# Knowledge Workers
# &
# Knowledge Utilization:

## Professionalizing interchange of knowledge between practice and science

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**Abstract**
In the era of 'Knowledge Societies' innovations and expertise are often called the most important resources (Daniel Bell; Peter Drucker) especially for organizations, and the knowledge worker becomes a famous object of sociological research (e.g. Helmut Willke). In theories of organizational learning (e.g. Agyris and Schön) the individual actor and his attitudes aren_t in the focus of interest. Here we will present a qualitative research on practitioners from different professions and their use of and attitudes towards scientific knowledge and their interaction with research establishments or scientists. We interviewed more than 50 professionals with different academic backgrounds in different organizations. They were asked, how they search for and use scientific information or knowledge, how they proof it and how important this information input is for their personal work and for the organization. Two major findings are: (1) a specific science orientation – attitude among most interview partners and (2) a change from educated knowledge to informed knowledge (Nina Degele).
**Keywords:**
Knowledge Utilization, Scientific Knowledge, Knowledge Worker, Knowledge Society,

## 1. Introduction

In our project[1] we investigate to what extent knowledge exchange takes place between social scientists involved in various research projects and practitioners from different professions. In choosing to look at knowledge exchange rather than knowledge transfer, we wish to emphasize that the subject of our investigation is not only the transfer of scientific findings into practice but also the flow of information or knowledge derived from practice into academic research. Here, social science and practice are treated as two separate social systems, with differing rationales, rewards systems, and operational logics. They are not, however, perceived as standing in a hierarchical relationship (Luhmann 1984, 1993; Neidhardt 1993). The concept for our project is based on a long tradition of analysis, in particular on the *knowledge utilization research* practised in the US (e.g. Weiss 1977, Weiss and Bucuvalas 1980) and Germany in the 1970s and 1980s, which, in turn, had its origin in the approaches of Charles Lindblom *(muddling-through theory)* and Nathan Caplan *(two communities theory)* (Beck and Bonß 1984, 1985, 1989, 1991; Caplan 1979; Daheim et al. 1989; Lindblom 1959). At the same time, we also consider these different forms of cooperation between social scientists and practitioners in the light of more recent debates in the sociology of science, which sees in them the possible emergence of a new type of knowledge production, *Mode 2* (Gibbons et al. 1994; Weingart 1997). In addition, we also seek to consider the changes that the so-called *knowledge society* (Drucker 1969; Bell 1973, Castells 1996) has brought about in the work of professional actors in practical contexts and the corresponding new forms of work it has engendered (for example, the *knowledge worker*) (Willke 1998: 21). An interesting question here is whether the perceived increase in the significance of information and scientific knowledge for everyday practice has also had a tangible effect on attitudes to researchers and research findings and vice versa. In the following we first provide an overview of our methodological approach and then outline cursorily some results of our qualitative and quantitative analysis.

[1] Our project 'Wissensaustausch – Interaktion und Kommunikation zwischen Wissenschaft und Praxis' is raised by the Bundesministerium für Bildung und Forschung (BMBF) from 2004 to 2007.

## 2. Methodological Design

The study was characterized by a multi-method design. We used both qualitative and quantitative methods in the expectation that a combination of different approaches (known as triangulation) would yield solid findings (Flick 2004; Kelle and Erzberger 1999). The study was divided into two analytical phases: 1) the interaction phase and 2) the dissemination phase. During the first phase we studied interactions that took place between researchers and practitioners during the research process. In the second phase we looked at the dissemination of scientific findings into practice and how they were received and used by institutions engaged in practice. In conclusion the two phases were compared.

The guided interviews in the interaction phase were based on the concept of hypothesis-led qualitative research (Hopf 1996; Strobl 1998). The aim in both phases was to construct meaningful models, so that when the two phases were compared more profound information about the attitude of practitioners to the findings of social scientific research and the integration of practical responses into research could be obtained (Kluge 1999).

