-oriented engineers, architects and designers. The aim is to apply social scientists’ knowledge of the needs and life situations of the elderly to making products and systems which are optimally adapted for the elderly. However, gerontechnology has not been embraced by all social science researchers. Some are critical of the concept based on what they perceive to be incomplete perceptions of human behaviour, and stereotypical images of elderly technology users.

This divide between researchers trained in the social sciences who accept a division of labour in which they devote themselves to the non-technical issues and those who do not is readily apparent in the literature survey presented here. The issue of what is to be considered technical or non-technical raises fundamental questions of scientific theory as it relates to the social science mission. In other words, how do researchers with technology backgrounds think in comparison with those trained in the social sciences?

Neither has it been possible to avoid such issues in the work of analysing the material included in the research survey. How is technology to be understood in relation to ageing? Where does the interface between technological and social science expertise in this context lie? Why is it difficult for social scientists to accept gerontechnology? What is the attitude of the researcher with a social science background toward technology? What contributions can be derived from a social science perspective?

2.2 Renewed calls for an interdisciplinary approach

The research funding which was made possible when the elderly garnered attention as an important group in the IT society of the future emphasised the need for collaborative interaction between technical expertise and knowledge of the needs of the elderly and their integration into society. Arenas were created in which researchers from different backgrounds could engage one another.

One underlying idea was that collaboration among such researchers would solve problems that neither engineers nor geriatrics researchers could solve by themselves. This type of thinking is not new.

The discourse concerning the problem of a lack of communication between the natural sciences and the humanities, and its consequences, often takes as its starting point Charles P. Snow's 1963 book concerning the two cultures (Snow 1963). Considering the current discussion, it appears that the gap between the cultures is deepening at the same time as the demand for interdisciplinary research is increasing. One example is the American debate, in which the lack of such communication is evinced by natural scientists who criticise humanists for undermining public confidence in rationality and objectivity.¹ We know at the same time that interdisciplinary initiatives are common today, as exemplified by the Tema research at Linköping university.

Snow's thought process was actually quite simple, insofar as he called attention to these deficiencies and believed that they could be resolved by reorganising the educational system. Such thinking presumes that different research traditions are capable of engaging and cross-fertilising one another. In addition to obstacles which have to do with academic traditions, differing linguistic usage and people's willingness or unwillingness to collaborate, such a meeting of the minds also presumes the existence of an area of overlapping interests, or of a logic which is meaningful to both sides.

The author's own experiences derived from participating in one of these EU-funded projects concerning technology and the elderly, COST A5: Ageing and Technology, have demonstrated the need for an interdisciplinary approach. There is in fact a tendency to underestimate the theoretical starting points. Social scientists are often more interested in reflecting on the origins of technology and the forces which drive it than are technology researchers. In this context, the question of the best way to create interaction between elderly people and the use of technology in their daily lives has been reduced to a matter of wedding technology, which is taken as a given, with agreed conceptions regarding the elderly. It is not uncommon for the elderly to be assigned the role of object rather than subject, and perceptions regarding how technological development proceeds are particularly deterministic and linear.

When it comes to technology and the elderly, these problems become especially evident. The elderly are so obviously the objects of other people's preconceptions about their needs and capabilities. Thus the technological development which is currently targeting the elderly finds that these preconceptions conform well to notions of what technology should be contributing. One example is the preconception that IT should serve as a tool for elderly people to create social contacts and keep themselves informed. This is an obvious conclusion if ageing is generalised as a state in which one spends the bulk of one's time at home, has limited mobility and a diminished capacity to meet people in other ways. Listening to elderly people, one quickly realises that such generalisations are not tenable.

¹ Review by Ross, Andrew: Science Wars, published 1996, in Issues in Science and Technology Online. Spring 1998. www.nap.edu/issues/

3. THE SOCIAL SCIENCE CONTRIBUTION TO RESEARCH ON TECHNOLOGY AND THE ELDERLY

3.1 Techne and phronesis

The Danish professor of social planning Bent Flyvbjerg has addressed the issue of the nature of the genuine contribution which social science research has to make. He believes that it is better to accentuate the differences than to have social science research emulate and adapt to natural science research, as it often does (Flyvbjerg 2002).

