Efficient and effective knowledge distribution in an enterprise – a multilevel problem

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Abstract

We present elements of knowledge that should prove useful for any employee of an enterprise, independent of his duties and level and as well for his respective task as for the overall task, of which this task is a part. This recursively appearing multi-level problem (problems in problems in problems ..., knowledge in knowledge ...) is related to a recursive perception of the terms efficiency and effectiveness and some ideas of social systems theory.

1. Problem definition

At latest after Chorafas' book „The knowledge revolution" [Chorafas, 1968] the economic importance of knowledge came into the focus of our interest. Since then a comprehensive literature on knowledge management appeared.[1] However it is generally concentrated on the organisation of the knowledge process and its technical bases. Statements with regard of the content of knowledge, needed by the different members of the organisation are rare, though there are some examples [Müller-Merbach, 1999, p. 89; North, 1999; Mertins/Heisig, 2001]. In any case we have to recognise that „the fewest co-operators today have a clear idea of what knowledge is of importance for their success..." [Probst/Raub/Romhardt, 1998, p. 40, own transl.].
In an earlier contribution, appearing soon [Schiemenz, 2004], the author tried to bring this question nearer to a solution. The perspective there however was that of an individual member of the enterprise. In this paper it shall be expanded by aspects resulting from the multilevel problem ("knowledge about knowledge about knowledge"). Into this context we also want to include the terms efficiency and effectiveness, frequently used in economics and business administration, but in my opinion not understood deeply enough. And we also want to refer to some results of social systems theory.

2. Disambiguation

First, however, in order to enhance communication, some basic terms shall be cleared.

2.1 Knowledge and knowledge distribution

As can be expected from the complexity of the problem, there are very different perceptions of "knowledge". [Davenport/Prusak, 1998; Willke, 2001; Sommerlatte, 1999a; Lehner/Hildebrand/Maier, 1995, pp. 207 ff.]. Here we want to follow Müller-Merbach, who, after showing also the history of the term "knowledge" and following [Mittelstraß, 1999, pp. 228 f.], writes: „By 'knowledge' we here denominate (in linguistic differentiation to 'opinion' – 'Meinung', B. S.) the having subjectively understood objective issues. Crucial is thereby the above mentioned standard of Mittelstraß: ‚knowing is being able to teach' ..." [Müller-Merbach, 1999, p. 87, own transl.].[2]
"Knowing evolves from understanding and is always linked to humans." [Müller-Merbach, 1999, p. 91, own transl.]. This differentiates knowledge from information which, according to our definition are data, models and methods belonging to problems which a problem solver has. [Schiemenz, 1993; Schiemenz/Schönert, 2003, p. 53] Information can exist also outside of humans. From the perception as "purpose orientated knowledge" ("zweckorientiertes Wissen") [Wittmann, 1969], dominating in German business administration and management, it differs in so far, as the term knowledge,

1 The joint catalog of all libraries of the state Hessen alone contains 798 books with the keyword "Wissensmanagement" and 271 with the keyword "knowledge management".

2 Similarly [Probst/Raub/Romhardt, 1998]. They write „Knowledge denotes the entirety of cognitions and abilities which individuals apply in problem solving. That comprises theoretical cognitions as well as practical directives for all day actions. Knowledge is based on data and information, but in contrast to them always bound to persons." (p. 44, transl. By B. S.). Our notion for knowledge however does not restrict it to such one for problem solving, though this is in a management context of special importance. See also [Polanyi, 1964] who writes on page XI "... that all knowledge is ultimately personal.".

used there differently from here, is substituted by "data, models and methods".

Knowledge distribution is, following Probst/Raub/Romhardt one of 6 building blocks of knowledge management. [Probst/Raub/Romhardt, 1998, p. 51] The respective lead question is: „Who should know what in what amount ..." [Probst/Raub/Romhardt, 1998, p. 53][3].

