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## Contours of a contours of a contours of a empirical science, food science, food science

### Practical elements to complement the scientific perspective

from volume Baars

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empirical science as  
Research method has  
Developed since 1985 as  
part of my work with farmers  
in the Netherlands. The  
first manual appeared in 1999  
on the topic: "The farmer as  
empirical scientist"  
(BAARS, T.). Because of  
the universal character of  
experiential knowledge, I want to  
Thoughts and results  
other authors also outside  
the agricultural sciences.

Experiential knowledge is not  
reserved solely for farmers.  
All parts of society talk about  
experiential knowledge.

Especially in sociology  
you are interested in these  
qualitative research method.  
Within agriculture it is part  
of the

Scientists in the tropics who  
strive for research methods  
that do not  
try western alone  
Copy findings and  
to export. Common

Terms there include: "on-  
farm research", "farmer-  
participatory-research",  
"inspirational learning"  
and "learning by doing".

The humanist VAN DER LAAN  
speaks in his inaugural  
lecture (2006; University for  
Humanistics, Utrecht) of it,  
that it is regarding the  
scientific and  
empirical science  
Methods around a question of  
perspective. What poses  
one in the foreground: the  
holistic experience of the  
Practitioners or scientific  
knowledge?  
Complement natural science  
and empirical science  
each other. You need  
both in order to be truly  
successful and have both  
their strengths and weaknesses.

For me it is about  
the empirical scientific  
method around the following  
six elements:

#### The knowledge that is in the action is involved

empirical science is  
an epistemology of  
action. This is busy  
deal with the knowledge that  
arises through doing. The  
Method refers first of all  
to practitioners who are through  
their activities something new  
in the world or

improve something qualitatively,  
the explorers are in everyday  
life. So it's not about  
Stories or philosophies, but  
about tangible and  
comprehensible patterns of  
action that lead to a new one  
Point out the causal  
relationship, in the picture:  
about the green thumb. It's about the  
hidden wisdom that is in the  
Acting (is) hidden, according to  
POLANYI "tacit knowing" or  
"hidden knowledge". One  
special action is that  
intuitive, the action that was not  
planned in advance but was  
nevertheless successful (see below).

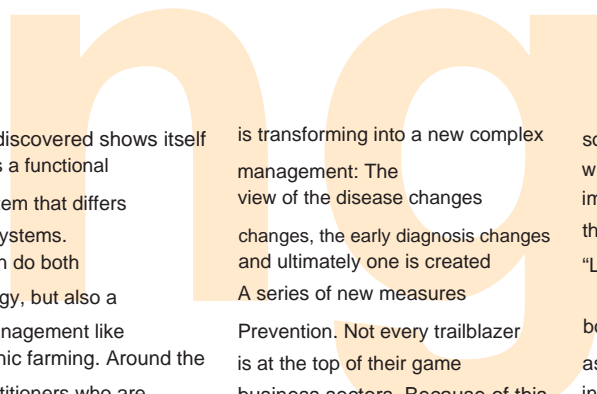
Practitioner-experts act  
in principle holistic, like  
e.g. E.g. farmers, doctors,  
nurses, firefighters etc.  
Holistic means that  
action is taken and new territory  
is broken out of consciousness  
for the situation as a whole  
and in tune with it.  
In empirical scientific  
research  
on the discovery and  
development of new knowledge  
The aim is to focus on the  
"pioneers" within the group  
of professional practitioners.  
These people want new  
territory parallel to the researcher  
discover the one through  
scientific methods, the other  
through being  
Action and reflection  
about it.

#### Short and sweet:

Experiences from practitioners-experts also lead to progress like research that is usually model-oriented.

Empirical science is working on a theory of knowledge like this action.

Expertise arises from comparing events with internalized patterns and systems of experience such as the "natural progression" during action.