By referring back to Aristotle's concepts of episteme, techne and phronesis, Flyvbjerg shows that natural scientific knowledge and philosophically rooted research have entirely different focuses. He thus rejects attempts to have these researchers engage on the same level, or believes at any rate that such an approach is fair to neither epistemological orientation. Clearly, social-science oriented researchers can make contributions to projects with technical applications, but these researchers can be most useful when they make use of their distinctive focus.

In the Aristotelian sense, natural scientific knowledge is characterised by episteme, an analytical approach in which generalisability and independence of context are considered to be characteristic of knowledge. Techne refers to applied technical knowledge and practical attainments characterised by an instrumental rationality. The modern equivalents of techne are technique and technology. Phronesis, which is the third Aristotelian concept, refers to the ethical, practical, pragmatic and behaviour-oriented aspects which Flyvbjerg believes characterise social science research. The emphasis here is on practice before discourse, and on the value of grounding problems in their context. The demand for generalisability and context-independent theorisation thus becomes irrelevant.

Table 1 is intended to illustrate how researchers from a technology background and those from a social science background tend to think, and what distinguishes them. Technical research is characterised by an analytical thought process which strives for objectivity, generalisability and independence from context. The technical researcher is driven to apply technical knowledge to solve problems or, in some other way, create new possibilities for people. To be able to do this (and it is implicitly assumed possible) these researchers must find a means of identifying and categorising needs for which technical solutions are to be created. One of the things expected of social science researchers is that they will contribute to such categorisations. In other words, the technology already exists, and now the problem is to find appropriate corresponding categories.

Social science research is characterised as subject-oriented, empirical and grounded in context. This does not mean that social science research does not strive for general elements, but rather that these elements are based on the results of studies of practical behaviour rather than causal links. The technology is not a given but rather can itself serve as the object of research and redesign (just as the concept of the elderly can). Collaboration with technical research on social science's own terms thus leads to increased knowledge and understanding of social actions and daily routines.

Table 1. Survey of concepts derived from Aristotle, and an interpretation of how technology researchers and social science researchers think about technology.

***Technology in technical research –
Techne***

Epistemological interests

Application of analytical knowledge which is generalisable and context-independent. Practical attainments characterised by instrumental rationality.

View of technology

Technology creates change.
Technology solves problems, compensates, prevents, enables.

Focus

The elderly are the focus, the technology is a given.
The elderly have needs that technology can meet.

Social science contribution to techne

Knowledge of a non-technical nature.
The concept of power is irrelevant.

***Technology in social science research –
Phronesis***

Epistemological interests

Ethical, practical, pragmatic and behaviour-oriented knowledge. Context-dependent.

View of technology

What creates change? How? For whom? What creates differences?

Focus

Both the elderly and technology are objects for research.
Access to and use of technology by the elderly are results of the social order.

Social science contribution to phronesis

Understanding of human behaviour and daily routines.
The concept of power is key.

3.2 The concept of power is key

Flyvbjerg devotes much space to the concept of power. Because the social science mission is ethical, practical, pragmatic and behaviour-oriented, the concept of power is unavoidable. Flyvbjerg believes that it constitutes the core of social science and philosophy, and quotes Bertrand Russell in that “the fundamental concept in social science is Power, in the same sense in which Energy is the fundamental concept in physics” (Flyvbjerg 2002 page 88).² This is often the point most clearly noticeable when a social scientist works in collaboration with a technical researcher. The concept of power is irrelevant from a techne perspective. (see Table 1). Conversely, it is by focusing on power and influence that the social scientist can answer many questions concerning the availability of technology among various groups of people, and the importance it assumes in different physical and social contexts.

² Flyvbjerg discusses the concept of power based on a number of authors. He compares Steven Lukes with Foucault. Lukes believes that there are two types of questions regarding power which are important: the results of power being exercised, and the location of the power centre. From Lukes’ perspective, the following questions are key: Who can alter the interests of whom? Who has control over whom? Who has control over resources? Who is responsible for the results? Who gets to divide the results? Where is the source of change located? Where would alternative actions have made a difference? Foucault on the other hand believes that power is an attribute of a complex strategic situation in a society at a given time. For him, power cannot be sought in a centre. It is present everywhere and can arise in many different ways.

3.3 Different rationalities

Another way of explaining the differences between a technical perspective and a social science perspective is to describe the rationalities or logical thought processes which the researchers follow.

