

Knowledge, Innovation and Quality for Competitiveness. An integrated Leadership and Management Approach. Evaluated by a web-based Delphi Research

Gereon Klein¹, Klaus-Jochen Lisner² & Erik Nagel³

1 Knowledge Management - an attempt of a reapprochement and disambiguation.

Knowledge Management – is a buzz phrase preferably used by managers in the broadest context of knowledge, training, intranet ... Like with every catchword it has the pro that everyone understands it. But it has the con that everyone understands something different. The concept of Knowledge Management hackneyed like all the other different management methods but the life cycle of this word seems to be longer. Because implementation is very rare and it often is followed by negative experiences as well the people prefer to use this catchy word without looking for implementation. The common meaning of KM focuses on IT-systems to store projects, analyses and documents on the intranet. Data warehousing, data integration, data enrichment and data mining are the main benefits when it comes to IT-based KM. On this level you have information at one's command. But information is not the same as knowledge. Knowledge includes information, facts, date etc. However, it is the result of complex cognitive processes like perception, learning, communication, association and reasoning. It is also related to the capacity of acknowledgement in human beings.⁴

Training and learning is sometimes in the focus of KM as well as suggestion systems or the continuous improvement process, Since Senge's 5th Discipline⁵ processes of organisational learning are introduced. Key words are learning loops, action learning, creativity techniques etc. Senge also differentiates between information and knowledge and the needfulness of an integrated strategic approach on KM. And, moreover he emphasizes the importance of leadership.

This survey should extract the key factors describing the KM-system more precise and clarify the understanding of KM especially in knowledge driven organisations. We established a structured communication survey with experts working on KM in organisations, offering KM relevant counselling or lecturing at universities. The experts had to elaborate an outline of key factors and to evaluate the interdependencies with a cross impact analysis. They were asked for a feedback on the results, interpretations, on their experiences with KM in context of their organisation / clients and on the Delphi process itself.

The study is done in the framework of KM and Innovation at the University Luzern (CH), the Bühler Group, Uzwil (CH) and the company 'Facilitation for Change', Freiburg (D) and Pretoria (ZA)

We are very thankful for the time, the knowledge and the participating experts were willing to share with us for free. This present is the base for this study. Thank you.⁶

¹ Geschäftsführer der Unternehmerberatung 'Facilitation for Change' Moderation, Beratung, Zukunftsforschung, Freiburg, (D) Pretoria (RSA)

² Leiter der Abteilung Intelligent Process Control der Bühler Group Uzwil (CH)

³ Leiter des Instituts für Betriebs- und Regionalökonomie an der Hochschule Luzern, Studienleiter des Executive MBA

⁴ Cavell (2002) For a further discussion of the meaning of „knowledge“ it should be referred to the specialist literature

⁵ Senge (1990), Senge et al. (1994)

⁶ The appendix shows the names of the persons and organisations that participated.

2 Scope of the system „Leadership and Management in knowledge driven enterprises “

A system is a set of elements and relationships between these elements that is different from relationships of the set or its elements to other elements or sets. The system is surrounded by a boundary. The boundary is more or less permeable. The system has a structure defined by the components and their composition. It has a behaviour that involves inputs, processing and outputs of material, energy, information or data. The various parts and elements have functional as well as structural relationships to each other (interconnectivity within the system as well as to other systems outside the boundaries). The System may have functions or groups of functions.⁷ The system can be described by functional groups so called key factors. A key factor is an aggregation of different aspects or sub factors. These sub factors are aggregations of sub-sub factors. It is important to realise the different levels of aggregation or itemisation and to keep them separated. In the same way the boundaries between the systems are permeable and arbitrary the aggregation of sub factors to key factors are the same. These structures are made to describe and handle the complexity of a system. The changing of the boundaries (of the system or the key factors) will induce different insights and a different understanding.

It is the same with the handicap of a cartographer: He tries to draw as much information as possible, related to his mandate according to the scale on one or different layers on a piece of paper as a map. He has to leave details aside and he draws important information bigger than they are in reality. If he changes the scale the clipping increases / decreases. How ever it will still be an image of the landscape – not the landscape itself.

According to this we tried our best to describe the system of knowledge driven enterprises. But different people would have generated a different structure. Therefore we suggested a structure using key factors and a description of sub factors. This draft was further developed as a result of the first term of the Delphi panel.

2.1 Description and disassociation of the relevant System

The title of the article describes some elements of the system we are focusing on. Knowledge, Innovation and Quality for Competitiveness – A integrated Leadership and Management Approach.”

We are looking at enterprises and their competitiveness. The focus is on enhancing the assets of knowledge, innovation and quality. Managers are important drivers with leadership concept and behaviour to support implementation.

Even if learning and adaptation is in the centre we do not include universities or schools. Competitiveness does not mean only earnings in terms of money. There are several other assets for shareholders, employees or civil society. Even non-profit organisations have to compete for funds, attention and visibility.