Table 1 Research projects

| **Projects chosen for analysis** |
|---|
| A: Recognition relationships among school pupils (education)<br>$a^1$: quantitative subproject<br>$a^2$: qualitative subproject |
| B: Group conflicts among teenagers (politics/sociology)<br>$^{b1}$: regional subproject eastern Germany<br>$^{b2}$: regional subproject western Germany |
| C: The processes of joining or leaving the skinhead scene (education) |
| F: Disadvantaged neighborhoods (sociology) |
| G: Images of Islam in modern society (psychology) |
| H: Insecure employment relationships (sociology) |
| I: Integration in sport (sociology) |
| J: EU – eastern enlargement (psychology/sociology) |
| K: Neighborhood interethnic violence |

In the qualitative part we chose nine social science research projects from a variety of disciplines (see Table 1) and subjected them to closer study. The selection was based on the principle of a "most-similar-most-different sample" with regard to the practitioners involved in order to be able compare research projects being carried out in both different and similar social settings (see Table 2)

We studied interactions that took place between researchers and practitioners during the research process and we looked at the dissemination of scientific findings into practice and how they were received and used by institutions engaged in practice.

More interesting in this context is our quantitative study. Here we conducted 868 standardized interviews by telephone. This sample is composed of four different areas of practice which share subject matter with the social sciences.

In the next part we will show some of our findings from this study. We interviewed four different groups of professionals. The first group were police officers doing advice work in crime and/or violence prevention, the second group were heads of youth welfare offices (Jugendamt), the third group were heads of service centers for the unemployed and the last group were so called 'managers' of deprived urban quarters (Quartiersmanager), which is a kind of social worker (see Table 3)

Table 2 Overview of guided interviews

| **Projects** | **Interviews with researchers** | **Interviews with practitioners** | | ∑ |
|---|---|---|---|---|
| | | No. | Type of practitioner | |
| a[2] | 6 | 3 | School principals, teachers | **9** |
| b[1] | 4 | 4 | Social workers | **8** |
| b[2] | 2 | 3 | Social workers, local government administrators | **5** |
| C | 3 | 5 | Social workers, police | **8** |
| F | 4 | 3 | Local government administrators | **7** |
| G | 4 | 3 | Teachers, managers | **7** |
| H | 4 | 5 | Trade unionists, teachers, management consultants | **9** |
| I | 3 | 3 | [sports] association staff | **6** |
| J | 1 | 0 | - | **1** |
| K | 2 | 1 | Local government administrators | **3** |
| ∑ | **33** | **30** | | **63** |

Table 3 Professionals in the quantitative Study

| **Group of Professionals** | **N** |
|---|---|
| police officers concerned with crime prevention | 170 |
| heads of youth welfare offices | 260 |
| heads of service centres for the unemployed | 269 |
| ‚managers' of deprived urban quarters | 169 |
| ∑ | **868** |

Most of them (altogether almost 90 percent) have an academic education. 36.4% of them had an university degree equivalent to the master's degree. About 52 % held a degree from a University of Applied Sciences, which is comparable to the bachelor's degree (Fachhochschulabschluss). Only 11.2% of the respondents had no university degree (see Table 4).

Table 4 Academic Education

| Level of Academic Education | % |
|---|---|
| university degree | 88.8 |
| *university degree = master or similar* | *36.4* |
| *university degree = bachelor or similar* | *52.4* |
| without university degree | 11.2 |
| | 100.0 |

With our survey we reached high level professionals in different social contexts. Most of them were in an Executive Position and even more were able to make autonomous decisions (see Table 5).