A technical rationality is based on calculations of predictable processes. Conversely, empirically grounded research proceeds on the assumption that the role of technology in practical use is both predictable and unpredictable. The social scientist can accompany the technical researcher in pursuing an analytical rationality as far as it goes, but he can then press on and describe behaviours and routines outside the realm of predictability. Indeed, the social scientist is interested in more than just how well the technological intentions agree with the actual result. He is interested primarily in the structure of daily life, and in the ways in which the technology will or will not be integrated into daily routines.

The integration of technology into daily life has been described entirely or in part using phenomenological approaches. Peter Berger and Thomas Luckmann have provided the basis for understanding how everyday knowledge evolves, including in my own dissertation (Berger & Luckmann 1979, Östlund 1995). Other authors who have conducted empirical studies and formulated concepts and theories based on the practice of technology include Roger Silverstone, Erik Hirsch, Merete Lie, Knut Sørensen and Jörgen Nissen (Silverstone & Hirsch 1992, Lie & 1996, Nissen 1993). There are also interesting examples of technical researchers who have discovered that there is something beyond the analytical level which is difficult to express, such as MIT researcher von Hippel, who speaks of the user as a carrier of “sticky information” (von Hippel 1988).

The integration of technology into daily life entails in practice that it become invisible. It is indeed the very fact that it is non-problematic which causes it to be moulded into habits or integrated into habits, routines and other behaviours which the individual accepts as given. One of the characteristics of daily life is the fact that, as long as life is proceeding normally, there is nothing to reflect about. Things are simply taken as given. Daily recurrent activities which initially demanded attention and care eventually become habits and routines. It is only when something occurs which shakes up our daily existence that our habits can be observed and reflected on. This is the process by which we develop the fundamental sense of security which is part of our daily lives. Integration may be described as a multistage process of domestication or as a learning process. Silverstone describes it as a process in which technology is purchased, evaluated, and incorporated and then it acquires meaning for those who live in its environment. Conversely, technology which is not integrated is problematic, and it poses problems or goes unused. Such technology is thus often visible to the individual. Hubert Dreyfus and Stuart Dreyfus describe the integration of technology as a learning process in five stages, from being a novice, an advanced beginner and competent, to become a proficient and an expert (Dreyfus & Dreyfus 1986). They point to the fact that people function as more than problem solvers when interacting with new methodologies and experiences.

3.4 Levels of research issues regarding technology and man

Two thought models concerning the relationship between man and technology derived from two sociologists, one of whom worked in collaboration with a psychologist at a technical college, may also help to sort out these issues. Here we still find ourselves in the divide between two scientific viewpoints. However, in this

case the questions are asked from the standpoint of the problematic surrounding IT use from a user perspective, and not from the standpoint of different disciplines or any specific technical application.

The first thought model comes from an article by JanErik Hagberg which appeared in an anthology on the theme “technology/politics/the future”. Hagberg believes that the discussion of technology, social effects and social changes must be conducted on two levels. “One level pertains to the social, economic, political and cultural factors which give the development of technology its direction and content. Another level pertains to how different types of technology are developed and acquire their properties, how this occurs in relation to the users of the technology, and what options and freedom of action the individual users actually have when new technology is disseminated in the society” (Hagberg 2002, quotation from page 61)

This two-fold division may be compared with a thought model formulated by Marianne Karlsson and Britt Östlund. It is a thought model drawn from a 1999 anthology which was intended to collect and compare articles from various disciplines with an empirically grounded user perspective. The results of the comparison point to three levels with different focuses on the relationship between user and technology (Karlsson & Östlund 1999).

The first level focuses on the design and structure of the technical artefact. A typical guiding question at this level is, how is this mobile phone to be designed so that it will be easy to use? The second level focuses on the use of the technology, and seeks clarification of its importance in the user’s life. Typical questions asked here include: on what occasions will the user use the mobile phone? What practical or symbolic significance does the mobile phone have in the user’s daily life? The third level focuses on technology and social development, and poses questions concerning the social consequences of increased mobile phone use, or: what are the driving forces behind the increasing prevalence of mobile phone use?

Level 1: design and structure of technical application. How to optimise utility?

Level 2: the technology’s practical and symbolic in the user’s life. Why use it?

Level 3: technology and social change. driving forces and consequences

Figure 1. Three levels with different focuses regarding the relationship between user and technology in empirical studies with a user perspective. Karlsson & Östlund 1999.