2.2 Efficiency and effectiveness

Efficiency and effectiveness are two terms with positive connotation. One (therefore) frequently demands to use them both together as measures of success. According to our information they were first discussed in Chester I. Barnard's book „The functions of the executive" [Barnard, 1938]. Efficiency there asks for the fulfilment of the individual and social objectives of the members of an organisation whereas effectiveness refers to the fulfilment of the objective purpose of the organisation. Today, following further Anglo-American sources, efficiency frequently is measured as input-output-relation and effectiveness as degree of achievement of objectives. [Scholz, 1992, col. 533]

Concerning this view Eberhard Witte writes: „It was tried to differentiate between the two terms (Effizienz (efficiency) und Effektivität (effectiveness), B.S.) approximately so that *effectiveness* (*Effektivität)* is understood as measure for the effective completion of tasks (Output) and efficiency as measure for the economic achievement of objectives (Output-Input-Relation). These attempts however did not lead to a uniform scientific language use." [Witte, 1995, col. 263, own transl.].

If one understood by efficiency an output-input-relation then return on investment as a relation between profit (output) and capital (input) would be a measure of efficiency though it obviously serves an achievement of objectives. The author therefore prefers a (decision-theoretical) conception of efficiency as e.g. Bohr formulated it. „A possible output-input-combination $y = (x_1,x_2, ...,x_n,r_1,r_2,...,r_m)$, which is also called (possible) *activity (production process*; → *activity analysis)*, is called efficient, if no other (possible) combinations $y' = (x_1', x_2', ..., x_n', r_1', r_2', ..., r_m')$ do exist such that $x_1' \geq x_1$, ..., $x_n' \geq x_n$, $r_1' \leq r_1$, ..., $r_m' \leq r_m$, whereby the strict inequality applies at least once." [Bohr, 1993, col. 859 f., own transl.].[4]

Building on this view a perception of efficiency may be recommended which already Drucker used: „... the major problem ... is fundamentally the confusion between effectiveness and efficiency that stands between doing the right things and doing the things right. *There is surely nothing quite so useless as doing with great efficiency what should not be done at all*. Yet our tools - especially our accounting concepts and data - all focus an efficiency. What we need is (1) a way to identify the areas of effectiveness (of possible significant results), and (2) a method for concentrating on them." [Drucker, 1963, p. 54].

Following Drucker efficiency demands to do the things right, effectiveness to do the right things. According to Bohr, when one differentiates, one mostly differentiates with this handy formulation. [Bohr, 1993, col. 855 f.]

In the view of the author the problem is seen too much as one with two levels only. In reality we have to regard many levels, e.g. in the following sense: When maximum social welfare is the right thing (objective), then one does (according to ordo-liberal economists) it right to institutionalise a market-economy but also to span a social network. With regard to the intensity of the market relations and the social network we now can start with calculations corresponding to the mentioned efficiency approach of the theory of decisions.

When a market-economy is the right thing (the right economic system), then top management does it right to strive for profit. Because of social aspects (and others), however, they will not strive for an extreme but for a satisfactory level of profit.

When profit is the right thing (objective), one does things right if one strives for cost leadership or differentiation. [Porter, 1998] And when differentiation is the right thing, one does right to concentrate on core competencies. And (for a specific car producer e.g.) it then can be right to specialise in engines. The idea can be drilled down further.

2.3 Multi-level problem and recursion

We realise, that the demand for efficiency and effectiveness must be solved on the different levels. We also recognise, that this question is closely connected with the knowledge, necessary to do this. And we finally see, that on a higher level of abstraction we have the same problem on all levels: On any level one has to ask oneself for the right thing (res. objective, res. knowledge) and how to achieve it best. One achieves it best by doing the right things (res. following the right objectives, res. getting the right knowledge).

From the perspective of the superior level one therefore does things right by doing the right things. This way the problems of the relative system level are solved recursively. Solving problems recursively here means "... tracing a general task back to a 'simpler' task of the same class". [Bauer/Goos/Dosch, 1991, p. 59, own transl.] Like the similar use of recursive objects this is a very effective means to manage complexity [Schiemenz, 2002 a, b].