Table 5 Level of Autonomy

| Level of Autonomy | % |
|---|---|
| Executive Position in the Organization | 79.0 |
| Make Autonomous Decisions (often/very often) | 91.0 |
| | |

## 3. Knowledge Utilization by Professionals

We were interested how the respondents use scientific knowledge. But how we can measure knowledge utilization? We applied a scale with different stages of knowledge utilization developed by Knott and Wildawsky in 1980. This scale was applied and validated in the recent studies of Landri and colleagues (Landri et al 1998, Amara et al. 2004). We have six stages of utilization that we finally aggregated to a latent variable, computed with a Principal Component Analysis. The first stage is *Reception* of scientific Knowledge. This only means that the practitioners are aware of research on

a topic which is relevant for their work. The second stage is *cognition*, which means that they read and understand research results. *Discussion* is the third stage and this is the case if the practitioners participate in meetings and events to discuss the aforementioned research. To cite research studies as reference in their own reports and documents is the fourth stage, called *Reference.* The fifth stage is *Adoption*, which means to make efforts to favour the use of research results. If research results influence decisions in the work unit, it is the sixth stage of utilization and we call it *Influence.*

Table 6 Stage of Utilization

| Stage of Utilization | Item | very often/often % |
|---|---|---|
| **Reception** | Do you recieve the research pertinent to your work? | 73 |
| **Cognition** | Do you read the research results that you recieve? | 70 |
| | Do you understand the research results that you read? | 88 |
| **Discussion** | Do you participate in meetings and events to discuss the afromentioned research? | 34 |
| **Reference** | Do you cite research studies as references in your own professional reports? | 40 |
| **Adoption** | Do you make efforts to favour the use of research results? | 30 |
| **Influence** | Do research results influence decisions in your work unit? | 41 |

About 70 % of the interviewed professionals answered that they receive, read and understand the research that is pertinent to their work. There is a gap between *reception* and *cognition* on the one hand side and *discussion, reference, adoption* and *influence* on the other. Only about 30-40 % of the interviewees engage that intensively with science.

The question is now, which variables have a positive or negative influence on knowledge utilization? The level of Autonomy and the level of Academic Education mentioned above have no impact of knowledge utilization.

Landri and colleagues (Landri et al 1998, Amara et al. 2004) neatly summarize the four different groups of explanatory factors for the use of social science knowledge:

*(a) The Organizational Interest Explanation* sees the reason for non-use in the context and the constraints that policymakers – or in general practitioners – are embedded in. That is: organizational structures, the size and number of employees, the positions in the organization and the needs of organizations.

*(b) The Engineering Explanations* focus on the variables that relate to the characteristics of the research products themselves. Here utilization is explained by the advancements brought about by the research products.

*(c) The Two Communities Theory* identifies a shortage of shared values and language between scientists and practitioners that eventually lead to a lack of communication. Two predictors of knowledge utilization are reported in the literature: Firstly, effort to adapt research products, to make products more readable, to make conclusions and recommendations more operational, to make reports more appealing. And secondly, the acquisition efforts that are made when users engage resources in the acquisition of research knowledge.

*(d)* Finally there are *Interaction explanations.* These identify the lack of interactions between researchers and practitioners as one main reason for non-use of research findings. Earlier studies suggest that knowledge utilization depends on disorderly interactions between researchers and users. This would suggest a decisive role for interaction at different stages of knowledge production, dissemination and utilization.

We included explanatory variables of these four groups in our regression model. The dependent variable is the Knott and Wildavsky utilization scale with its 6 stages (*reception, cognition, discussion, reference, adoption, influence)* as described above.

*Organizational interest*

In the first part of the regression model we see the variables that relate to the organizational interest explanations. Some of the variables represent single questions. For others we conduct a Principal Component Analysis (PCA) and formed latent variables.

This is the case for the first variable, *sufficient resources*. Here we asked our subjects separately:

- Do you have an adequate amount of time in your work unit to accomplish your job?
- Do you have an adequate amount of money in your work unit to accomplish your job?
- Do you have an adequate amount of staff in your work unit to accomplish your job?

Interestingly, we see that *sufficient resources* has no impact on the use of knowledge and it is not significant.

The second variable asks for the *number of employees* in the respondents' workplace. It shows that the size of the respondent's organization has also no impact on research utilization.

The third variable is very interesting: *work relevance.* We asked the single question:

- Please indicate your opinion regarding the following statement: In my work unit social science research is of high relevance.