Both thought models include a level which poses questions concerning social development and the driving forces behind technological development. The user and his context come into play on the second levels. In Karlsson & Östlund’s thought model this level is subdivided into two levels: one focused on concrete structure and design, and another focused on understanding the factors (i.e., impediments and options) associated with use. Employing Flyvbjerg’s terminology, we have already abandoned the analytical rationality once we pass the first level in the Karlsson & Östlund model.

4. CURRENT SOCIAL SCIENCE RESEARCH ON TECHNOLOGY AND THE ELDERLY

4.1 Questions for analysing published material

Where then do we find the social science researchers who have published on the topic of technology and the elderly? Do we find them on an analytical technical rational level, supplementing technical expertise with information and knowledge about non-technical issues with regard to ageing and the elderly? Or do we find them taking a phenomenological approach, studying both the elderly and technology as phenomena? And if such is the case, how prevalent are questions concerning priority of interpretation with regard to the problems and needs of the elderly?

In light of the foregoing, three questions have been applied to the empirical material which constitutes the basis of this research survey:

1. What is the research orientation? To what theories or schools of thought do the researchers subscribe, and what more or less explicit assumptions do they make? ‘Schools of thought’ is used here as a designation for shared assumptions which can be the result of empirical studies or other starting points, but which do not constitute a coherent theory.
2. The role of the elderly in the research – is it pointed out and discussed? Are the elderly viewed as object or subject? Are preconceptions regarding ageing and the elderly discussed?
3. The role of technology – is it pointed out or called into question in any respect? Is technology viewed as given in advance, or is it also a topic of discussion?

4.2 Method, selection and limitations

The research survey is based on literature, articles from scientific journals and proceedings from conferences published from 1984 to 2002.

The study has been conducted in three stages:

1. Database searches and categorisation of publications.
2. Supplementation with known scientific publications not found in the databases.
3. Analysis of a selection of publications with respect to the foregoing questions.

See Tables 2 – 7 in the appendix for search word selection, distribution of social science publications in the databases, relevant scientific journals and a list of other reports.

The material is limited to social science publications with a focus on technology and the elderly, or on research and development in which social science researchers have been involved. The latter is the rule rather than the exception, since this subject area is interdisciplinary in nature. ‘Social science’ research refers here mainly to sociology. The aim of including social psychology, history, ethnology, anthropology and cultural geography has not been attainable, given the absence of such research literature from the material.

No limits were imposed in advance on the areas of technology involved. As the categorisation of the articles below indicates, access to subject areas has been identical with their delimitation. For reasons having to do with this subject area’s close ties to IT development and communications technology, these areas constitute the dominant technology field. This also means that the technical expertise involved in the publications generally involves computer science and systems science.

Prior to the more in-depth analysis of a number of publications, the material was limited to publications about technology related to the social integration, social participation, social relations, daily lives and gender of the elderly, as well as gerontechnology. The analysis thus excludes certain fields, among them geriatrics and rehabilitative medicine, functional limitations, the supply system for technical aids (assistive technology, occupational therapy), healthcare and, most importantly, the distribution of such care by healthcare personnel.

4.3 Categorisation and analysis of publications

The database search yielded a total of 220 hits; 197 hits on the ISI Web of Science, which contains only scientific material, and 23 hits on Libris WebSearch, specifically in the sociological abstracts and social service abstracts databases.³

Forty-six of the 197 hits on the ISI Web of Science can be categorised as social science research on the basis of their titles. The other 151 hits concern only intra-disciplinary technical questions with no link to social science issues.

Of the 23 hits on Libris, 16 may be categorised as social science research, two as reports from symposia which address social science issues, and five as publications in the form of policy documents, handbooks and articles with no scientific pretensions. See Table 3.

In addition to the material derived from the database searches, it was deemed necessary to undertake some supplementation with scientific publications which contribute to clarifying this area of research. See Table 7.

Of the publications derived from the databases and the supplementation performed, 26 were subjected to more in-depth analysis, see table 8. The result of these analysis are presented below.

5. RESULTS

5.1 Theoretical orientation

The first question concerns the research orientation. To what theories or schools of thought do the researchers subscribe, and what more or less explicit assumptions do they make?

The term “schools of thought” is used here in parallel with “theory” to more thoroughly describe the assumptions, approaches and thought processes which guide research in this area. Analysis of the material reveals three such schools of thought, each with its own character and scientific status.

