

Knowledge Barriers – Barriers of Knowledge Management

Introduction: The >Case< of the Iron Curtain

Moscow. Winter 1991-1992. Endless masses of people on the streets, all offering different goods for sale. The country's trains full of people transporting all sorts of things from one place to another. Within a few weeks the whole country - from Odessa in the north to Ochotsk in Siberia – was flooded with Western cigarettes, spirits, chocolate, followed closely by electronic equipment and used cars.

Do you remember the days in 1989 to 1992? The world had changed. Granted, a much more dramatic change for the people in the East than the West. Indeed, the changes were probably almost impossible to really understand for those who were not there to experience them for themselves.

The breakdown of the state supply system left people to their own devices and, motivated by the suspension of travel restrictions and bans on earning money and owning property, it did not take long for them to mobilize energies and abilities long thought dead, such as individual initiative, responsibility, ingenuity, fantasy, appetite for learning and business sense. Euphoria was everywhere and it was not until later that society once again split back into two camps, with the successful organizers and enablers in one camp and the losers, victims and silent sufferers in the other.

Dams were burst and barriers broken down, but it would not be long before new barriers took their place, built on the State's need for tax income and the citizens' need for security and order.

Transition: Knowledge Barriers – Barriers of Knowledge Management

I must admit it took me a lot of will power to actually sit down and write this article. In fact, the whole exercise may well be of little actual benefit to me, except perhaps for the narcissistic satisfaction of seeing it published, which does little to compensate my fear that readers might consider me incompetent and stupid.

Lack of fulfillment of motives / expectation of criticism / projection of value judgments as barriers

To make even the slightest sense, an article on knowledge barriers must be concise and to the point, otherwise no one will read it. And, it should contain recipes for removing barriers, otherwise it has missed its point.

Anticipation of alien behaviour / stereotypes as barrier

I did not want to write a psychological scientific paper, since I don't think that is sufficient and the concept doesn't correspond to my >view of things<. On the other hand, it would be wrong to limit the discussion to the technical aspects of knowledge transfer (coding, archiving, transferring).

My own view of things / knowledge / identity that I do not want to give up as barrier

Perhaps I did not look hard enough, but I was unable to find any suitable literature to help me bring some sort of order into the many faces of this complicated subject matter.

Lack of orientation / support materials as barrier

But despite all the above, I was still tempted to see how far I could get and curious about what lies behind this issue. But given the short amount of time available, the predefined framework and the limited reference points, there is no way it can work. A seemingly futile battle against >barriers< I don't even know that what I think they are.

General framework and problem as barrier; challenge / stimulus

I am sure I am not wrong in assuming the following statements and arguments are not new to those readers who are well versed in knowledge management:

"Inflexible working methods and hours, regulations, multi-level reporting / decision-making hierarchies and comprehensive rule books obstruct flexible action and thought on the employee's part and thus the innovation of enterprises... " WM 2/2000 / P.42

"Employees, who do not share their knowledge with co-workers fear... they are giving up a bit of security by disclosing their knowledge and experience. They harbor the fear of becoming replaceable and thus... dispensable to the company if they make their expert knowledge "public"... The conventional form of corporate organization with a "top-to-bottom" hierarchy, chains of command and the competition the system forces both between co-workers and departments and

branches is like "single combat". Everyone keeps their knowledge to themselves and regards it as their own personal capital, capital from which they and no-one else will profit." ("WM in mittelständischen Unternehmen")

All the convincing statements and claims intended to make Management and staff change their way of thinking (altruism, understanding, far-reaching view) can be summarized in the following >must haves<: positive corporate culture, level hierarchies, flexible structures, reduction in fears, change in behavioral and thought patterns, creation of trust through transparency and fairness, motivation through incentive systems, toleration of non-conformity, stimulation to open-minded thought, creation of freedom-space, availability of information technologies.

Apart from the fact that these are all >introversions< (view on the internal / inside) and obstruct wider-reaching approaches (regional developments, global networking, ESC, CRM, EERM etc.), what worries me about all these claims is that they demand unconditional agreement. Anyone who objects to one or more of them is likely to be labeled an affirmative opponent of advance or a stickler for >law and order<.

But I object nonetheless and maintain they are wrong, because they are too superficial, inexact, and monotone and cover themselves through vague demands for cultural changes.

I maintain that barriers are not only "subjective" (in our heads / minds or over our heads in >culture<), but also always "objective" (objects / >hard fact< boundaries / resistance that can be created, processed, overcome and destroyed).

Furthermore, barriers are ambivalent. They can be either enabling or impeding, depending on the point of view you see them from and which side you stand on.

Barriers are set up to stabilize, regulate, channel, stem, safeguard and distance something. Or in other words, barriers are *for* and *against* something.

Usually, barriers are something you come up against and see as obstacles to be overcome.

Trade barriers: What is beneficial to one party is a thorn in the flesh to another. Migration

barriers: The protection of one person's living space creates an exclusion zone for another.

Legal barriers: The protection of one person's rights restricts another person's freedom.

Behavioral barriers, change barriers, thought barriers, knowledge barriers. We are surrounded by barriers, we live in a world of barriers and, or so it would seem, cannot survive without them. Yet our behavior towards barriers has changed. Our values have changed. Breaking down fences, iron curtains, walls, borders, dissolution of prohibitions / taboos, overcoming restrictions, ignoring finiteness is good. Globalization, liberalism, pluralism, deregulation as the rule. Freedom of movement as the standard. Is this our reaction to a regulated world?

We don't build barriers to establish a lasting, social, economic, political, universal, moral, divine order. We build them as provisional steps on the road to a global civilization in which barriers are the markers for the >not yet<.

Thanks to modern traffic and information technology, some of the largest barriers (at least) have disappeared. They have been automated and pushed into the background. They have become invisible as mathematical formulae, rational thought patterns and social behavior patterns. They seem to be gone with one shove and pushed into the interior.

The rest is a question of technological viability / practicability (e.g. blasting a mountain to build a motorway).

I think these claims are quite plausible and should not cause a great deal of shaking of heads.

Phenomenology of Barriers

Barrier 1: Why I do (not) read short articles. (The space for thought)



My desk and bookcase are piled high with books, discussion papers, articles and studies on all manner of KM and IT issues. When I first started researching this subject, I highlighted everything I thought to be useful, statements confirming my opinions and views, things I disagreed with. But, as time went on, I gave up, read nothing but the titles and really only gathered material to keep my collection up-to-date.

There was never anything new or challenging or provocative. Nothing that could be added or taken away. The arguments and phrasing was always the same. A collection of common places and generalizations to reinforce the prejudices that had prompted the writing and collecting of the texts in the first place. Even the structure and form was always more or less the same. Like polished, shiny, new billiard balls. So boring you could cry. How much of consequence can be said in two or three pages?