Our understanding of knowledge management is not limited to IT and databases. This media can be quite helpful, but without communication, connection, networking and exchange knowledge it might be properly stored for generations but it will not lead to a benefit or a return in anyway. Knowledge has to be activated by people. This can induce a reassembling of information and concepts and learning inside the organization. Learning needs loops to internalise the new. This includes making mistakes, which refers to way the management and corporate culture deal with mistakes.

We talk about knowledge in terms of training and experiences, kept by the employees, shared with colleagues used to adapt and improve activities (processes), leading to new ideas and solutions, assuring and increasing quality. This all seems to be appropriate to upgrade the competitiveness.

⁷ wikipedia.org: „system“. Retrieved: August, 04, 2011

2.2 Extracting Key Factors

According to this description the discussion of the authors started with a set of eight key factors:

- Knowledge Management (data processing / individual and team learning / organisational learning and adaptation/ scouting / open innovation)
- Innovation (methods and tools / incubator laboratories / reward system)
- Quality (processes / structures)
- Process Management (initiation / design / implementation / evaluation)
- Leadership (concepts / decision making / attitude / personal mastering / communication)
- Culture (looping / trusting / sharing / appreciation / co-opetition)
- Cooperation (collaboration / networking / partnership)
- Internal and external Supporting Systems (processes / products / scanning the environment / project management)

During the discussions these eight factors were further developed and rearranged. Twelve key factors were derived and sent out for the first consulting round to the experts. Analysing the experts' feedback we decided to stay with twelve key factors but with additional sub-factors and different arrangement in the groups. You can find the results in chapter 5.1.

3 Cross Impact Model

The Cross-Impact Analysis is a method analysing impact networks with a qualitative appraisal of the cross-impact of factors, which are used to describe the system of consideration.⁸ The key factors of the system are systematically structured and derived in discourse. As an inclusive approach they characterise the aspects belonging to the system. The cross impact is assessed in a subjective estimation of single experts or in groups. This evaluation represents an approximation and different experts / groups might find different results. The differences can be used to sharpen the description, to exposure misunderstandings, variable inclusions and comprehension. For the evaluation numerical data are used (e.g. 0 – 3 or 1- 10) even if it is only an individual scale of rating. The results indicate a kind of preciseness that is not part of the digits. In a statistical way we would talk about an ordinal scale. This means that even the calculation of an arithmetic mean is not feasible. Using the results you always have to be aware of the apparent preciseness.

The most important insights are the discussions between the participants especially on the discrepancies of estimations and later on if the results are compared and interpreted. So the Cross-Impact Analysis is not an automatism producing answers. The insights have to be reviewed before they can be integrated for decisions.

3.1 Method

The cross-correlation estimates the impact of one key factor on every other key factor of the system. For a system with 12 key factors you have to make 121 estimations. You put the figures into a matrix and calculate the sum of the line (influencing other key factors) and the sum of the column (influenced by other key factors).

The product of line (1) total and column (1) total describes the degree of interdependencies with other key factors (cf. fig. 1 abscissa). The quotient of line (1) total and column (1) total shows the degree of amplifying impact on other key factors (cf. fig. 1 ordinate). The lines creating a 4-field scheme in figure 1

⁸ The RAND Cooperation developed the Cross-Impact Analysis during the 60th last century. RAND was one of the eldest Think Tanks in the USA working mostly for the US army. This model was designed as an expert system to overcome simple and mostly linear <math>\lt;math> algorithms for decision-making.

are balancing the interdependencies (vertical line: quotient = 1) and the amplifying (horizontal line: ½ of the total max.).

The most important field in this scheme is top right because you can step in with several different key factors to release a strong impact. They have a strong leverage effect; you can achieve an important impact with a little action. Top left you will find key factors only slightly connected but with a high outcome for the system. With this factors you have to watch out because they might be unimposing and the effects surprising. Bottom left you find the key factors with low interconnectedness and low amplifying. These factors you can leave because they are uncritical for the whole system. But the factors bottom right you should observe because of they are highly cross-linked. Changings might have an impact at various aspects of the system even if the consequences might be only slightly reinforcing.