³ [LIBRIS WebSearch](#) is the collective name for several bibliographic services offered by the LIBRIS Department at the Royal Library. Access to the service is free. The most important service is the LIBRIS Database with more than four million titles representing the holdings of about 300 Swedish libraries, mainly research libraries.

1. First, there is a scientifically well-grounded knowledge of ageing and the elderly as mediated by gerontologists, sociologists and social science researchers, and by psychologists and computer scientists (human factors).
2. Second, we find more or less well-substantiated or reported assumptions regarding the effects of technology use by the elderly.
3. Third, there is a body of premature thought surrounding the relationship between technology and the elderly. No problematisation occurs unless it is demonstrated that some type of knowledge is at issue here.

In other words, ageing and the elderly are well problematised and scientifically grounded, the technology is non-problematised and thus viewed as given, and the relationship between technology and the elderly is scarcely developed.

5.2 Empirical foundation

The contents of the publications can be divided into two levels, meso and macro. At the meso level are social relationships and daily needs and routines, primarily the need for care and other assistance. At the macro level are socio-economic studies regarding access to information and communications technology. Hagberg's thesis that the discussion of technology and the elderly is being conducted on two levels may thus be viewed as empirically substantiated.

Empirically supported assumptions and conclusions regarding the need for technology on the part of the elderly generally derive from statistical studies or interview studies. These may pertain to statistics on population trends or proportions of people who have functional limitations or require care. The interview studies pertain to communication patterns among the elderly, or their social relationships within the family, at home or in institutions.

Assumptions concerning the use of technology by the elderly are based largely on studies of the effects of technology in different environments. Examples of such studies include how it impacts their independence in some respect, integration in the IT society as related to socio-economics, employment rates, gender, and the effects of living in a home which contains a large number of technical solutions, that is, a "mechanised environment".

The material contains one coherent theory, which is gerontechnology (Graafman, Taipale & Charness 1998, Mollenkopf 1996). As noted earlier, this theory has its roots in Man-Machine Interaction (MMI) and Man-Computer Interaction (MCI), and is intended to guide designers and developers of technology in their efforts to apply technology solutions. Technology has the mission and capability of preventing or compensating for physical and social losses, and of enabling elderly people to live independent lives. Their needs for mobility and social contact are viewed as being relatively constant. Because technology is modifiable, it can also be adapted to variations in the needs of the elderly. The underlying justification for subscribing to this theory is thus that ageing can and should be compensated for, and that the losses entailed by ageing are undesirable.

Other comparable terms are associated with technological advances for those subject to functional limitations. Examples are "design for all" and "universal design". These two terms refer to availability for everyone, rather than just the functionally limited. The idea is that the user-friendliness ascribed to technical aids and other technical applications created for the functionally

limited also constitutes user-friendliness and makes living easier for most users, whether functionally limited or not.

5.3 Assumptions regarding the effects of technology

The bulk of the publications address what is assumed in terms of the expected effects or, to a lesser extent, the empirically substantiated effects of the use of technology among elderly individuals and groups of elderly people. One assumption which is made is that many functionally limited elderly persons can be compensated using technology (Dozet et al. 1999, Dozet et al. 2002, Harrington et al. 2000, Heikkilä 1999, Johansson 2001). Others proceed on the basis of population statistics and call for better adaptation of technology, where the needs of the elderly are better defined (Czaja & Barr 1989, Cullen 1997, Graafmans et al. 1998, Enders 1995, Fries 1997, Mollenkopf 1996, Mollenkopf, Meyers, Schulze & Wurm 2000, Poulson 1996, Walker 2001, Steenbekkers & Beijstervaldt 1998). The tacit assumptions which clearly underlie these proposals consist of stereotypical images of ageing combined with the insight that the elderly comprise a heterogeneous group. The summary conclusion may thus be drawn that we are dealing largely with effects studies pertaining to specific solutions, and that structure and context are lacking.

5.4 The relationship between technology and the elderly

The lack of developed thought concerning the relationship between the elderly and technology is evinced in critical questions and ambivalent questioning by researchers regarding technology's *raison d'être* (Berg on Dunkle 1984, and Sackmann in Mollenkopf 1996). A few authors have emphasised thought concerning the driving forces behind the development of technology for the elderly in terms of push or pull factors (Karlsson & Östlund 1999). Others argue that technological development is evolutionary, and that the new technology is dependent upon the use of technology which is already established (Enders 1995).