Yet it would appear that people only read short articles. In fact, it would probably be even better if the message were summarized in one-easy-to-remember-sentence. Then you could keep it in your pocket like a penknife and pull it out when you needed it. "Knowledge is the only resource that grows through being shared." Why read a whole book if the author could have got his >message< across with one short phrase. Then, of course, there is the pressure to conform. No article is complete without the current terminology and buzz words, the naming of names and the >what's-in-it-for-me-arguments<. Master the jargon and you will belong! Or, small talk as confirmation and affirmation of the status quo of collective prejudices.

Statements like "open-minded thinkers often have the best ideas" are of no consequence, since the pressure for harmonization prevents people from stepping outside their given roles, open-minded thinking is definitely not a defined role and the role player cannot be given a >nest< as free space. Very few of the very big American enterprises entertain >court jesters<.



After the fall of the Iron Curtain, scientists in the former Soviet republics tried to break out of decades of isolation. Travel restrictions were lifted slowly but surely and sponsoring helped with financial barriers but other hurdles appeared in their place.

They could not follow or understand interesting presentations at international congresses and their own reports were not understood because of their limited knowledge of English. They could not get their articles accepted for publication in Western scientific journals because of grave stylistic and formalistic errors. Their research results were strongly condemned for insulting Western moral values (in one such case, a neuro-surgeon reported that in the course of his experiments he had removed the roof of the skull of an otherwise healthy subject to carry out tests on an open brain. He was booed from the platform and out of the lecture room and restricted himself to >sight-seeing< activities for the rest of the conference).

Other results were ignored because they did not fit the scientific community's >common sense<.

Interim balance: What is positive about the >hardening< of knowledge?

Standards (norms and contents / institutionalized knowledge)

| | | |
|------------------------------|---|--------------------------------------|
| ensure comprehensibility | ↔ | complicate necessary differentiation |
| allow joint action | ↔ | impede non-conformity |
| support group identification | ↔ | suppress creative conflicts |
| offer decision security | ↔ | restrict experiment / risk-seeking |
| strengthen confidence | ↔ | weaken curiosity |
| create order | ↔ | reduce flexibility and openness |
| promote consensus | ↔ | restrict objections |
| allow tradition building | ↔ | narrow gaining of new knowledge |

Barrier 2: Why I do (not) use a title. (The social sphere)



The staff of a Western company in Moscow demanded that their >boss< define their titles, position and competencies (power). He came back with the argument: "We're a team. We all have to roll up our sleeves and help each other get on with the job. We don't need a command structure and medals like in Soviet times!" Six months later, everyone had a title, position and role (and not just on their business cards).

Perhaps they were both right. A congressman can't discuss political matters with any Tom, Dick or Harry, a minister will not sign a contract with a nobody and the owner of an expensive automobile won't have it repaired by anybody who claims to be a mechanic. However, the appeal for team spirit was only >half-true< and wouldn't work the other way round.



For quite some time, I have been participating in a so-called >virtual< discussion forum. This international forum is open to anyone interested in its strictly limited subject matter, who sticks to the rules of the game and participates with >good manners<. Each discussion item starts with a short address (everyone in the forum is addressed by their first name) and a few friendly words. Everyone appears very collegial, open and egalitarian. Then they get down to the nitty-gritty. No-one is sparse with their knowledge. In fact the situation is quite the reverse. Items are closed with address and personal details (e.g. "Professor at the Institute of ... at the University of ..." or "Head of Department and CKO since ... at ..."). And of course, the message texts also include plenty of references to their own publications (if applicable...).

I followed this forum with interest and, after a few months, I noticed that >newcomers< or >no-names< increasingly only asked subordinate questions (and did not deliver input of their own) which were then answered by the same >experts<, with all the pomp and circumstance of the self-proclaimed master. It did not take long before the experts started to have >loud< arguments and battles for position. Some even went as far as to include insulting comments. When appeals by the forum moderators to keep postings fair and to the point were largely ignored, some participants were excluded from the forum and it gradually disintegrated into nothing more than a boring insider circle.

Interim balance: What's wrong with a >characterless man <?

Specification and objectivation of behavioral options and expectations
(organizational structure / social structure / laws, duties / responsibilities)

| | | |
|---|---|--|
| relieve decision / selection pressure | ↔ | cause lethargy / laziness / nest building |
| enable selective information processing | ↔ | favor expert idiots / narrow-mindedness |
| support work-sharing co-operations | ↔ | handicap free run of powers |
| offer orientation support | ↔ | force conformity and subordination |
| strengthen / establish individual identity | ↔ | reduce readiness to change |
| create clarity in social relationships | ↔ | suppress individual specialty |
| promote expectability of behavior preferences | ↔ | limit behavior to stereotype interaction patterns |
| allow classification of learning histories | ↔ | push non-classified learning content in the background |

To make a name for oneself, orientate oneself and find one's position within a social environment: expectations, behavioral options, control of social interaction

Barrier 3: Why I (don't) like to do everything myself. (The action sphere)



Two school friends founded a company and agreed to split management tasks according to their interests. One was to be responsible for representational, administrative and financial tasks, while the other followed his interest in operational matters and the development of innovative solutions. The company grew quickly thanks to an innovative niche product, optimal management work-sharing and motivated, talented co-workers. However, as the years passed, tension and conflict grew between the managing directors. The >administrator< was angry with the >innovator< because he was always late, increasingly sloppy and generally wandered around with his head in the clouds, while his partner was left to run the business and was permanently overworked. The >innovator< felt his partner was increasingly bureaucratic, did not recognize his achievements and that he was generally misunderstood by everyone. He invested all his energy in thinking up more and more new ideas, yet took less and less interest in turning them into mature marketable products. He stuck his nose into everything, yet never finished anything. They both suffered enormously and felt chained to each other. The negative management situation also began to affect the staff. The fish began to rot. Complementary negative amplification as learning barrier.



Heinz began his career as a service engineer for an Italian manufacturer of ultra scan equipment. He went to night school to improve his medical knowledge and soon moved into the customer training department. He was later promoted to Sales Manager and then appointed head of the company's German subsidiary. At the age of fifty, when the German office was closed down as a result of rationalization measures, he was faced with the choice of using his experience and knowledge to open up a new subsidiary in China or of retraining in a completely different product field. He tried to find a new job with the competition, but the answers were always the same: there were no vacancies or he was either too old or overqualified. He was not yet old enough to retire, but felt he was too tired for retraining or another international move (he had just survived a heart attack) and he was too good to accept a lesser position in any old company. (Who in his position would not have been proud of his career history, unwilling to give up his management role and imprisoned by his knowledge and expertise?)

Interim balance: Why is it (not) good to be specialized?