The newly discovered shows itself ultimately as a functional rendering system that differs of existing systems. The new can do both Be technology, but also a complex management like e.g. in organic farming. Around the To find practitioners who are breaking new ground, you look for them Outliers, the successful ones Show results. Farmers fundamentally lack this Possibility, subsequently to look for symptom-oriented solutions. A farmer must act in such a way that he... next year not e.g. b. weeds or animal diseases must regulate. This requires coherent, holistic or networked thinking necessary. A special feature of ecological and biodynamic farmers are the preventive, holistic elements of their action.

How do you select those? Pioneer, how do you decide? as a researcher, what is new, interesting and successful? The I have to do it myself as a researcher determine. Often there is good objective criteria. When I come up with solutions If I'm concerned about udder health, I'll look for them most successful dairy farmers, farmers theirs have already solved problems, with permanently low cell counts, a low incidence of mastitis and all without the systematic use of antibiotics. I'm looking for the farmers who are biographically interested in this Interested in topic (here: complete avoidance of antibiotics) and an interest have, even independently to develop topic. The original intention, without to get by with antibiotics,

is transforming into a new complex management: The view of the disease changes changes, the early diagnosis changes and ultimately one is created A series of new measures Prevention. Not every trailblazer is at the top of their game business sectors. Because of this You should come up with a new one for every question Look for a group of farmers and not just work with "permanent" partners.

The difference to the natural scientific process? Natural science is an epistemology of thinking, whereas empirical science is oriented towards it take action first. In the Science is what you aim for to a factorial, model-like understanding of reality. Only

measurable, objectifiable data used. In an empirical science Scientific results can be used in a study (which you got via on-farm research), but it in principle it is also possible without experiments alone farming experiences reflect. Here is too Space for qualitative results, feelings and also intuitions. (see also BAARS AND BAARS, 2007)

**Reflecting the action and Pattern recognition.**

In empirical science it's about "learning first Hand". The steps involved These include: acting – reflecting – developing insight. The learning process is different than this

so-called "second-hand learning", where theoretical knowledge is imparted the steps: offer – process – apply. "Learn second-hand" can both based on theoretical as well as practical ones insights take place, Bookish wisdom and/or Become "master wisdom". learned indirectly.



In the original vocational training it was The apprentice's task His teacher's pattern of action as precisely as possible to imitate without doing so to think a lot. The body learned. In the journeyman phase, people looked at each other the action patterns of different masters and became so physically flexible. In your own master phase every farmer develops Techniques and patterns of action that are personal to him fit. When "learning from first hand" reflects the Expert-master of what is happening through his work in the world changes. That means: him creates a context of life and observes his thinking and cognition process. Decisions also involve feelings used, among other things,

**Practitioners are experts – it depends on that cognitive process**



to judge: "It's true or is it not true?" A Master knows how to do it in one new, unknown situation should proceed. He can one 'Know-that, know-what and Know-where in every situation combine.

In reflection it becomes (un-) consciously pattern recognition applied. This enables Security in acquiring your own Understanding. The causal can be determined via pattern recognition security will be queried (retrospective approach). What is important is: the Uniqueness of the pattern and the agreement between my pattern of action and the pattern that arises in space or time, the so-called *illustration*



The ways of knowing science and practice can complement each other (The author, left, on the Arpshof)

*correspondence* of the pattern. The causal certainty is the bigger it is, the more complex it is Patterns are: just think to the uniqueness of one Fingerprint, a DNA profile or iris scan as a complex spatial pattern. After Helmut KIENE (1998, 2002) shapes causal cognition through the following: Man speaks of a positive one Causal knowledge based on the uniqueness of the pattern, an image cor-

response because of me own measure and the Control of correspondence of uniqueness.