As Table 1 indicates, we are faced with two different types of epistemological interest, namely the application of technology, and reflections regarding technology. (See Table 1.) Salient difficulties are also apparent in reconciling these more clearly, such as Flyvbjerg's thesis that technology and social science constitute knowledge at different levels.

Technology is, for the most part, accepted as a given in the material in question. Technology is viewed as an independent variable, even though a number of authors raise the issue of whether it can be modified through better-organised design processes.

The critical questions and the dilemma of reconciling these levels point to the need for development; the premature thinking is waiting to mature. This is exemplified by the need expressed to "unlock the power of the design methods" in order to progress (Graafmans & Taipale 1996), or the need for a change in attitude toward elderly technology users (Czaja & Barr 1989, Enders 1995, Fries 1997, Östlund 1999).

5.5 The role of technology

Another question concerns the role of technology – has it been called into question or criticised in any respect? Is technology viewed as given in advance, or is it also a topic for discussion?

Technology is specified when it appears, but it appears as a general concept as well. One important delimitation is that “technology” refers to technical solutions, that is, ready-made applications such as security alarms or the Internet, rather than technical knowledge in the sense of the Aristotelian term “*techne*”, or knowledge which is in the process of being applied and developed in various concrete solutions.

Few authors raise issues concerning the priority of interpretation with regard to the elderly or include social science issues when discussing technology. One of the authors does so when he speaks of “empowerment” (Walker 2001). He contends that the elderly should, from a social science perspective, occupy centre stage in the research process. On the other hand, when it comes to technology he accepts that social development contributes only non-technical reflections, and makes reference to gerontechnology.

The division of labour is relatively clear insofar as those who possess technical expertise write about technology, while gerontologists and sociologists write about the elderly. In one of the anthologies, seven out of 26 articles problematise the relationship between technology and the elderly. The sociologists write about the social integration and social relationships of the elderly. Psychologists and doctors write about functional limitations and dementia. Engineers and psychologists write about traffic and mechanised environments and homes (Mollenkopf 1996).

One conclusion is thus that technology is relatively non-problematized throughout the material, with the exceptions of Karlsson & Östlund, and Sackmann in Mollenkopf. With a few exceptions, the role of technology is thus not discussed. The assumptions which more or less explicitly serve to guide the authors are that technology is a given, but does afford certain possibilities of modification to suit the elderly. The most extreme perspective, from which technology appears not to be thought about at all, is represented by an author who asserts that there is no evidence that technology should have any role to play whatsoever for elderly people (Berg on Dunkle 1984).

5.6 The role of the elderly

Is the role of the elderly in the research called into question and discussed? Are the elderly viewed as object or subject? Are preconceptions regarding ageing and the elderly described?

How, then, to characterise these elderly people for whom technology is to be adapted? Many authors address this issue by referring to the elderly as a heterogeneous group. These authors believe that it is becoming more and more apparent that the view that the elderly constitute a homogenous group with uniform needs is restrictive in a design work context (Czaja & Barr 1989, Cullen 1992, 1997, Graafmans et al. 1998, Mollenkopf 1996, Walker 2001).

Based on statistics and preconceptions which are held but all too seldom described by the authors, the elderly are characterised as weak and sick, and as having a need for social contact, continued activity and compensation for physical and social losses. This is most evident in the concept of gerontechnology, even though the anthologies in which the term appears also include articles which offer a significantly more critical perspective. The most flagrant example is Steenbekkers & Beijstervaldt, where the physical need for technology among the elderly is measured in almost Tayloristic fashion. These generalisations are also accompanied by preconceptions of the elderly as being fearful of or unfamiliar with technology. This is most clearly evinced in the scientific discourse

conducted during the 1990s in publications such as *Interaction with Computers, Telecommunications Policy and Educational Computing Research*, in which scales were developed for measuring just how afraid of technology the elderly actually are, and whether training can alleviate such fears.⁴

It is clear that those authors who have studied technology use by the elderly acquire a more nuanced picture, and feel compelled to rid themselves of prejudices concerning elderly people. One example of this is the finding that the elderly desire to use computers to a greater extent than expected, which contradicts the assumption that the elderly are technically illiterate or unwilling to embrace new technology (Thompson). Östlund also describes how attitudes toward the elderly, rather than their own capabilities and desires, can be limiting. The lack of empirical studies concerning the daily lives of the elderly creates a fertile ground for erroneous assumptions. Socio-economic studies which illustrate the distribution of technology and other resources also naturally nuance conceptions of the elderly, and can help pave the way for more well-founded assumptions.