Lifelong specification of knowledge areas
(training courses / learning histories / role profiles / role definitions)

| | | |
|---|---|--|
| ensures professionalism and guarantees competence | ↔ | leads to operational blindness and know-all manner |
| allows bundling and concentration of forces / resources | ↔ | narrows view of learning potential (alternative knowledge spheres) |
| allows efficient use of available learning time | ↔ | complicates general training and balanced realization of interests |
| promotes social/professional career building | ↔ | leads career down a one-way street |
| strengthens identity and self-confidence | ↔ | contains the danger of high-handedness |
| ensures >employability< | ↔ | endangers >employability< |
| increases chance of new knowledge generation (research) | ↔ | leads to simplification and generalization |
| promotes connectability to related knowledge domains | ↔ | increases possibility of >not being understood< (isolation) |

Barrier 4: Why I am (never) content. (The psychological sphere)



When the time came to >pass over command< at a family confectionary, the old boss's personal assistant was given the role of training new administrative staff. She had been his >right hand< for many years, had dominated (monopolized) all important information channels and made sure that everyone knew nothing was possible without her. She really was indispensable to the business. She treated her potential replacements like slaves and used any means to defend her >territory<. The old boss refused to make her redundant, so junior tried to motivate her and make the new changes seem attractive. "The mentor role will mean much less work, you can choose your own staff and will get a bonus!" When even these efforts failed, the junior boss chose to play the >waiting game<, gradually passed on her responsibilities to others and let her position die out. This open war lasted over a year and ended with the PA leaving and her valuable knowledge (and other things) lost to the organization forever.



A successful, experienced Regional Sales Manager in an international company was promoted to >International Sales Director<. He moved to HQ, bringing an ambitious and hard-working >prodigy< with him, and then concentrated increasingly on coordinating R&D, Production and Sales. He was seen as an integrative personality and a competent authority. Growth in Sales reinforced his position of power and a financial share in success (incentives) provided additional motivation. A change in corporate management led to a series of strategic decisions that he considered >shortsighted< (wrong). In the resultant power struggle, the >prodigy< sided with new management, intrigue and selective dissemination of information split the staff into two camps (yes-men, conformists / critics, fighters) and the Sales Director was pushed to one side. The solidarity of the fighters with the loser led to an informal >alehouse public<, where critical points of view were discussed, ideas and projects born and problem-solving suggestions discussed. But this >intellectual potential< was no longer turned into >formal procedures< and used to benefit day-to-day work (boycott/passive resistance). The new management became more and more occupied with glossing things over and blamed sales losses on >old management< (who had gone to the competition as a result of the new corporate culture). Our Sales Director was seen as a money-grabbing, power-hungry schemer.

Interim balance: How greedy are we as "needs / desire maximization beings"?

Standardizing and fixing of creation, substitution and satisfaction of needs
(social security, standard of living, consumer protection, property law, salary scales, luxury goods)

| | | |
|---|---|---|
| free from paralyzing fears for survival promise security for future survival | ↔ | lead to lethargy / laziness / cementing of previous achievements (pragmatism) |
| regulate/channel >never-have-enough< vs. >always-want-more< syndrome | ↔ | cause power games / position and territory struggles |
| stabilize social dynamics | ↔ | lead to freezing of the social system |
| allow exchange / substitution of primary and secondary interests | ↔ | hide a danger of openness to blackmail (institutionalized conflicts of interests) |
| allow time for >non-critical activities< (games, sport, art, luxury, leisure) | ↔ | allow unproductive games / hedonistic attitude to life |
| create room for reflection | ↔ | reduce decision-making action-seeking |
| reinforce calm, considered action | ↔ | weaken proactive problem-solving behavior |

Fear of and need for security as experience of the finiteness of resources and human life. The Sloterdijk view of the European as needs/desire maximization machine. What are the modern pantries, intellectual freezers and wine cellars that are defended at all cost?

Barrier 5: Why I (don't) like French garden(s). (The objective, technical, artificial space)

The old university building in a Japanese city center was to be demolished and replaced by a new building in a park outside the city. Teaching and administrative staff were invited to take part in a survey and make planning suggestions. They visited national and international universities to collect ideas. Then the Board decided that the status quo must be determined and argued that no-one should have less (space) in the new building than they had at the moment. So all the rooms were measured and allocated to names and functions. The problem was that the status quo was not the result of careful planning. It had just grown at random over the years or resulted from (social/institutional) hierarchies/power relationships. Long-serving colleagues had wangled themselves the largest, best rooms and younger lecturers had to make do with smaller, shabby rooms. One of the younger staff members suggested that they develop a joint concept based on teaching and research requirements in order to determine the optimal functional division of the total floor space proposed by the Ministry. After two years of bickering, they reached a compromise that neither provided a concept for the future nor satisfied individual claims and requirements. The proposal was rejected and the matter resolved by an external commission. The frustration was never-ending.

In the 1950s, the KGB requisitioned a complex in a St. Petersburg clinic (like many other cities) for a secret research laboratory. Walls were moved, windows bricked up, concrete underground corridors and secure chambers built, pipes moved and huge machines and equipment installed. Everything was done to adapt the building for strict isolation and secret research. >Research< was done for a few years until the equipment was outdated and useless. A laptop could now do the work of the huge computer center more quickly and efficiently. The steel monsters were just scrap metal and the endless rows of filing cabinets collected dust. In the 1990s, the rundown complex was officially given back to the clinic, which desperately needed more space, but didn't have the funds to adapt or demolish it. The time consuming and costly demolition work was sponsored by a western pharmaceutical company (with ulterior motives) and a new building financed using money intended to help with the clean up after the Chernobyl disaster. A great deal of effort was put into opening of a new, modern research center (for Chernobyl victims). The center is still there today, has never treated a single victim and is now awaiting adaptation for new functions.

Interim balance: Why do we build houses for eternity?

Objectivation/reification of living standards, communication forms, social relationships (buildings, sites, installations, infrastructure, furnishings, machines, equipment, tools, border ramparts, workflow, IT implementations)

| | | |
|--|---|---|
| retain tried and tested ways of living / working / communicating | ↔ | restrict modification and adaptation to changed requirements |
| stabilize living / working / communication requirements | ↔ | freeze status quo at a previous, functioning level |
| offer security in action option selection | ↔ | restrict view of possible action options |
| allow routine / automation / mechanization (lessen burden) | ↔ | lead to >don't think about it any more< and accept the >actual situation< |
| require comparability / measurability / controllability of processes | ↔ | tempt towards schematic / mechanistic thinking |
| ensure future retention of quality standards | ↔ | suppress individual evaluation / responsibility |
| avoid >reinventing the wheel< and allow advance | ↔ | handicap creative open-minded thinking and determine the direction of advance |
| form prerequisite for concentration on actual contents / processes | ↔ | influence contents/processes negatively by coercion to standardization |

The "wonderful new worlds" planned by Hitler, Stalin, Ceausescu etc. with their social-political orders forged in steel concrete failed even to become tourist attractions like their predecessors, the medieval castles or feudal palaces.

Barrier 6: Why I (don't) know what I should think. (The space for images and thought patterns)

As a young boy I was fascinated with science fiction and technology and this led to numerous arguments with my grandfather because I stubbornly insisted that the world had not been built in seven days and that rockets would soon be flying into space. The local priest was called in to convince me of the error of my thoughts and cure my spiritual confusion. When even his efforts failed, I was told to say some "Lord's Prayer" as a penance and the insulting material was thrown on the fire. After that, I restricted any such discussions to my friends, but that was much less fun as I was >preaching to the converted<.