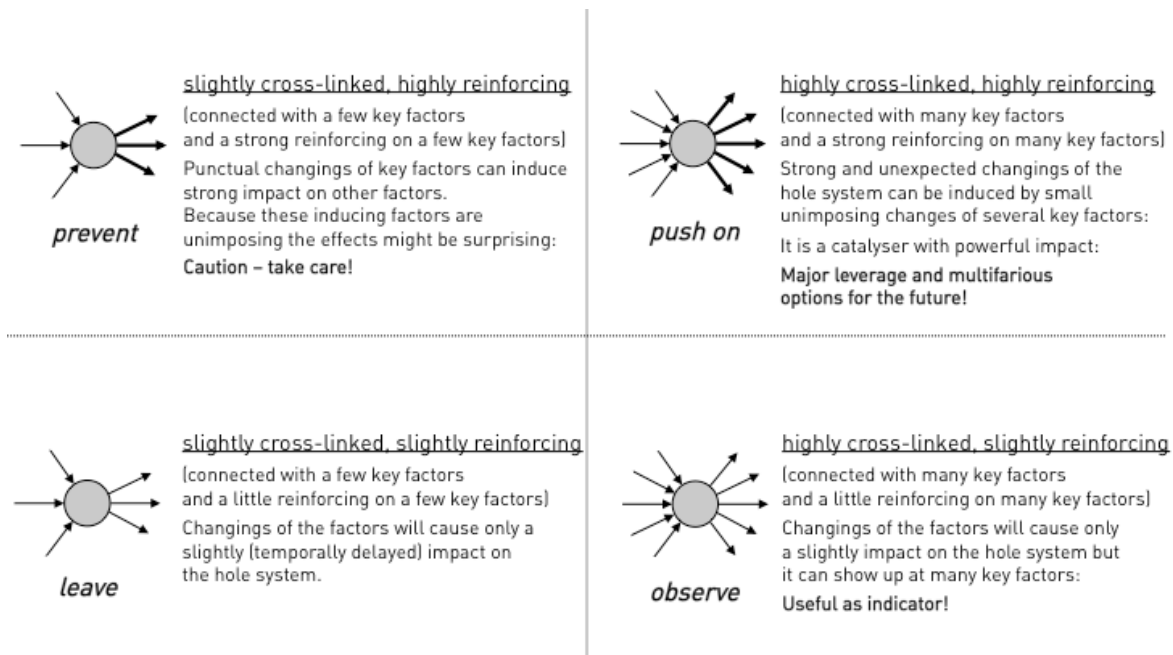


Fig. 1: Degree of interconnectedness and amplifying impact as a result of the cross-impact matrix. (modified according to Ninck et al. 1997, p 94f)

The cross-impact model does not deliver a functional-dynamic evaluation of impact and interconnectivity. For this we refer to software like 'Stella' or 'iThink' of ISEE systems⁹ and Consideo¹⁰.

3.2 Description of the used Software CIM

At the Centre for Futures Research St. Gallen Switzerland the software CIM was developed¹¹. It was designed especially for workshop situations to make it easy for small groups to use this tool after a short introduction without loosing time on technical issues. To prevent a mismatching of the direction of action the software guides to fill in the cross-impact matrix. The results are visualised in several graphics. A Java Virtual Machine is needed to run the software. CIM 8.1 and a manual can be downloaded from the Internet for free¹².

Graf & Klein 2003 published a detailed description of the whole concept the planning of a scenario workshop and the use of the software.

⁹ www.iseesystems.com

¹⁰ www.consideo.com

¹¹ Graf & Klein (2003/2005)

¹² www.gereonklein.de/a_szenario.html or www.scenarios.co.za/engl_sc_scenario.html

3.3 Experiences in the field

The method of a cross-impact matrix was used in many workshops. Usually it was framed in a 2-days-workshop with 10 to 16 members of management. Mostly it was applied outside the company at a conference venue only with members of the company. Some outside experts of the subject were invited to contribute their experiences and to offer an external view. In preparation of the workshop the focus, the time line and the framework was planned in detail with a steering group.

During the workshop the first mayor step is to start with the description of the factors driving the system to resolve a common understanding. This takes nearly $\frac{3}{4}$ of a day. Than the factors are clustered to find key factors. This simplification is necessary because it is very time consuming working with more than 20 factors on the cross-impact analysis. Experiences showed that you will not get more findings or conclusions but the participants got exhausted and incurious. The balance of oversimplifying and overwhelming seems to be between 10 and 18. Therefore the extraction of key factors makes sense.

After listing the key factors in the CIM software the participants go in groups with 3 – 5 to discuss the evaluation of interconnectedness for each key factor. Often the different understanding of factors, processes and interests gets obvious during this part of the workshop and the participants reporting these discussions as very helpful and enriching. Eventually they have to record the consensually evaluated result encoded with a figure between 0.1 and 1.0.

In the plenary the results of the different groups are compared and differences discussed. Mostly this offers a second room to work out discrepancies and a common understanding. On a pin board the 4-field scheme (Fig. 1) is used to define the results over all graphically as well as the most important differences.

The next main step is the design of scenarios according to scenario frames defined previously. These scenarios are done in small groups and presented as a story to the plenary.

The pillars of the scenarios are compared with the key factors of the cross-impact analysis so that the overlapping's and differences get visible. Out of this the intended core areas, investments and change processes are derived. As a follow-up a supervising and facilitating process is established to support the organisation during the change and reorientation.