**Gestalt cognition and the construction of a 'living flow shape'.**

The term "flow shape" comes from Goethe. He was a master in the observation of living things, in precise comparison of course successive, momentary overall images. The Metamorphosis of the plant is a comprehensible example: the entire plant is always there (current overall picture), but in time a transformation appears the plant shape (time or flow shape). The flow shape can be compared in experimental research with the "natural course". Knowledge plays a role in empirical science of the natural course important role. This ultimately functions as an inner, personal benchmark. Based on the reflection a living flow shape constructed, that is, the laws of nature The process is recorded and used for assessment. The Farmer expert contributes e.g. b. internally the course of the year and "knows" how the plant world develops into shapes and forms Colors transformed. Recognizes the z. B. "Language" of his grain, his pigs, its landscape. Experts use the so-called "Gestalt insight". The shape encompasses more than a fixed form is not exact photocopy. The shape also includes

the potential changes and outliers that lead to that Objects include the transformations within a lifetime (calf to adult cow), within a year or several years, hence the Term "living flow shape". Gestalt knowledge means the expert has the living ones Internal laws recorded, they can recognize it and from it appropriately act. An expert can distinguish between what is part of the process and what are exceptions. The expert view can decide at an early stage based on small signals whether something is right or not. EN GROOT (1946) calls these human ability one Learning process: Learning regulations (rules) and learning of exceptions change away. The expert is capable of this To connect the universal and the existential and develop a meta-program. You can recognize shape define as the (actively produced) understanding of underlying rules: of legality.

**Concept formation: Aha moment and Flash of inspiration**

Conceptual knowledge is enough even further than just adequate to be able to act. There are adequate action, but that cannot be conveyed conceptually to others. A term is a gift from one other world – all at once Understanding there. STEINER (1915) speaks of "thought-intuition". On insights from this supernatural world must you have to be prepared and on they can wait. Parallel to this thinking intuition exists

the action intuition: the unexpectedly successful plot (see below).

Understanding a situation can proceed in stages: some feel something without Having words for whether something is true or not. Others describe their understanding the situation as rich in images Story. The right ones Finding words, grasping the laws, that is one more step: it involves looking through the context of life. This can be figurative for now – expressions are necessary then be interpreted, it can also be essential – man grasps the laws of life internally. This one He calls the cognitive process Phenomenologist HUSSERL “eidetic reduction”, conceptual reduction to that Essentials. DE GROOT describes it (1946) like this: “The Intuition is the art of forgetting”. In other words: the Cognizer captures the “essence or essential”.

### Adequate action or unexpected ones, not planned action

JAWORSKI writes in his book about synchronicity, that the appropriate action always with a real one point in time is connected. Experience experts are in the Location, the “knowing-that”, that Combining “knowing what” and “knowing how”. An adequate action is Expression that the practitioner-expert the situation has seen through, conceptual formation has taken place in action has. Anyone who is an experience expert in the process of experiencing

development, performs actions that he does not planned in advance, but that are nevertheless a correct answer to the current situation. *An expert is connected to the essential and through this he acts correct.* Looking back, in the Reflection he sees the new ones contexts of life he created.

### “Systems that work” and innovations

Prof.Dr.Ir. Niels RÖLING speaks from “the soft side of knowledge” (2002). Experience experts develop their own, cultural truths. In addition to the scientific laws, there are always mental models, conditions and one Context within which a Truth applies. So creates too everyone will be an experience expert own system, that for him functions. Among other things Region, landscape, culture determine how this works Truth looks like. Although this seems subjective, must keep in mind that this is within natural science is no different. There you present results without context and considers them to be objective truths. How little That’s right, you can easily understand based on the development within Animal breeding. Cows are becoming today bred without considering their environment: factors such as feeding quality, pasture quality, climate, etc all standardized. The so on Trimmed for maximum performance Animals are determined by genetics the breeding bulls all over the place distributed around the world. But this is genetic basis so close,



that you can only see the animals through Food with a very high energy density can be kept healthy. In addition, you have to raise the stables to shoulder height Adjust 150cm. Because of the Fixation on performance genetics requires consideration of the environment adjust. All scientific results are available in a socio-economic and in an agro-ecological context, which are usually not communicated.

Practical experiences give suggestions for the science

Every process of developing and searching for a practitioner-expert ends once. The natural scientist is finished when he sees through the laws and can describe mathematically and model-wise. The The search process of an empirical scientist stops, if he finds an adequate solution for himself within his company found a functioning system. When it comes to a complex situation, then you can see that the expert all sorts of subsystems or Innovations developed (after years) the possibility offer to function as a new overall system.

Literature from the author or from the editorial staff