A young, dynamic employee had worked his way up the career ladder with a confident, determined approach. As a rookie top manager, he visited his company's sales partner in Asia. The partner found him to be arrogant, over-the-top, condescending and power-crazy. But the rookie was delighted to be invited to join him at the signing of a large, new customer contract. He was introduced to the Board of Directors and, unfortunately, could not refrain from demonstrating how (in his opinion) business was done in the West. "We are the market leader. We are the largest company. We have the best product" He then shook the Directors by the hand, saying: "We want to make you successful!" and for good measure "...in a mutually beneficial cooperation". The Chinese sales partner was left with the almost impossible task of rescuing the deal and getting the contract signed. It would probably have been better if he had just said: "We want your money!" (in the opinion of the sales partner).

Interim balance: Who says there are (no) Gods in heaven?

Compression of experience with models

(generalizations / thought patterns / mental models / metaphors, paradigms, histories, action instructions)

| | | |
|--|---|---|
| allows situation to be understood and relationships recognized | ↔ | leads to prejudice / false conclusions / inappropriate generalizations |
| allows a reduction in complexity / compression of knowledge | ↔ | suppresses the fine differences and differentiated points of view |
| offers action orientation in social / natural environments | ↔ | hides the danger of acting blind to reality and being biased |
| supports fast communication | ↔ | blocks differentiated argument |
| promotes emotional participation and value-oriented action | ↔ | complicates factual conflict solving, leads to valuing, emotional statements |
| makes identification with others within communities easier | ↔ | simplifies ideology building and forming of conspiratory views of the world communities |
| allows substitution through signs, symbols and codes | ↔ | leads to manipulative use of models (symbolic force) |
| favors tradition building | ↔ | leads to inability to find contact through loss of experience base |

I question the point and benefit of only studying >best practice< success stories (as is the current trend) as I think these are no more than >marketing< trumpet blowing. In my opinion, it might be better to study >worst practices< since they encourage analytical thought and it is common knowledge that we can learn more from our mistakes.

"Is there anything good in being banned from paradise? Well, you are free to consciously do what you know to be wrong, unknowingly make mistakes and then choose whether to learn from these mistakes or not."

Barrier Theory

- a) The **finiteness of resources and life** (time / space / energy /..) as limitations and restrictions of target-oriented (individual, social, economic) action are seen as basic conditions of human life.

These (objective) limitations

- form the challenge and compulsion to constantly generate new knowledge, where knowledge serves to preserve and maximize chances in life (action and communication possibilities).
- are not the objects of optimization strategies for knowledge production and transfer (knowledge management). They are >life tasks<, which knowledge serves to overcome.
- influence knowledge production through their stimulating effect on knowledge production. This is why strategic use is often made of artificially created shortages and limitations to provoke increases in performance /productivity. (invention out of necessity).
- can influence knowledge production by having a laming effect on the socialization (transfer / share / renewal) of knowledge if they are felt to be a threat and trigger off contra-productive reactions (defense against potential threats to existence / fear / jealousy / greed / aggression / hoarding / hiding away)
- could be the indirect subject (object) of optimization strategies if there is no credible reason for defensive reactions, i.e. they are interpreted by external observers to be irrational.

Consequently, optimization strategies must explain the causes of defensive phenomena and uncover the (deliberate) irrationality of this way of behavior.

What is behind all this?

If the experience of imperfection in living conditions (finiteness of lifetime and limitedness of resources) is expressed in the development of interests and needs (i.e. one is a correlation of the other), then defensive and short-sighted egoistic ways of behaving can (usually) be traced back to conflicts of interest and in particular to:

- direct conflicts of interest as incompatibility of primary interests if they cannot be prioritized properly (want to be loved >< want to assert oneself / exercise force). Repression, suppression or substitution with other interests don't resolve the conflict (results in so-called >sham existences<)
- indirect conflicts of interests as incompatibility of primary and secondary interests (fictitious interests), when secondary interests (e.g. desire for money) overshadow the underlying primary interests and so cannot be prioritized properly. Fictitious satisfaction of interests / needs leads into the spiral of forced behavior (so-called >obsession<)
- Conflicts of interest between personal and other interests that have no connection to personal interests and so cannot be dealt with (incommunicable interests lead to a breakdown in communications or war).

Interests and needs do not need to be dealt with rationally (articulated, reflected, prioritized, calibrated) if they can be realized ad hoc / ad libidum by actions (you eat when you want to eat and go on holiday when you need a rest), but this is only partly possible in a social environment (society, organization). To harmonize the numerous, different interests within groups, behavior (routines) is trained through learning histories (trial and error) and expectations (projections) established (corporate culture / good manners / behavior / tradition).

Intervention into the >blind< struggle of diverging interests within a group assumes that to work on acute conflicts of interest (crises), the interests themselves must first be recognized, named, analyzed and evaluated before similarities and incompatibilities can be determined and act as the subject of a constructive discussion.

This is not as easy as it might sound, since agreement must first be reached on

- what can be included in each classification (e.g. does the interest "I want to be myself" or in value terms "self-realization" also include a concrete self-realization issue in a particular situation?)

- what are considered "good" and "bad" interests / needs (judgement). ("I want to be stronger" (domination), "I want to have more" (egoism/ownership needs)

Classification of interests and needs is thus always synonymous with the stylizing, generalization and standardization of content peculiarities (creation of comparability through suppression of actual differences).

Judgement (evaluation) is synonymous with the generalization of >I want / can / should / must< into >one wants / should / can / must< or >we want / should / must< in the sense of >wanting what is good and avoiding what is bad<.

Weighting of interests / needs (creating hierarchies: this is important, less important or not important to me now) as a negotiating requirement presumes classification and judgement has already taken place.

The importance, difficulties and complications of such an undertaking for knowledge management initiatives (organizational / personal / regional development / group dynamics / family therapy, etc.) are illustrated in an article by Brian B. Hall in the Journal of Knowledge Management (Vol 5. No. 1, 2001) entitled "Values Development and Learning Organizations". He talks about 125 values that are effective in the steering of communication and interaction processes (in organizations). They form the basis for a prolonged investigation and evaluation procedure, which aims to develop a corporate culture open to learning (creative relationships that leverage knowledge creation and innovation).

But the elaboration and harmonization of interest profiles and value maps alone is not enough. Whilst classification, evaluation and weighting offer orientation guidelines and establish relative stability in social relationships, as specifications, they are also a (societal) disciplinary instrument and barrier to the development of individual constellations of interest (legally secured ownership as >objective< specification / fixation of realization of interests).

- b) **Specification / fixation of distinctions and decisions** (validity of selection outside the actual situation / agreements, rules, conventions, standards, methods, knowledge systems, terms, language) as a limitation and obstruction of flexible, creative (individual, social, economic) action is considered a basic condition of (ordered) human co-existence.