The experiences using a cross-impact analysis in organisations have proved the following obstacles:

- Evaluating the cross-impact between one factor onto another the direction of impact is mismatched (key factor A takes effect on key factor B is different from key factor B acts on key factor A).
- The influence is often evaluated with figures around 0.5 (the mean value) if the opinion of the group is heterogeneous. The gain in insights is slightly small.
- The evaluation of a single person might stick to a specific understanding / misunderstanding which will not be disclosed because of the missing group discussion.

4 Structure and intention of the Delphi-Studie

The Delphi method offers a systematic, well-structured interactive communication process. You can use the Internet and emails for the communication to include experts all over the world. You have to write down your request precisely and you receive written answers. Usually the Delphi method was used in order to produce more accurate forecasts using the knowledge of a structured group of individuals. By the time Delphi was used for normative and explorative use.

The key characteristics of Delphi are the structuring of information flow, a regular feedback and the anonymity of the participants. The facilitators of the Delphi we are responsible to select the panel of experts, to structure and send out the questionnaire. They have to collect and analyse the responses and to include the feedback into the next round, and they have to keep the overview and to document the results.

This Delphi was planned as a email interrogation with three rounds focusing the key factors of the considered system (1), asking for the evaluation of interconnectedness of all key factors (2) and the assessing of the over all results and interpretations (3).

We wanted to find out more about the importance of Knowledge Management as a competitive factor according to strategy, brochures and implementation. Background is the hypothesis that knowledge, innovation and quality are the most important drivers for organisations competing in global markets.

4.1 Selecting the panel of experts

Delphi-Studies requires a lot of time from the experts. So it is hard to find participants spending the time and expertise for free. We looked for experts in the environment of the last 15 years of counselling – customers and colleagues. By using personal contact we tried to receive a higher return rate than usual. We invited 60 experts to join the Delphi. The requested persons are working in the field of Knowledge Management as employees in companies (37 (13 production, 24 services)), as consultants (6) or as lecturers at universities (17).

4.2 Design and structure of the Delphi

The Delphi was structured in three rounds of questions and feedback. For all rounds the experts received an introduction into the whole concept and an explicit report of the feedback of the previous questioning. The next step of procedure was described with a detailed instruction e.g. how to use the software (round two) and a dead line to return the results. All the documents were sent via email. Further enquiries were done via phone.

The first round brought key factors derived by discussions of the authors. The experts were asked to add and to rearrange factors and key factors of the draft.

As facilitators we tried a synthesis of the feedback and sorted out a list of key factors with describing sub factors which was used as reference for the second round (compare the catalogue chapter 5.1). Next the experts had to evaluate the cross impact of each key factor.

The results where merged in a graph for each key factor. An interpretation of analogies and differences was compiled. In the third round we asked for comments on this interpretations and we designed a short questionnaire on personal experiences with implementation of KM in the organisation the expert is working for or the framework of customers the expert is serving as a consultant.

5 Accomplishment and results of the Delphi-study

The study was conducted between October 2010 and March 2011.

We invited 60 experts to join the Delphi-study. We received a feedback from 11 experts (18 %) on the first round. 14 experts (23 %) completed the cross-impact analysis and 15 persons (25 %) answered the questionnaire. 10 experts responded on all 3 rounds and another 10 peoples answered on one or two rounds.

5.1 Questionnaire of the key factors (1. Round)

The draft of the key factors we started with (see chapter 2.2) was enhanced by the feedback of the experts and the processing of this information and filtering the content by the facilitators.

The number of key factors did not change and we stayed with twelve. The aspects of the key factor “External Corporation, networking and partnership” had been included into other key factors predomi-

nantly into “Corporate Culture”. “Customers (internal and external)” was set up as a new key factor focusing on economic chains, life cycles, customer based learning, profiles, needs, benefits etc.

Six key factors stayed without changes. The others key factors received additional factors and further details describing these factors. The key factor “Knowledge Management Concept” was complemented the most with factors like “Semantic and self-organisational concepts”, “Human Resources Management”, “Knowledge retention”, “Reward system” or “Resources”. Table 1 shows the catalogue we derived as base for the cross-impact evaluation.