Efficiency and effectiveness are also related to the parts – whole problem. Efficiency refers to the functionality within the system, effectiveness to the functionality with regard to the supersystem. 'System' here can be any level of an economy. It can be one individual person, a

3 Their question is: „Who should know or be able to do to what extent and how can I facilitate the processes of knowledge distribution and sharing?". It was here abridged because here ability is not identical to knowledge and we are concentrating on knowledge and not on knowledge management.

4 See also [Fandel, 1972].

department, a business unit, an enterprise, but also an economic sector etc.[5]

3. Duties of a position and zoom-concept as a first orientation

In enterprises this multi-level character is since long reflected in organigrams. To build them one – according to the approach of a formal deductive organisation theory [Kosiol, 1962] - starts with the mission of the enterprise – the determination of what is the 'right thing' for it - and breaks this stepwise down until one gets little task-pieces. These then are aggregated to individual positions, these to departments etc. Thus the organigram of positions tells the duties of each subsystem of an enterprise. The knowledge of this structure gives valuable hints where one can get what knowledge res. to whom one can bring own knowledge with a value increasing effect.

To concentrate the acquisition of knowledge to the direct duties of a position however will frequently not result in the wished advantages of specialisation, except the following idea is already included in the job description. Aspects like replaceability, flexibility, further qualification etc. demand that the individual co-operator gets knowledge also beyond the 'edge of the plate'. For the extension of this knowledge the author suggested a 'zoom-model' [Schiemenz, 2004]. With regard to the own position the knowledge must be 'sharp'. The greater the distance of a position from the own position the fuzzier the knowledge about this position can be. It is true that there is a certain redundancy and overlapping of knowledge. However these are positive. According to Nonaka and Takeuchi the resulting common knowledge " ... enables individuals to invade each other's functional boundaries and offer advice or provide new information from different perspectives." [Nonaka/Takeuchi, 1995, p. 81].

Concretely such a zoom-model is realised in the project Skills Planning And Development (SPUD), explained by Davenport and Prusak. [Davenport/Prusak, 1998, p. 75]

To a certain degree this zoom-model should be extended also to knowledge of the past, which actually is not used but may become important in the future again. For more details see part 5.1.

4. Shift of importance from accumulative to structural knowledge

The differentiation between efficient and effective knowledge respectively knowledge distribution is also correlated with the distinction between accumulative and structural knowledge. This distinction goes back to a lecture of Heinz von Foerster titled „Memory without record" (own transl.) at the "First Conference on Learning, Remembering, and Forgetting" in 1963 in Princeton/New Jersey. [Foerster, 1999] The fundamental idea of this contribution is that the human brain does not store information but is networking itself so that it always con compute them new. It is a „…computational mechanism which changes its own inner organisation as a result of interactions with its environment." [Foerster, 1999, p. 137, own transl.]. „The changes of the inner organisation of this computer proceed in a way that certain laws of the environment which are responsible for its order are mapped into the structure of this computer. This homomorphy 'environment – system' is the 'memory' …" [Foerster, 1999, p. 153, own transl.].

Building on this idea, Müller in a paper of the Institute for Advanced Studies in Vienna elaborates the distinction between accumulative and structural knowledge. [Müller, 1994] It shall be explained by a little example: As a preparation for the multiplication of factors of any length we learn in the primary school the multiplication tables. We can bring this to our mind as the recording of a matrix with 10 multiplicands and 10 multipliers, ranging from 0 to 10 each.[6]

It would be completely impossible to store also products of factors with 10 digits each. The corresponding matrix would have 10^{20} elements with up to 20 digits each and would therefore exceed the capacity of the neurons of the human brain by far. We solve the problem by combining the accumulated knowledge of the multiplication tables with the knowledge of the structural relations of multiplication.

Another example which still impresses the author stems from the time when he was a student. In preparation of written exams in mathematics and natural sciences, into which we were not allowed to take any records with us, an exceptionally gifted teacher indicated us some few formulas from which we could deduce the further formulas needed by using our knowledge of the calculus.