These (civilisatory, normative) obstructions / boundaries

- form the backbone of the social space where individual learning, decision and action is located and provide it with support (expectability, comparability, communicability). They form the building blocks for the development of rational social systems (society and organizational structure, legal and knowledge systems) by coding facts, relationships and processes and setting them in a (cultural-specific) relationship to one another.
- are the object of optimization strategies in knowledge production and transfer (knowledge management) to the extent that specifications of selection form normative borders between relevant, non-relevant knowledge and ignorance (or deed / atrocity) and collectively limit learning space. (We have agreed not to regard one or other possible subjects, questions and problem areas as object of our attention, thus not building up any specific knowledge on this).
- influence knowledge production to the extent that they exclude individual learning in non-selected areas and suppress curiosity and >open-minded thinking<. However, rigid standardization (excluded potential knowledge as taboo) can also have the opposite effect and become a temptation to >cross the border <.
- influence knowledge production to the extent that they allow the building of tradition (generic establishment of knowledge systems) and advance. However, since fixed selection should per definition and purpose be irreversible, every decision will determine future processes and be restricted by previous decisions. Advance as a direct, one-way street that can only be broken down by a crisis.

- are the indirect subjects (objects) of optimization strategies (knowledge management) when the chain of decisions blocks the future, because development only takes place as an increase in consistency within the current selection status. (Creativity as new /re-combination of available knowledge elements; >mathematization< of the world)

Selection specification / fixation is only possible if >powers of recollection< exist, either as:

- discursive harmonized individual memories well-suited to each other ("I would like to remind you that ...", "You said that ...", "Please remember that ..."), or
- circulating, oral stories of perceived actual facts, experienced events and experienced action sequences. ("He founded the company then ...", "The order situation was satisfactory ...", "Research results are ..."), or
- symbolic objects in which selections are recorded / embedded / reified (documents, notes).

Whilst the power of recollection ensures the temporary existence of stipulations, it needs its own controlling and sanctioning instruments to guarantee inter-subjective validity.

To guarantee the obligingness of selection fixations, adherence / following / application of these specifications must be linked back to individual interests and needs. These links can be either >positive< and motivating (rewards) or >negative< , such as the threat of exclusion / withdrawal of social acceptance / rejection of fulfillment of mutual needs. ("You have no idea!", "That's not what we agreed!", "We don't care what you think!", "Tell that to your grandmother!", "Why do you always have to be different!", "We'll see!", etc.)

However, since the obligations of selection fixation must (always) be bound to validity conditions, these must be the constant subject of discussion. It is not possible (either in science or in social actions) to define conditions (the validity of distinctions / decisions) once and for all and for all possible cases.

(Only religious, ideological specifications (models) allow no room for the interpretation of obligation, validity and valency. Absolute >truths< are always >totalitarian.<)

Therefore, a rational negotiation of the obligations and validity (who must / should adhere to it and in which situation) of selection specifications in the knowledge field (as action orientation) and with regard to behavioral options is not possible if

- it is bound by general (absolute) values (community of western values, Christian and other religious views of the world, scientific view of the world), thus blurring its conventional character (agreements), or
- it is not objectivised (documented) and cannot be reflected upon, or
- it refers to a standardized, technical and artificial object world (e.g. a world in which there is no room for discussion on when "gold" is "gold" or "a meter" is "a meter" or not, yet a red traffic light does not necessarily mean >stop< in all situations.)

Intervention in the sense of an evolutionary change in selection fixation occurs in (nearly) all conversational situations. This is the aim and purpose of conversations (discussions, negotiations, arguments).

Information technology (IT as objectivised selection specification) can support intervention but, per definition, not fulfill / perform it.

Because of their inner logic, selection fixation spread like infections. What has been specified, determined and stabilized must be brought into a fixed relationship with other factors, which of course means that this >the other< must also be defined.

If something cannot be defined (in immanent criteria), it will be excluded and either treated as a heterogeneous system or evaluated as >sick thought<.

The increase in the inner consistency of closed knowledge / action systems can lead to a loss (decrease) in ability to link to other systems, for if all questions can be answered explicitly in a >community of knowledge / practice<, then this means that all contingencies were banned to the outside.

Knowledge managements interventions must therefore try to show / point out the necessities (requirements) for redefining fixations for the particular >community< and determine possible/necessary areas and limits for a relaxation / softening of (normative) fixations.

However, this is no easy task, because in order to do so, agreement must first be reached on

- why it is necessary to check out the suitability of rigid stipulations (e.g. why should the producers of nuclear power integrate religious, philosophical or ecological arguments in their knowledge domains?),
- what should be considered >true< breaking of fixations and what is just pretence (The integration of neurobiological considerations in IT knowledge systems (cybernetics) could also be carried out in such a way that somebody simply sees everything with >cybernetic< , mathematical-technical eyes).

Knowledge management strategies usually (and with good reason) concentrate more on the creation of consistencies within knowledge domains because terminology, standards and rules are too vague on obligation and validity to make a clear differentiation possible and at the same time avoid misunderstanding and decision insecurity.

The importance, difficulty and complications posed by the difficult problems of the function of selection specifications (fixation) and the identification of quasi-specification requirements (formalization, calibration >< dynamization, openness) to knowledge management initiatives is illustrated by the countless theoretical attempts to try to define, categorize and systemize "knowledge", "information" or "content / context". In >knowledge management practice<, a significant number of papers have been published on the subjects of "search/retrieval", "knowledge linking" or ISO, BSC and QM implementations, etc.

This is illustrated in current battles in the "knowledge management" knowledge domain, where the advocates of open creativity are fighting the attempts of the certification communities to standardize terminology, methods and practices. In the German-speaking world, standards are currently set by a handful of "experts" and institutions without questioning.

- c) The **objectivation (reification) of knowledge and action in artefacts** (manipulated natural / cultural goods / buildings / infrastructure / technology / documents / books / grammars / dictionaries / sign systems / databases / symbolic objects / institutions) as a limitation and restriction of chaotic (yet evolutionary) change processes is seen as a basic condition of human civilization and cultural history.

These (materially artificial) restrictions / manifestations

- form the collective memory in object form by being simultaneously processed (manually) as material object worlds and interpreted as symbolic-sign substitutes. They represent and reference not only decisions, actions, experiences, stipulations and knowledge but also force their >form< on thought and action,
- restrict the openness and randomness of differentiation, decision and action. Thoughts can be forgotten or thought again/differently. The spoken word can be interpreted or disputed in one way or another. But if something has been recorded or written down etc. it cannot be (easily) disputed (e.g. a signature on a contract / traffic network plans / police equipment / prisons) and can only be used, adapted or destroyed,
- are the primary and most important approach of optimization strategies, because the material manifestations of selection prevent people from making (any) changes to them. (Limitations only then oppose change / interpretation if they are worked into the form of >fences< and walls. Discussions / negotiations are only possible when weapons have been surrendered and uniforms removed. When you wear >armor<, your movement is restricted by its limitations).