Table 1: Catalogue of the key factors

(1) Knowledge Management Concept

Structures
Strategic Focus of Knowledge Management
Concepts for Collaboration and Transformation of Information to Knowledge
IT Based Systems (*Groupware Systems, Social Networking Systems, Systems for Artificial Intelligence, Data Mining Systems, Content Management Systems, Systems for Visualisation, Management Information Systems, Learning Content Management Systems, Blended Learning, Virtual Classroom, Inquiry Learning Forum*)

(2) Exploring and Scanning the Environment

Focus of Relevance (*Subject, Scope, Indicators, Context Analysis, Interrelations, Feed Back*)
Dimensions (*Economical, Ecological, Demographical, Social, Political, Technical*)
Players (*Markets, Competitors, Stakeholders, Shareholders*)
Method (*Collecting Data, Analysing, Monitoring, Technology Scouting*)

(3) Individual and Team Learning

Action Learning (*Initiating Change, Searching for new Ways, Strategizing, Planning, Implementation and Experimentation, Sharing and Reflecting Experiences, Re-Planning for the next Learning Cycle*)
Capacity Development (*Training (In-house), External Seminars, Courses, Mentoring*)
Failure Learning (*Listening without Judgement, Blame Free Reflection, Lessons Learned, Optimum Failure Rate*)
Team Learning (*Helping Each Other, Offering Detached Views, Problems in (different) Perspectives, Peer Supervision, Sparring Partnership, Feed Back Techniques, Documentation (Structures, Platform), Best Practice Sharing*)

(4) Organisational Learning

Learning Loops (*Explicit Practices, Policies, Norms, Detecting and Correcting of Deviations, Variances from these Standards, Questioning Basic Aspects of Organisation, Reflecting of Appropriateness of Standards, Structures, Self-Examination of Standards, Structures, Transformation of Internal Structure, Culture, Practices, Transformation in the External Context*)
Learning Loop Characteristics (*Personal Mastery, Mental Models, Shared Vision which Everyone Agrees, Team-Based Mastery, Systems Thinking*)
Communities of Practice (*Structures and Resources for Exchange, Learning from Experience, Multiple Intelligence to Accelerate Learning, Creating, Identity and Meaning with Others*)
Crowdsourcing (*Cheep Anonymous Amateur Labour, Insourcing of Ideas, Crowd funding*)

(5) Innovation

Creativity Techniques (*Brainstorming, Collective Notebook, SIL Method, Synectic, Semantic Intuition, Association by Chance, 6-3-5 Method, Morphological Box, Sequential Morphology, Morphological Matrix, Attribute Listing, Problem Solving Structure*)
Incubator Laboratories (*Space, Time, Outcome Oriented Open Outcome Procedure*)
Masterplan (*Prototyping, Up-Scaling, Traps and Pitfalls*)
Adaptation (*Business Processes, Structures, Techniques, Products*)
Reward Systems (*Incentives, Group Rewards, Performance Goals, Innovation Goals*)

(6) Communication

Common Language
Understanding Different Backgrounds, Positions, Interests
Mutual Feed Back Mechanisms
Vertical / Horizontal Open-minded Communication
Exchange Platforms (*Web-based, Personally, Formal / Informal*)
Structures for Exchange (*Flexibility, Space, Rhythm*)
Facilitation (*Meetings, Workshops, Conflicts, Processes*)

(7) Implementation Process Management

Design (*Objectives, Input, Intended Effects, Responsibilities, Implementation Plan*)
Implementation (*Story / Picture of the Innovation, Structure, Design, Examination, Documentation, Teamwork*)
Process Monitoring (*Areas of Observation, How to Measure, Criteria of Achievement*)
Evaluation (*Focus, Methods*)
Supporting Systems (internal, external) (*Counselling, Facilitation, Attendance*)

(8) Quality (processes and structures)

KaiZen / Quality Circles / Six Sigma / Total Quality Management (EFQM)
Benchmarking / Customer Survey
Suggestion System for Improvements / Knowledge Process Quality

(9) Leadership

Attitude (*Vision, Intention, Intuition, Gut Feeling, Self-Reflection, Honesty, Integrity, Incorruptibility, Accountability, Humour*)
Personal Mastery (*Responsibility and Accountability, Getting your Priorities Right, Managing your Boss, Self-Concept*)
Communication (*Facilitation, Negotiation, Feed-Back Techniques, Emphatic Listening*)
Empowerment (*Encouraging Diversity, Dynamic Knowledge Relations, Autonomy, Allocation of Responsibility, Sharing Information, Power, Cooperation and Participation*)

(10) Championing the Culture

Looping (*Perception, Interaction, Monitoring, Adaptation*)
Trusting (*Honesty, Reliability, Integrity, Transparency, Accountability, Incorruptibility*)
Sharing (*Knowledge, Ideas, Success – Errors, Benefits*)
Appreciating (*Experiences, Services*)
Collegiality / Openness / Commitment

(11) External Cooperation, Networking, Partnership

Scientific Community / Managing / Facilitating
Initiation, Setting up / Establishing
Benefits (Appreciation, Sharing, Monitoring)

(12) Management- Techniques

Project Management / Product Management / Controlling, Budgeting / Business Process Management / Human Resources Management

5.2 Cross Impact Evaluation by the experts(2. Round)

For the second round of the Delphi the experts received the software CIM 8.1 to analyse the interrelations of the key factors with the Cross Impact Model according to the methodology described in chapter 3. The results of all experts had been matched as an arithmetic mean.