Experience derived from technical research and development also gives rise to critical questions concerning how the elderly should be viewed. In this material these issues are raised mainly by authors at technical colleges, principally design-oriented researchers, but also by sociologists (Czaja & Barr, Karlsson & Östlund, Bouchayer in Mollenkopf).

5.7 The contribution from social science research

In order to ascertain the ways in which these publications contribute to technology and the elderly as an area of research, they have been categorised as follows:

Category 1: those taking a technical, analytical, rational approach to the issue of technology and the elderly, or

Category 2: those in which practice, context and power are key to the issue of technology and the elderly

The results point to a divide between social science researchers who contribute solely non-technical information and a supplementary perspective and those who also take a phenomenological approach or clearly articulate social science issues concerning power and influence.

The results also indicate that a number of authors fall into both categories. Ambivalence is evident in that the authors want to strengthen the influence of the elderly on technology and heighten awareness of technology's context, while at the same time they want people who design technology to incorporate the information offered by those who research the elderly. In Mollenkopf, for example, the editor addresses in her introduction the issue of not viewing man and technology as two separate entities. She asserts that this way of thinking about the use of technology needs to be altered by relating these concepts to one another. At the same time, the editor proposes in her conclusions that a database containing information from sociologists and technicians should be set up. Rather than forging a relationship between the concepts, such a proposal would seem to constitute almost a reductive measure.

On the other hand, it may be fully possible to feel at home in both camps. In a technical, analytical phase the social science researcher can set limits and contribute to an understanding of what should be possible in the development of new technology. In addition, involvement in the daily lives of the

⁴See the description of this discourse and references in Östlund 1999, page 27.

elderly while gathering data often provides ideas for technical solutions which could be utilised by designers and technology developers. The social science researcher can also be helpful in design processes when the elderly are involved. However, this is not the primary mission of the social scientist.

That mission is inherent in the researcher's ability to examine practical factors in context, and the consequent ability to develop knowledge about ageing and the elderly in a technological society based on understanding rather than on positivistic impulses. We may even ask ourselves whether social science researchers are delinquent in their duty if they do not do this. Based on this material, Flyvbjerg can find support for his contention that the social sciences lose their edge when they try to be sensitive to the natural sciences and technical, analytical modes of thought rather than pursuing their true mission. At any rate, the technical scientists certainly cannot be accused of failing to pursue their own true missions.

6. CONCLUSIONS

The social science perspective on technology and the elderly leaves a good deal to be desired. One encounters here not only a need for knowledge about the role of technology in the lives of the elderly and about ageing in a modern technical society; there are fundamental theoretical challenges to be faced as well. With one foot planted in theoretical sources and the other in the results obtained from empirical research into the practice of technology and the elderly, the area of technology and the elderly could in all likelihood contribute important and groundbreaking knowledge. This area could also contribute to improving and advancing communication between philosophy and technology.

In light of the material available regarding research on technology and the elderly, this survey has focused on two questions. One is, in its most extreme form: to what extent shall social science researchers simply support technological development? Shall we consent to collaborate with technical researchers on an analytical level to which the technology beckons us?

If we answer this question in the affirmative, then no greater efforts are needed. This collaboration is already ongoing, and interest in involving experts who can supplement technology development and modify it on behalf of the elderly is strong.

The other question is this: should we develop an area of research which addresses the practice of technology and the perspective of the elderly critically and independently?

An affirmative response to this question demands that efforts be made. Proposals concerning such efforts should be part of the discussion regarding the future orientation of social science research on technology and the elderly.

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APPENDICES

Table 2. Search words for database searches

Search words:

ageing, elderly, old, older, later life

In combination with:

technology

information technology (IT)

communication technology

information and communication technology (ICT)

gerontechnology

assistive technology

technical aids

smart homes

design for all

universal design

home

Table 3. Distribution of social science publications in databases

Social science publications on technology and ageing	in ISI Web of Science	in Libris WebSearch
Social relations	2	
Everyday Life	18	4
Gender		1
Gerontechnology		2
Design		2
Organisation of technology within health care and home help service	9	1
Housing	3	2
Communication, language	1	
Abuse, criminality	4	
Economic development	1	
Evaluation models	1	
General social science related to ageing and elderly people	7	4
Summa	46	16

Table 4. Scientific journals with published articles about technology and the elderly, 1984 - 2002