Intervention in the sense of decomposition / destruction of objective fixations (material structures) is not possible without a great deal of work and resources in form of time, money and energy (e.g. the destruction of the Buddha statues by the Taliban and terrorist attacks on the Pentagon / World Trade Center.) These acts are not only extremely effective, they are also very

dangerous. The results are unpredictable because these are not just material artefacts but symbolic representations / images of knowledge, action and social systems (assuming we consider them to be more than relicts / museum exhibits, i.e. as active, valid and required >reifakta< for a culture.)

However, the reason behind the unpredictability of the (negative) results of interventions (destruction) lies in the fact that, in many cases, it does not seem possible to provide a precise description of the representative function of artefacts. It might well be obvious that they form permanent manifestation of individual / social decision and action (and thus the consensually determined spectrum of action / learning options and so the preferences or prioritization / evaluation of interests and needs), but, in individual cases, it is not possible to determine everything they actually represent. (If someone deliberately vandalizes a car, its owner might become aggressive and depressive, because the car meant more to him than just a means of transport and was a >status symbol< / a >cult object< or an extension of his >personality<.)

Therefore, knowledge management intervention must try to discover the function of symbolic artefacts (trophies, awards, titles, certificates, books, ownerships, money, tools, rooms, establishments, etc.) by creating an >experimental< framework to observe / reflect / analyze any changes in behavior or ways of thinking when these are put >out of action<. What happens if the participants in a meeting don't wear ties, suits and company pins? What are the structural or regulatory functions of a meeting agenda, the type of presentation media chosen, etc. ?

Not an easy task, since the determining artefacts are usually not found on site. They are somewhere other than in the current meeting room (e.g. the millions in the bank / the luxury apartment in the city center / the entry in the Companies Register / the diploma on the living room wall / the Mercedes in the garage etc.) and act from a distance as known, remembered abutments of selection, thus influencing communication and learning behavior.

This is compounded by the fact that each individuals >body< is also an artefact which is continuously processed through practice and training (conditioning), thus strengthening successive selection preferences and suppressing other possibilities.

Processing of Barriers

The personal experiences described in the first section do not provide a clear answer to the question of where the actual >barriers< or causes for failure as a result of "irrational" thought and action lie.

In all cases, the insight or far-sightedness (or lack of them) play as important a role as the psychological, social, cultural, information technological and objective factors.

Therefore, it seems neither possible nor rational to separate learning and knowledge barriers from organizational, structural and objective barriers to the extent that we can say: "This is just a psycho-emotional problem", "This is just an organizational structure problem" or "This is just a technical or information technology problem.

Of course, there are some problems (obstacles) that can be solved by a practical, technical solution, but these only play a marginal role in the knowledge creation and transfer processes.

Whilst technical solutions are available for overcoming time and space distances, information technology cannot be described as a purely technical issue, since aesthetics (design), semantics (comprehension of meaning) and pragmatics (action and behavioral expectations) also play a role and, above all, IT cannot solve the problem of (contra-productive) fixations.

Furthermore, closer examination reveals that almost all barriers are ambivalent and it is not able to say whether or not they are totally irrational, stupid or bad.

So how can the negative effects of change-, action-, communication- and learning barriers be dealt with in a pragmatic way?

I don't think that the general solutions proposed by the majority of concepts for re-engineering / re-education, motivation and KM tools are going to get us very far.

If knowledge (in its broadest sense) serves to overcome the challenges of life, then we must look more closely at where these challenges lie, what >type< of knowledge could be useful and then at the typical hurdles and difficulties that could be encountered in the process.

I would suggest a rough classification of possible >knowledge environments< in which >knowledge< plays a specific, describable function in the system-environment relationship.

A stable or stabilized technical artificial environment (e.g. a mechanical production process) leaves little room for flexibility, creativity, intuition, interpretation or emotions and value concepts. Here, applied knowledge is characterized by rigid standardization / objectivation (terms, measurements, procedures, methods) and is tied to a specific inventory of artefacts applicable to the technology in question.

In this case, the possible problems (barriers) are totally different to those that might be faced in a complex environment of social relationships (management, customer support, marketing, organizational development).

For a particular, current knowledge environment we must differentiate above all between:

- the >objects< to be processed (what is worked and negotiated upon), and
- the enabling, regulating structures / tools (objectivations)

Obviously, the way something was made in the past (whether successfully or not) will have found its place and will materialize in plants, equipment, infrastructures and other (objective) specifications / fixations (rights, duties, regulations, laws, organizational structures, workflow, etc.). However, experience shows it would be wrong to assume that the supporting material (created conditions / structures) are always being used / applied correctly and the knowledge incorporated in them can be successfully applied to analogous object-processing-challenges.

The following attempt to characterize and classify knowledge environments with respect to the degree of stability or instability cannot be reduced to a differentiation between technical, social and natural environments, but it is possible to say technical environments are characterized more by stability and social environments more by instability.

It is the actual focus, i.e. what is to be described as the knowledge environment (function) that establishes a suitable characterization. The repair work on a defective automobile engine can be described as a >stable< knowledge environment as it is unlikely to produce any great surprises, provided of course that the mechanic has accumulated the appropriate level of knowledge for the task.

However, the participants in a two-hour employee training course will find themselves in a partly stable , partly instable environment.

If the object to be processed is the "transfer of standardized knowledge" in a standardized, regulated form and if the objective conditions (room, equipment, infrastructure, materials, etc.) have been specified, the result will be a predominantly stable environment unless psychological, group dynamics, external issues or political factors come into play. Of course, preventative measures can be taken to avoid this situation occurring.

In the project planning phase of a long-term product development project in which other tasks and factors than just resolving technical, financial or deadline issues play a decisive role, the project leader could just as easily see the situation as relatively >stable< or as >open<. If he sees himself faced with a stable >situation<, he will transfer project experience and knowledge one-to-one from previous projects and, in doing so, will either fail or will force stabilization on the new >knowledge environment<.

Conversely, we would not describe the setting up of a business, a customer support department or of international / organizational cooperation cycles as exclusively open, dynamic knowledge environments since standardized expert knowledge plays a relatively big role in overcoming these situations.

This is why I assume that the type of environment (knowledge application situation / learning situation) says something about the type of knowledge (to be used / gained) and vice versa.