A third, actual example shall explain the difference further. One sometimes finds the statement „If Siemens knew, what Siemens knows" [Hill, 1997, p. 13; Müller-Merbach, 1999, p. 91; own transl.]. The exclamation has been generalised in the German title of the book of Davenport and Prusak „Wenn Ihr Unternehmen wüßte, was es alles weiß ..." [Davenport/Prusak, 1999] – "if your enterprise knew, what it all knows".

If we would comprehend knowledge here as knowledge on one single level only we would end with a problem of recursion, the author analyzed in more detail in another paper. [Schiemenz, 2004, p. 3 ff.] Already between two employees an infinite circle would result. A must then have the knowledge of B into which the knowledge of A is included, etc. The problem of the knowledge of a firm therefore can only be solved as a multi-level problem. Already the individual employee has besides of accumulative knowledge structural knowledge, as shown with above examples. Additionally he needs knowledge about the structural coupling of his (accumulative and structural) knowledge with the knowledge of his immediate colleagues and further, although with

5 For this perception of ‚system' see [Schiemenz, 1993a].

6 Physiologically these are networking processes of much higher complexity.

decreasing intensity, about the structural couplings of the knowledge of his immediate colleagues with the knowledge of the colleagues with more distant duties.
Besides this problem has many levels already for the individual employee. He possibly needs no more the structural knowledge, how to multiply but only that multiplying can be done by a simple pocket calculator. And in the future a computer may solve this problem already by call.
May be that Äschylos had similar, but certainly more profound, insights, when he stated „Who knows useful things, not many things, is wise“ [Davenport/Prusak, 1998, p. 7].

5. Meta knowledge as and about knowledge about states and structures

In this chapter some constituents of knowledge shall be elucidated which the author denotes meta because they refer to knowledge about the acquisition, recording, processing and transfer of knowledge. They also are constituents which generally everyone in an enterprise – or even any organisation – independent of the type of enterprise and the level of his/her job should have to cope with a world continuously getting more complex.

5.1 The state concept

A first, but more formal, orientation what one should know gives us the state concept.
State according to this concept is the smallest collection of descriptors (variables, units etc.) of a system necessary to forecast the development of that system (given that one knows the future external factors and the ‘state equations’). The state, to put it into other words, contains that complete past of the system which is still relevant for its future. In control theory that state concept plays such an important role that Tou could write: „Modern control theory starts with the characterization of systems by state variables and the design of systems by state-space techniques.“ [Tou, 1964, p. 11].
For exact, e. g. technical, control processes that concept is very helpful. For more general systems it at least can help to draw our attention to such and only such knowledge with relevance for the future. [Schiemenz, 1984] It thus can contribute to avoid a too extensive preservation of knowledge the danger of which “...lies primarily in a knowledge overkill. The more knowledge is being preserved the greater becomes the ballast, the smaller is the relevance of the knowledge found by a search.” [Sommerlatte, 1999b, p. 66, own transl.].