Journal of Applied Gerontology,
Generations,
Social Science and Medicine,
Social Forskning,
Contemporary Society,
Ageing and Society,
Ageing International,
Gerontology and Geriatrics Education,
Social Practice,
Future
Clinical Medicine

Table 5. List of non-scientific articles which raise questions regarding technology and the elderly in the Libris database, 1984 - 2002

TelDok	1995
Handbook	TEKES 2000
Handikappinst	2001
Forum Health Care US	1989
Experts EC	1998
In total 5	

Table 6. List of non-scientific reports which raise social science questions regarding technology and the elderly in the Libris database, 1984 – 2002

Symposia	1975
Symposia	1985
In total 2	

Table 7. Supplements to the databases

From the discourse on technophobia: Baack 1991 et al , seevKarlsson & Östlund 1999 page 27.
Steenbekkers & Beijsterveldt 1998

Table 8 List of authors, titles, publications and years for publications subjected to analysis:

Authors	Title	Publishing data
Bray Jean & Wright Sheila (eds)	The Use of Technology in the Care of the Elderly and Disabled. Tools for Living.	Frances Pinter Ltd London 1980
Czaja Sara J & Barr Robin A	Technology and the Everyday Life of Older Adults.	The Annals of the American Academy of Political and Social Science. 503 (1989) ; 127-37.
Cullen Kevin & Robinson Simon	Telecommunications for Older People and Disabled People in Europe	Result from the MART study in the TIDE-programme, EC 1997
Cullen Kevin & Moran Rosalyn	Technology and the elderly. The role of technology prolonging the independence of the elderly in the community care context.	FAS research report EUR 14419 EN: 1992
Dibner Andrew S	Personal Emergency Systems: Communication Technology Aids Elderly and Their Families.	The Journal of Applied Gerontology Vol 9, No 4, sid 504-510, December 1990
Dozet Alexander, Lyttkens Carl Hampus & Nystedt Paul	Health Care for the Elderly. Two Cases of Technology Diffusion.	Studies in Health Economics 26. Department of Community Medicine, Institute of Economic Research Lunds Universitet 1999
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Enders, Alexandra	The Role of Technology in the Lives of Older People	Generations, Spring 1995, Vol 19 Nr 1, sid 712.

Fries, Brant E	Changing the technology of Assesing the Elderly: the Example of the R.A.I.	Generations, Spring 1997 Vol 21, Nr 1, sid 59-61.
Harrington, Thomas & Harrington Marcia K	Gerontechnology. Why and How.	Bouma Foundation for Gerontechnology, Shaker Publishing Netherlands 2000 IOS Press Amsterdam: 1998
Graafman J, Tapipale V & Charness N (eds)	Gerontechnology. A Sustainable Investment in the Future.	
Heikkilä Jukka, Kallio Jukka, Saarinen Timo & Virpi Kristiina Tuunainen	EC of groceries for elderly and disabled. A comparison of alternative service models	Information Technology & people Vol 12 No 4 pp389-402, 1999.
Ylva Johansson	Äldre människor, yngre teknik [Old people, young technology].	Dalarnas forskningsråd i Falun 2001
Karlsson, Marianne & Östlund, Britt (eds)	Users in Action. Stories of users and telematics in everyday life.	Swedish Board for Transport and Communication Analysis, report 1999:8
Mollenkopf, Heidrun (ed)	Elderly People in Industrialised Societies. Social Integartion in Old Age by or despite Technology?	Edition Sigma Rainer Bohn Verlag Berlin 1996.
Mollenkopf Heidrun, Meyer Sibylle, Schulze Eva, Wurm Susanne & Friesdorf W	Technik im Haushalt zur Unterstützung einer selbstbestimmten Lebensführung im Alter.	Zeitschrift fur Gerontologie und Geriatrie Band 33 Heft 3, Steinkopff Verlag 2000.
Porrero Placencia I & Ballabio E (eds)	Improving the Quality of Life for the European Citizen. Technology for Inclusive Design and Equality.	IOS Press 1998. Report under the EC: TIDE.
Poulson David, Nicolle Colette, Richardson Simon, Ashby Martin, Phillips Kathy, Audouard Elsa, Stapleton Lenny, Waddell Neil, Owen Helena (eds)	Userfit. A practical handbook on user-centred design for Assistive Technology.	TIDE European Commission: 1996

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