The following >matrix< should illustrate this >analogy< and allow us to come to some conclusions on particular >knowledge barriers<.

| | A | B | C | D | E |
|--|---|--|---|---|---|
| Characteristics of the knowledge environment (situation) | stable stabilized regulated linear | non-linear differentiated inhomogeneous divergent | open not sure changeable complicated | complex dynamic not rational organic | paradoxical chaotic irrational |
| Typical examples (Cases) | technical production, technical service, engineering, automated processes, accounting, implementation of rule/standards-based activities / operations | project work, interdisciplinary research, cross departmental / organizational cooperation | marketing, customer support, inter-organizational cooperation, personnel development, news & press work | social behavior, educational work, politics, art, literature, multi-layered feedback loops | emotional rash reactions, unpredictable catastrophes, fantasy |
| Characteristics of the processes (quality) | predictable calculable reconstructable secure | expectable understandable collectable stimulating | limited expectability, difficult to control, problematic | imaginable, foreseeable, limited predictability, irritating | incalculable, difficult to imagine, chaotic, disquieting |
| Type of functional relationship between knowledge and knowledge environment | knowledge acquired, accumulated by someone, sometime in a particular situation can be used by someone else at another time in a similar situation | knowledge accumulated by someone, sometime in a particular situation can be used in similar situations in a modified form | It is unclear and uncertain whether the use of assimilated knowledge will achieve the desired results | Decision and action is not possible with knowledge alone, but rather requires intuitive, sensitive feeling the way, sensitivity, openness and courage | Questions all knowledge. Forces the production of completely new knowledge |
| Type of knowledge | replicative, constructive, technical-mathematical, standardized, tested in the past | discursive, figurative, model-like, integrative, comprehensive | social, hermeneutic understanding, experience of life, soft skills | imaginative, intuitive systemic capture, instinctive, tacit knowledge | non-knowledge ignorance |
| Type of application | linear, analogous application assertive, commanding | paradigmatic experimental iterative-provisional reflective searching | metaphoric, pictorial descriptive illustrative | mobilize all senses and don't think too much! creative figuratively descriptive | no possibility forget all knowledge! |
| Requirements for application (prerequisites) | availability accessibility awareness it exists | ability to compare and recognize patterns/images. insight into the pragmatic character of knowledge | curiosity on what happens and when. sensitivity to difference / change flexibility, courage | self-confidence, vivid imagination willingness to get involved on an emotional level | left open |
| Typical barriers | inaccessible, property rights, lack of time acquisitions, forgetting, lack of information material, lack of application pressure | too high a degree of specialization, organizational / departmental limits, narrow-mindedness, ignorance, prejudice | too careful, clinging to old knowledge, rules, routines and standards. lethargy, convenience | fear of allowing surprises, love of order, lack of experience of life, cutting oneself off, trust in technology | refusal to accept reality, defensive reactions (excuses, looking for scapegoats) head in the sand |
| Type of information processes | data processing, documentation, technological distribution and logical linking | Information process management. documentation, distribution and networking. comparative description and reporting | multi-dimensional information processes, learning by doing, pictorial, written, oral reporting, relating, deliberating, representing. broadband media | learning from experience and observation, literary, artistic media | sensitive, emotional experience / processing |
| Optimization possibilities / motives | IT solutions to increase accuracy, completeness, speed and accessibility reduction in errors, savings in time, money and resources automation | interdisciplinary communication, project work, job rotation, discussion gain new insights, synergy effects, innovations | scenario playing, case based reasoning brain-storming, opens new knowledge and action possibilities gain in flexibility | telling stories, role games, behavioral training, observation training increase in social competence empathy | learn not to react in panic. learn to survive |

The differentiation between >stable< to >open< to >instable< indicates a gradual increase in the deviation from the norm or differences between previous learning environments and the current knowledge environment.

I differentiate here between >dynamic< and >chaotic< environments which mark a qualitatively different dimension. (Chaotic = dramatic sensitivity to ignorance / dynamic = emerging properties / self-organizing complex systems).

We are not discussing a >knowledge theory< but rather a requirements profile that allows statements on the probability of success or failure of human behavior in certain environments.

There is much to support the idea that human beings only mobilize intellectual, creative >energy< if there is no other way of resolving a problem or facing a challenge, but it is of course rather problematic to generalize on the conclusion of the above approach. (Human life is more than just a battle for survival: >> joy, lust, fun, love of/for knowledge in art, philosophy, games.)

This at least maps out a possible line: characteristics of environmental challenge >> knowledge requirements >> adequate information processes >> recognition of ambivalence of enabling / restrictive conditions >> intervention by interpretation >> observation of results and feedback.

The following table summarizes the argumentation and illustrates the procedure:

1. Limiting / defining of a >situation< to be considered a knowledge environment (e.g. reformulation of the marketing strategy by a team in a particular period of time / drawing up and implementing a plan to restructure a particular production division / implementation of an Intranet / drawing up of a regional development project with person group X in communities Y, Z / give a lecture about .../ etc.)
2. Breakdown of the >situation< into areas / processes that allow the clearest possible characterization according to stable / analogous / instable / complex etc.
3. Differentiation between >objects for processing< (tasks / topics) and general framework.
4. Description and characterization of the object for processing into >hard< and >soft<, or standardized, normed, technical, changeable, dynamic, etc.
5. Characterization of the processing conditions (aids, structures, rules, specification of selection) into >enabling< (or promoting / supporting) and >restricting< (or disruptive / limiting) as ambivalent simultaneity.
6. Identification of intervention possibilities and clarification of the reasons (motives) for processing the barriers (could, in turn, represent an individual knowledge environment.)
7. Preventative, experimental or subsequent processing of (possible or emerging) barriers.

We must be aware of two possible misunderstandings:

There is no mechanical connection between barriers (objectivation / fixation of selection) and their concrete function in a particular situation since it is the barriers that >survive<, even when their original function becomes obsolete due to changed knowledge environment challenges.

It is not possible to categorically define the particular function of a certain barrier type, e.g. by differentiating between cultural, structural, material, physical, characteristic, emotional and mental barriers and coming to the false conclusion that infrastructural handicaps could be easily removed technically without affecting individual identities or the emotional control of behaviour. Observation is the only possible way of determining everything that belongs to a specification, objectivation or symbolic object.

The matrix illustrates the >rational<, easier-to-process connection between possible barriers.

[A situation only becomes complicated and exciting when it appears there are >irrational< links (substitutions / fictitious functions), like when owning a mobile phone / car is redefined / abused as a status symbol for stabilizing the >emotional household< and controlling social behavior.]