5.2 Formal Control Knowledge

Efficient and effective is also the knowledge that one can reduce a target/actual deviation recognised by feedback. Given the necessary capacity, one (the controller) in principle needs only a rather imprecise knowledge of the system controlled to do this. However, the better the knowledge about the system controlled is, the faster the target value can be attained. According to the well known theorem of Conant and Ashby [Conant/Ashby, 1970] every good regulator is (res. contains) a model of the controlled system. In regard of knowledge worth knowing this also directs our attention to fields that we can influence now or in the future. Additionally a general knowledge about the consequences of time delays and over-reactions appears useful [Schiemenz, 1972], the more as empirical psychological studies have shown that people generally have a lack of this knowledge [Dörner, 1989].
If one identifies in a state, in which one is, a possible action for which the utility is higher than its cost one should seize this opportunity. If one knows several possible actions one should realise the best. A basic knowledge about path dependencies as well as the difference between unimodal und multimodal problems (problems with one or several relative optima) will certainly proof useful. [For details see Schiemenz, 1982, pp. 45 ff.] Formally that are insights of the theory of optimum search, but also of the cost-benefit-concept, so important in economics.
As a further idea out of the field of formal control the concept of dual control shall be mentioned. When controlling a system one on the one hand changes that system. On the other hand one receives information from that system. The question of dual control is, to what extent we shall do this interaction to change the system compared to the search of information. [Schiemenz, 1982, p. 106 f.] So for example Itami suggests to understand production processes also always under the perspective of their importance for the accumulation of knowledge. This can in practice for example mean “to have key stages of manufacturing done inhouse and keep the information proprietary. ... Letting others do it may give away too much information.” [Itami, 1987, p. 27].
Basically this is single-loop-learning. If this does not suffice one has to change something on the superior level, for example adjust the objectives or choose another approach. This is the fundamental idea of double-loop-learning of Argyris und Schön, who thereby explicitly refer to the cyberneticist W. Ross Ashby. [Argyris/Schön, 1978, pp. 35 f., 330; Ashby, 1963]
This distinction between single-loop- and double-loop-learning correlates with the distinction between efficient and effective knowledge distribution. By single-loop-learning one learns things right as long as one made sure by double-loop-learning that one learned the right things, followed the right objectives or selected the right methods respectively paradigms.
Argyris and Schön use even a third concept of learning: deutero-learning. [Argyris/Schön, 1978, pp. 26 ff.] The term was introduced by Gregory Bateson [Bateson, 1972] and draws our attention to the fact that we learn to learn while we are learning and possibly to learn how to learn.
Finally we want to mention the viable system approach of Stafford Beer. [Beer, 1981] Such viable systems must have 5 subsystems respectively functions. [Büttner, 2001, pp. 139 ff.] The first one manages the respective unit, for example a division of a firm. The second co-ordinates several units which belong together. The third one works

towards the achievement of synergies by means of a co-operation of these units and assures the inner stability. The fourth, the central strategic management provides a continuous adaptation towards the continuously changing economic environment. And the fifth, the superior normative management determines the fundamental norms and rules and defines identity and objectives.
The 'viable system' is recursive in so far as the operative units themselves must be viable systems. This model gives for big nested trusts a hint, what knowledge the different units of the different levels must have. Finally this applies down to the single employee. So, for example, North sees a change of the social contract in the following direction: „Employees develop and control their own portfolio of competencies which then has to prove itself in an always new portfolio of activities." [North, 1999, p. 121, own transl.].

5.3 Knowledge about social systems

An idea, interesting also in regard to deutero-learning is autopoiesis. It is a nice example of the results of an interdisciplinary research. In 1957 Heinz von Foerster, at first more orientated towards mathematics and physics, founded the Biological Computer Laboratory at the department of electrical engineering at the university of Illinois. In this laboratory the biologists Maturana and Varela, founding on the ideas of Heinz von Foerster and other renowned scientists, developed the concept of autopoiesis of the human brain. The brain, according to this concept, is not – allopoietically – organised by input from outside but organises itself on the basis of its own structure and external disturbances.
This approach was in the social sciences, especially by Luhmann [Luhmann, 1987; Bendel, 1993], extended to social systems. From there it finds more and more applications also in business administration and management. [e.g. Kirsch, 1992]
Such autopoietic processes, be it cognitive processes of individual people or of social systems, circulate in a certain sense in themselves. External stimuli – disturbances – are included if they can be attached to the own "world view". However, there remains something that the individual person or the social system just can not see because of its relative closure. Referring to the place in an eye, where the visual nerve enters and where by mere physiological reasons optical signals can not be detected, one speaks here of a blind spot. Information that is not received because of this blind spot can only be recognised by an external observer, the observer of the observer in the social system.
It is valuable knowledge that such blind spots do exist.[7] It suggests to use the knowledge of other members of the organisation and also of external institutions like research institutes or consulting firms. They, because of their activities, have the knowledge of other enterprises too and they therefore are able to compare the knowledge of different firms. A similar approach are the so called benchmarking studies.
This approach of autopoietic social systems seems similar to the inquiring system of Locke as explained by Churchman. Besides this one Churchman elucidates the inquiring systems of Kant, Leibniz and Hegel (as well as Singer). [Churchman, 1971] Also in this regard it appears worth knowing what inquiring system oneself and the social system, in which we communicate, is following.
The reason is that knowledge in social systems is not transferred directly. In fact the sender detaches it from its context and codifies it into data or signals. Only these are transmitted. The receiver must interpret these data in view of his own knowledge and incorporate it into this knowledge. So during such a transfer the receiver adapts the knowledge (of the sender) to his specific knowledge structure and possibly to a specific problem situation. [Heppner, 1997, p. 187]