This variable is a strong predictor for research utilization with a high significance as you can see in Table 7. Of significance is also the *type of task performed at work*. Practitioners who are concerned with organization and coordination, with drawing up proposals and drafting funding applications, who have executive competences or representative functions are likely to use scientific knowledge. Those who are concerned with routine administrative duties or those who have advisory and caring tasks are not prone to use research in their work process. Also high significance are two

variables asking about *Colleagues*. We asked the respondents to agree to one of the two statements:

- My workplace colleagues positively acknowledge the use of research results
- My colleagues' experience and knowledge are more useful to me than scientific results

Those whose colleagues endorse the use of research results also make use of research findings. The practitioners, who find their colleagues' knowledge more useful than scientific results, tend to use research results significantly less than average.

Interestingly the variable *science's focus on users' needs* has no impact. Here we asked:

- Please indicate your opinion regarding the following statement: In my field of work researchers are focused on users' needs.

That means that utilization of research products does not increase when users perceive that producers (researchers) doing their research especially for users' needs.

Table 7 Regression Model – Part 1[2]

| | Standardized coefficient | T-Value | Level of significance |
|---|---|---|---|
| | Beta | | |
| (Constant) | | 8.325 | .000 |
| **Organziational Factors** | | | |
| Sufficient ressources | .004 | .164 | .870 |
| Number of employees | .004 | .169 | .866 |
| Work relevance of social science | **.243** | **7.669** | **.000** |
| Type of task performed on the job: organize, conceptualise and planning | .079 | 2.777 | .006 |
| Focus on users' needs | .024 | .913 | .362 |
| Users' context positive | .128 | 4.418 | .000 |
| Users' context negative | -.115 | 4.146 | .000 |

*Engineering Factors*

Like the previous variable, the *variable Focus on the advancement of science* is of no significance. We asked the subjects:

- Please indicate your opinion regarding the following statement: In my field of work, researchers are focused on the advancement of scientific knowledge.

Agreement with this statement has neither a positive nor a negative influence on utilization.

To the engineering explanation we added the question:

- What kind of outcome do you expect from cooperation with researchers in your field of work?

[2] For all parts of the regression model: n=868; adjusted $R^2$ .475; F 40.16; p.000

These variables load on two dimensions, using a Principal Component Analysis: The first dimension has a highly significant impact: Practitioners who expect to gain answers for their problems, who expect insights into the wider social situation and who expect a new perspective or devices for planning concepts and programmes are very likely to use scientific knowledge. Practitioners who primarily expect to have their practice confirmed, who hope to gain recognition from their peers through cooperation with scientists and who more want to show scientists the practical realities, are also likely to use research, but to a smaller extent (see Table 8).

Table 8 Regression Model – Part 2

| | **Standardized coefficient** | **T-Value** | **Level of significance** |
|---|---|---|---|
| **Engineering Factors** | | | |
| Focus on the advancement of science | .004 | .160 | .873 |
| Expected outcome of cooperation: problem solving | **.089** | **3.219** | **.001** |
| Expected outcome of cooperation: recognition | **.057** | **2.128** | **.034** |

*Two Communities Theory:*

The third kind of explanatory variables for utilization test for the Two Communities Theory. We chose them according to criteria described by Landri and colleagues (Landri 1998, Amara 2001).

The first is the *acquisition efforts*, that is the effort of practitioners to establish relationships with scientists and scientific organisations. The variable you see here is the product of related items that load on one principal component (PCA). We asked the following questions:

- Do you make efforts to establish relationships with researchers?
- Does the organization you work for support relationships with researchers?
- In your organization, is it assumed that relationships with science will be established?
- How important are these relationships for your work?

As you can see in table 9, these individual and organizational efforts to establish relationships with researchers have significant impact on the utilization of research.

We also measured the *attitudes* (values) that the practitioners hold towards social science and researchers. The items that load on the dimension of positive attitudes are the following:

- If the advice of social scientists would be heard, this could help solving the problems in the world.
- The progress of sociological research would help solving social problems like the future of the welfare state, social integration, etc.
- I feel better when I am aware of the contribution the social sciences make to my field of work.