| Limitation Hurdle Barrier Specification | Negative Effects consequences | Possibilities/Methods of Reduction/Resolution | Enabling Function positive | Possibilities/Methods of Compensation in the case of resolution | Possible Reasons/Motives for Intervention removal of barrier |
|---|---|---|---|---|---|
| Expert Terminology | Interdisciplinary use of terminology enables misunderstandings | Multiple specialization Domain switching Job rotation (Re)Training | allows secure, differentiated, exact use of language within the dome | Not necessary if contextual use is explained. Identify connotations | allows insight/better understanding of other domains. Connectivity |
| Knowledge Structure | Subject specific context logic rapes other knowledge domains Expert idiocy | Homogenization through structural comparison, textual representation, visualization | Consolidated context simplifies orientation and allows insight into connections | Development of a meta-structure in which there is room for diverging structures, knowledge maps | Increases ability for integration and connectivity, overview |
| Values Hierarchy Structure of Interests | Suppresses situative differentiation. Incompatibilities, conflicts of interest | Reflection, analysis, training of substitution chains, playful action | Consolidates situative variety of interests, allows longer-term planning action | Changing of environments, resocialising, change of workplace | Changed/new values, resolution of conflicts of interest reduces tension |
| Inner-organizational Differentiation Departmental Borders | Limits / obstructs communication & learning space / overall view, encourages egoistic behaviour | Project oriented cooperation forms create / open connecting communication space | Allow concentration / deepening in domains and selection of processing objects | Imbedding in overlapping structures, temporary resolution (projects) | Improves joint target orientation, increases problem solving competency |
| Cross-departmental structure Hierarchy | Reduces insight, transparency of decision process, increases inflexibility | Overlaying of top-down and bottom-up structures, networks, IT collaboration | Regulates decision processes, coordinates activities, reduces complexity | Use of groupware tools, middle-upside-down structures, relation maps | Increases identification with common goal, speed of reaction / sensibility for organization |
| Role fixation Individual identity Character - fixation | Restricts learning / knowledge space corporate blindness increases risk of blind insistency | Playful role change, change to other groups, emancipated behaviour training | Decision security, continuity of action, calculability | Substitute by soft factors / social recognition, openness, wisdom, integrity | Opens new behaviour options, increases connectivity, stimulates creativity |
| Selection of the processing object Task Description | Excludes following of other interests, tends to attach too much importance to one issue | Relativize the seeing of the issue as means to the end, limit the processing time | Allows concentration on one issue, prerequisite for work-sharing cooperation | Interdisciplinary processing, outsourcing, complete planning | Better connectivity to interest structure, allows prioritization of tasks, all-round view |
| Inter-organizational limitation | Limits information processes, promotes negative competitiveness | Extended supply chain management, project orientation, fusion, consortium/holding | Structures selective cooperation, reduces complexity, allows internal focusing | Formulation of common goals / potential synergies, interface optimization / IT | Reduces frictional losses, increases productivity / profitability, competitiveness |
| Fixation of time, space, resources Framework | Leads to insufficient processing, stress, not achieving goals | Limited withdrawal of power, target orientation, reflection on means to end | Allows cost benefit calculation, action orientation, clarity | Formulate scope for deviation, bonuses for reaching targets | Ensures targets are reached, promotes awareness for unexpected |
| Specification / Fixation of aids Old knowledge, Infrastructure, Technology, Tools | Limits processing possibilities, allows inadequate processing | Try out alternative instruments, experiments | Use of old knowledge, tried and tested methods reduces efforts | Means-end consideration, reworking aids | Improves proper processing, knowledge gain |

Lack of willingness (motivation, incentive, power struggle) to learn and share knowledge have not been included in the matrix, because I consider them to be symptoms with possibly completely different causes. Company or organizational culture (as reasoned above) should also be seen from this point of view.

The summarized characterization in the above table is neither complete nor sufficient. However, a detailed examination is not possible here. Matrix should be taken as a guide / main connecting theme.

Barrier 0: If you can't know something about it then you should keep quiet.

Before weather forecasts on the radio and television, farmers looked to the sky south of the Alps and said: "The clouds are moving out. The weather is going to be good." and "The clouds are moving in. The weather is going to be bad." In this valley south of the mountains, "out" of course meant >from the north over the mountains into the valley<. This was knowledge based on experience and was usually right. No one really bothered why this might be the case. Nowadays they say: "There is an Adriatic depression", since this is what they heard on the radio and they know they live in that region and television provides them with a birds-eye view of cloud movements over Europe. If they didn't have news and observation technologies they would still say: "The clouds are moving in. We need to get on with the harvest."

As we know from our schooldays, the Spanish were not the first Europeans to discover America. The Vikings were there long before them.

There is no doubt that the main reason Columbus discovered America – as it is said - was the current developments in shipbuilding and navigation technology. But the Vikings must also have had it or they wouldn't have been able to make it either. Of course, a willingness to use the technology to solve a particular problem must also have played a decisive role (in this case to find a navigable route to Asia). This was only possible because they were able to see the Earth as a globe. But the Vikings must also have known they would eventually reach land if they sailed far enough.

So why did Columbus' journey go down in history as the sensational discovery of the West Indies, while the landing by the Vikings did not have the slightest effect on knowledge development? There are several possible reasons for this. The Spanish landing occurred at a critical phase in world history and was to change this forever. Communication, information and knowledge systems had been developed which immediately latched on to the discovery and made it known. The political, social and economic effects were long lasting.

Technology and view of the world (level / structure of knowledge) alone are definitely not enough to explain how far new knowledge spaces could be opened up at a particular time.

That the scope for generating new knowledge using the instrumentarium available at the time and based on existing knowledge cannot be all that great is illustrated in the coroner's report on the spot where "Oetzi the Iceman" was found. The reaction is either "Wow!" or "The Gods must be mad."

It was a tremendous loss to musical history that Mozart and Schubert did not live longer. What could they not have composed and how far could they have pushed development of the >language of music<? Or could they really have done so? How far could they have gone? If Sigmund Freud had died at the same age, we would not have psychoanalysis? Or would we? If Marx and Lenin had never been born, we would have been spared the diamat (dialectic materialism) and all its consequences. Or would we have been? Why did Aristotle not write a >criticism of pure sense<, then ... But quantum physics was not possible sooner. That is clear.

Conclusion: A glass can only be filled until it is full. Or "Can God really know everything?"

The horizon of possible knowledge generation (at a particular time / stage in development) is defined by the current status of

- technological development:
technological advance allows the extension of scientific knowledge and vice versa.
- development of language / sign systems / social systems:
social advance (differentiation of social systems) allows an increase in the level of reflection and thus the extension of human / humanistic knowledge and vice versa.

The possibility for extending technical and natural scientific knowledge is limited by the status of development of socio-reflective knowledge. If there is no social advance there will be no scientific advance and vice versa.

But there must be some scope because without it advance would not be possible at all.

Humanity will never know everything, because in order for this to happen, the world would have to stand still and knowledge not change the world. But this is not a fact, it is a possible (philosophical) conclusion.

P.S.:

"One often sees in the social literature assertions that the act of studying an organization, say a corporation, will alert people to questions about their actions and that the study process itself will cause changes in behavior. I do not believe this is true. It is much harder to change the decision-making process than we first realized when system dynamics started. Old mental models and decision habits are deeply ingrained. They do not change on the basis of only a logical argument. Early system dynamics analyses were in the "consultant" mode in which the system dynamicist would study a corporation, go away and build a model, and come back with recommendations. Usually these suggestions would be accepted as a logical argument, but would not alter behavior. Under pressure of daily operations, decisions would revert to prior practices."

(Jay W. Forrester: The Beginning of System Dynamics; Banquet Talk, Stuttgart 1989)

Observation, description, analysis, systemizing, reflection and discussion do not replace action, processing, experience gaining and these are lengthy and difficult. Barriers cannot be discussed away using sensible arguments. They have to be worked on deliberately using insight and care, which requires observation, reflection and discussion. (Tackle >religious wars< at their roots.)

And I should not to forget: Some of the >barriers< are taboo's, they can not be addressed without losing >humanity<.