Figure 2 shows the results of the interdependencies and impact amplifying as a result of the cross impact evaluation as a mean value over all matrices derived by the experts.

The meaning of key factor 1 (**Knowledge Management Concepts**) deviated most between the experts. Asking in detail we received answers like: “Why do we need a concept if we only have another paper without any consequences” or “everybody emphasise the importance of Knowledge Management (KM) but there are no resources because no one is really going for it” or “we need KM to assure the quality of our processes and products according to our Quality Management procedures – that’s it” or “we practice KM but without a concept”. Probably the meaning of ‘Human Resources Management’, ‘IT-based KM Systems’ and ‘Reward systems’ was very heterogeneous in this context. Both explanations have been confirmed with the answers on the questionnaire at the third Delphi round. It was astonishing for the facilitators to see the little leverage effect. Assuming a concept as a base for the whole process these results do not reflect this importance for Knowledge Management, Innovation and Quality. This might indicate discrepancies between thinking - talking and doing. Interpreting the mean value the Knowledge Management Concept it is still a critical factor with strong impact even it looks unimposing – caution.

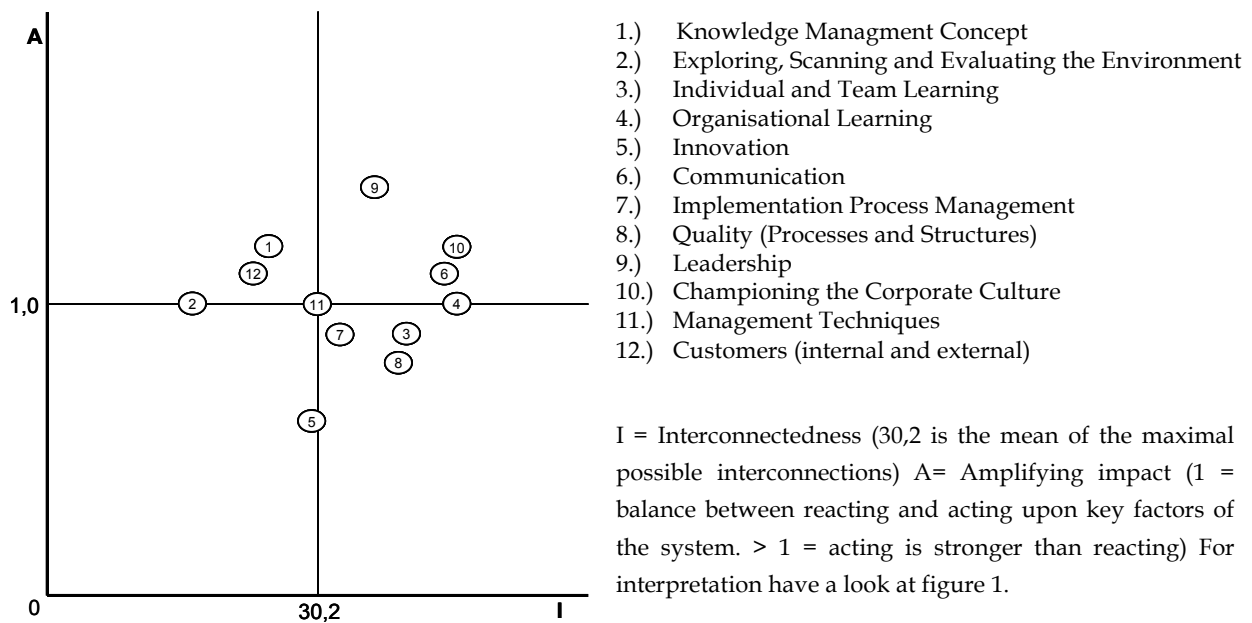


Fig. 2: Graphic results of the Cross-Impact Analysis

Key factor 2 (**Exploring, Scanning and Evaluating the Environment**) shows the lowest interconnectedness of the overall picture. This reflects the key factor as the information source that is important to monitor. But the results showed a very high variation of amplifying impact (between 0.5 and 2.0). Going into detail we saw high values coming from experts working in industries with high dynamics and exogenous forces.

Individual and Team Learning (key factor 3) and **Organisational Learning** (key factor 4) are assessed as medium active but clearly cross-linked. This means that there are many different opportunities to start activities, which are easy to control. Because of a small leverage effect you have to spend some efforts in it. The experts showed huge disparities in the level of reinforcing power of these key factors. We had not been able to find a coherent answer to this result and no patterns could be worked out between the three different types of experts (industry, consulting, university). It might reflect the different experiences the experts made about learning and implementation of learning.