They explain utilization to a significant extent. Negative attitudes have no significant impact (as you can see in table 9).

Table 9 Regression Model – Part 3

| | Standardized coefficient | T-Value | Level of significance |
|---|---|---|---|
| **Two Communities Theory** | | | |
| Acquisition efforts | **.105** | **3.183** | **.002** |
| Adaptation efforts | -.006 | -.203 | .839 |
| Positive attitudes toward social science | **.092** | **3.240** | **.001** |
| Negative attitudes toward social science | -.023 | -.822 | .412 |

*Interaction Model*

Last but not least we present the variables that account for the Interaction explanation: These four variables ask for the information sources the respondents use on a regular basis to inform themselves about the subject they work on. We asked:

- How often do you use the following sources to get specialist information about the specific field you work on?

With a Principal Component Analysis (PCA) we found the following four dimensions of information sources:

(1) Scientific *literature* and academic *journals*. This variable is a highly significant predictor for knowledge utilization. (2) Also attendance at scientific *conferences and meetings*, participation in *local networks* and attendance at professional training events and courses have a considerable positive impact on utilization. (3) Even more important is use of the *Internet* as an information source. (4) By contrast, practitioners who use their *colleagues and friends or the mass media* as primary information sources concerning job-relevant issues are not likely to use research results.

One important predictor of knowledge use is the self-reported estimation of how many *connections* the respondents have to researchers. We asked:

- What would you say: how many connections to researchers do you have all together?

Table 10 Regression Model – Part 4

| | Standardized coefficient | T-Value | Level of significance |
|---|---|---|---|
| **Interaction Model** | | | |
| Information source: Scientific and technical literature and journals | **.119** | **4.400** | **.000** |
| Information source: Scientific and local networks | **.069** | **2.416** | **.016** |
| Information source: Internet | **.082** | **3.159** | **.002** |
| Information source: colleagues and friends | -.025 | -.923 | .357 |
| Number of connections to scientists (self-reported) | **.178** | **5.776** | **.000** |

*Impact on research utilization*

The analysis above shows that there are some explanatory variables that have surprisingly no impact on research utilization.

Factors discussed as *Organizational Explanations* like resources (time, money, staff), the 'size of the organization' or the 'focus on users' needs' have no significant impact on research utilization. The 'focus on the advancement of science', which is an *Engineering* variable has no impact too. Neither 'adaptation efforts' nor 'negative attitudes towards social science' mentioned as test for the *two Communities Theory* have impact on utilization.

The information sources (*interaction explanations*) have a significant impact on research utilization excepting the variable Information source: Colleagues, friends and the mass media.

The key factors that have significant impact on the utilization of social science research results are the following ones:

In term of *Organizational Explanations* these are: (1) work relevance, (2) type of task performed, (3) Colleagues (pos./neg.). In terms of *Engineering Explanations* these are: (4) expected outcome of cooperation – problem solving, (5) expected outcome of cooperation – recognition. In terms of *two Communities Explanations* these are: (6) Acquisition efforts, (7) Positive attitudes toward social science. And finally in terms of *Interaction Explanations* these are: (8) information source: technical literature, meetings and the internet and (9) the number of connections to scientists.

The first conclusion that we draw from our study is that none of the reported single models of explanation (organizational, engineering, two communities or interaction) explains the phenomena on its own. Knowledge utilization is instead explained by a mix of models.

Intra-organizational needs and circumstances are very important in determining whether research is used or not. Besides the relevance of social sciences for the job – which is kind of self-explanatory – the most compelling thing to me is the need for a workplace environment that appreciates the use of scientific knowledge.

The variables that relate to the interaction and communication processes between practitioners and researchers have a great impact. Pure knowledge transfer (via written information sources), personal interactions at meetings and conferences and efforts to establish relationships with scientists are very good predictors for research utilization, as is the number of connections to scientists a practitioner already has.

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