Innovation (key factor 5) shows a medium interconnectedness and the lowest reinforcing power of all key factors. This result indicates that innovation is predominantly conceived as invention. Invention happens by chance. But innovation is a resultant of a structured management process (without knowing when and what is evolving). If this result does not reflect a mismatching of these two meanings it would indicate a very little prominence of 'Corporate Creativity' and the other factors describing this key factor.

Communication (key factor 6) is highly reinforcing and cross-linked. This key factor shares the "push-on" quadrant with the key factor 9 (**Leadership**) and 10 (**Championing the Corporate Culture**). There are many opportunities to act with a strong impact. It is common to all three key factors to refer to soft skills. They have to be established in the long term. To develop these soft skills training and education is needed on all levels. But the top management has to exemplify this attitude and activity through their own life.

Management Techniques (key factor 11) is seen in the centre of the graph like key factor 7 (**Implementation Process Management**). That means the system is difficult to operate through this key factors but they are important for functioning and stabilising of the whole. This might be the interpretation for key factor 8 (**Quality Processes and Structures**) as well even the position is less reinforcing and stronger cross-linked. In this case the results were very different between the three expert groups. The assessment of the consultants and the experts in context of university were likewise in the centre, while the answers from experts working for producing industries estimated the importance also little below the medium reinforcing but much more cross-linked.

At least, the **Customers** (key factor 12) are not the drivers of the whole even if they are a critical aspect important to keep in mind and to monitor.

5.3 Questionnaire on the results and the interpretations (3. Round)

The third and last round was done via a questionnaire. The first question was to estimate how strongly the potentials of Knowledge Management, Innovation and Quality is used in your organisation (differentiated between A) the company I am working in B) company I am familiar with as an external consultant C) the university or research institution I am working in).

On **Knowledge Management** 7 of 16 answers showed up to 20 - 30 % and 5 were between 70 - 90 %. The others were scattering around these two core areas. The opinion from inside a company seems to be more critical compared to the results of the other two groups. At least this aspect is estimated quite differently.

About **Innovation** we got 8 marks between 70 - 80 % (mainly the answers were given by members of a company and university). 5 replies came between 20 to 30 %. The others were around 40 to 50 %. If you assume 50 % as the mean the implementation of Innovation is rated more positive than negative.

Quality was quite homogeneous with 14 responses between 60 to 90 % (one with 40 % and one with 50 %). This indicates a high advantage of Quality in companies and universities.

The next question block was looking for consistence of "theory" and "practice". All three aspects assessed by the experts are very important (++) or important (+) in theory. In practice the importance of Knowledge Management is little (-) (8 of 16) with some 3 marks on important (+) and 4 marks on very little (--). The practice of Innovation is around the mean and shows 8 flags on little (-) and 7 on important (+). The weight of Quality is predominantly important (8 indications) with 3 markers on little important (-) and 4 on very important (++) . No major differences between the 3 groups of experts could be recognised.

These results are confirming the focus on Quality and the subordinated implementation of Knowledge Management with Innovation in between.

The last block asked for the key factor with the best opportunities to improve Knowledge Management, Innovation and Quality in their respective organisation. The experts could allocate 10 points on the twelve key factors (10 point on one as well as 1 point on 10 key factor or anything in between).

The predominant key factors were "Leadership" and "Communication". These are the key factors you can easily start to work on. At the same time they seem to be the clue for the individuals to open up their mind and the willingness to share and to cooperate.

In some distance the next important key factors are "Individual and Team Learning" (mostly assessed by the consultants) "Implementation Process Management" (highly rated by the industry experts) and "Management Techniques" (mostly assessed by the consultants without any points from the university/research experts).

5.4 Feedback by the Experts

Regarding the Cross-Impact Model, we received the following comments (e.g.): "The method was helpful to structure the interconnectedness of the key factors.", "I knew the Cross-Impact but to combine it with the discussion of the key factors and a questionnaire via Internet was a new approach.", "In the team of experts I took the time to think about these three drivers and their context in detail and I found new insights." One remark was more in general: "If I recognise the hurdles to deal successfully with Knowledge and Learning in present how difficult it might be to reach a fundamental approach focusing on futures and shaping futures."

Comments on the method are basically mentioning the circumstances that the experts did not had the opportunity to discuss the key factors vis-à-vis. Operating only via Internet no common understanding of the key factors could be developed, especially when using conceptual and theoretical terms on a high level of abstraction. Misunderstanding must be the outcome of this and it happens in two different ways. First, we all have diverse associations of words and terms according to our tradition, structure, experience, training, current situation etc. Secondly, we have different appreciations of a management concept beyond the names. Against this background the evaluation of interconnectedness might show differences where no difference are and it might even differences where strong differences are.

“The relation between the words, phrases and their denotation (semantics) and the of the and classification arranged in a hierarchical structure (taxonomy) was not precise enough. This might have brought variance into the results.”

6 Conclusions

6.1 Appraisal of Method

Looking at the approach for this Delphi Study the following conclusions get obvious:

- The evaluation of the key factors within the Cross-Impact Model showed big differences for most of the key factors. This is related to the importance of a clear wording and structure for the setup of the key factors. As mentioned by the participants without an intense discussion it is nearly impossible to achieve a common understanding of the key factors. Discussing vis-à-vis will be much more effective compared to this ‘long-distance’ procedure of the first enquiry.
- The interpretation of the Cross-Impact results based on the arithmetic means was possible in combination with the original data of the experts to include the variance
- During the Delphi it got important for the interpretation of the results to take the background of the experts into account (industry / university / consultant). Doing so the number of experts got very small for each cluster (4 - 6). Conclusion with this background could be done only as estimation without any statistics.
- Working on the Cross-Impact individually brings in a big variance, which can be avoided by a discussion in a small group so that the understanding is validated by the questions and remarks of the colleagues.

6.2 Findings on Knowledge Management, Innovation and Quality

The conclusions on the merits can be drawn like this:

- The key factors “Knowledge Management Concept” (kf 1), “Exploring, Scanning, Evaluating the Environment” (kf 2) and “Customers” (kf 12) are seen as input parameter without major importance. This sounds strange in the context of getting competitive and innovative. It might be tricky if there is no ‘futures radar’ on the environment and the clients. Working in the field of ‘Knowledge Management, Innovation and Quality’ without a basic concept, adequate structures and resources indicates a little importance on management level even they are always talking about it.
- The key factor “Innovation” (kf 5) shows little impact for the system. Innovation seems to be an unforeseeable resultant even if the authors see innovation as the main driver for competitiveness. In

contrast to this there are many companies with precise structures for innovation¹³. A lot of literature is available presenting ways to support innovation¹⁴.

- Management-Techniques (kf 7 and kf 11) are in the centre and the assessment is depending on the background. Consultants promote these factors stronger than experts working in a company. With a background of the university these factors are quite negligible.
- “Quality” (kf 8) seems to have nearly the same importance than the Management-Techniques. This was surprising to recognise. And in the ranking of the key factors it got the last.
- “Individual Learning and Team Learning” (kf 3) and “Organisational Learning” (kf 4) are noted with a stronger impact. The focus is more on Organisational learning. We were wondering how this might be possible if not implementing individual and team learning. But the differences are not that big.
- The most important key factors with the strongest leverage effect into the system are “Leadership” (kf 9), “Championing the Corporate Culture” (kf 10) and “Communication” (kf 6). With these ‘soft skill’ you have many opportunities to start a change and you are able to reach a strong effect compared to the effort.
- A difference between theory and practice is obvious but it seems to be less than the facilitators assumed at the beginning. The difference is the most on Knowledge Management and the least on Quality

Moving towards more Knowledge Management, Innovation and Quality it is advisable to focussing on the three key factors “Communication”, “Leadership” and “Championing the Corporate Culture”. This can be done without basic investments using a top - down approach. The top-managers should start, as they have to give role model – in the long - run.

This looks simple on the first glance. Going into practice it will crystallise to be very difficult. It strikes basic behaviour. To change this is a huge challenge particularly if patterns are well rehearsed and the daily routine is frantically busy.

References

- Cavell St. (2002). «Knowing and Acknowledging» Must We Mean What We Say? 238–266, Cambridge University Press.
- Graf H.G. & Klein G. (2003). «In die Zukunft führen» Strategieentwicklung mit Szenarien. Zürich: Rüegger.
- Graf H.G. & Klein, G. (2003/2005). Cross Impact Model (CIM), Version 8.1, St. Gallen.
- Meyer J.-U. (2010). «Kreativ trotz Krawatte» 224 p. BusinessVillage
- Nagel E., Kaudela-Baum St., Mohr S. & Wunderlin Chr. (2011) «Innovation auf den Weg bringen» 98 p. Hochschule Luzern Wirtschaft
- Ninck A., Bürki L., Hungerbühler R. & Mühlemann H. (1997). «Systemik» Integrales Denken, Konzipieren und Realisieren. p 94f. Zürich: Orell Füssli.
- Senge P.M. (1990). «The Fifth Disciplin» The art and practice of the learning organisation. New York: Doubleday/Currency.
- Senge P.M., Kleiner A., Roberts Ch., Ross R.B. & Smith B.J. (1994). «The Fifth Disciplin Fieldbook» Strategies and tools for building a learning organisation. New York: Doubleday/Currency.

¹³ “dare to try” (TATA), 9 of 10 Rule” (RIM), “noodle teams” (McDonald), “outsider advantage” (Intel), “ to put a Ding in the universe” (St. Jobs, Apple), “Two Pizza Rule” (amazon) ... cf. Meyer (2010)

¹⁴ One example: Nagel et al. (2011),