5.4 Knowledge about competition and co-operation

When distributing knowledge it is of great importance, if it is 'proprietary' or 'public' knowledge and if it is of an tacit or explicit nature. When proprietary knowledge is distributed, its value for the owner is reduced. [Willke, 2001, p. 67; Probst/Raub/Romhardt, 1998, pp. 113 f.] For public knowledge this is different. And only in the case of the distribution of public knowledge one can unconditionally speak of a win-win-situation [Sommerlatte, 1999b] (as long as one excludes an overflow of messages).
Tacit knowing is characterised by the fact „... that we can know more than we can tell and we can tell nothing without relying on our awareness of things we may not be able to tell." [Polanyi, 1964, p. X]. It refers to "... knowing, both of a more intellectual and more practical kind; both the 'Wissen' and 'Können' of the Germans, or the 'knowing what' and the 'knowing how' of Gilbert Ryle." [Polanyi, 1966, pp. 6 f.]. One can acquire such tacit knowledge by interaction with persons or by observation of their behaviour. If we follow the statement of Willke: „*Socialisation* is, like in the classical doctrine, the acquisition of the implicit knowledge of the master by his disciple in joint activities" [Willke, 2001, p. 14, own transl.], then we can speak here of socialisation.
Explicit knowledge, on the other hand, can be expressed and externally recorded and made generally accessible.
As concerns the distribution of knowledge one may have to act on the assumption that there is a certain tendency towards Darwiportunismus. „This term (created by Christian Scholz, B.S.) combines Darwinism with opportunism in a way that the former as evolutionary paradigm of a ‚survival of the fittest' is being attested likewise to individuals and enterprises while the latter is assumed for the employees only: a behavior, maximising utility by using everything as an instrument that is of

7 This view is more precise than that which can be found in [Davenport/ Prusak, 1999, p. 40]. „Knowing also means that one knows what one does not know." (Transl. by B.S.). We have here a multi-level problem similar to that of the (German) title of the book itself.

advantage for ones own benefit.“ [Bleicher/Berthel, 2002, p. 19; referring to Scholz/Stein, 2002; own transl.].
In this situation it is worth to know how one can motivate another person to give us their knowledge, especially their proprietary knowledge. For this on the one hand a common stock of knowledge, possibly meta-knowledge, plays a role that allows the attachment of the others' knowledge. That is true especially for tacit knowledge. On the other hand, he who gives his knowledge will expect a certain reciprocity. This can either result from an agency-information situation.[8] Or one develops a trustful relation to the partners. [Lorenz, 1999]
A trustful relation is the more necessary as for an evaluation of the knowledge that shall be transferred a paradox can appear. An offered information can first be evaluated when it had been exactly studied. Then however one has already acquired that knowledge. [Lehner/Hildebrand/Mayer, 1995, p. 175; Arrow 1974]
To develop such a trustful relation, the knowledge and realisation of the tit for tat strategy, proposed by Anatol Rapoport is helpful. Hoping that also the other one is willing to share his knowledge one reveals one's own knowledge. Afterwards one copies the respective anterior behaviour of the other one. This strategy is friendly because it is co-operative in the first step, it reciprocates positive as well as negative behaviour and pardons the latter after the other has changed his mind. [Axelrod, 1984] It is also possible for a higher system level. Subsystem A^1 of system A gives subsystem B^1 of system B his knowledge, when it can be expected, that B^2 gives his knowledge to A^2. That however already demands intensive communication within A und B and between the leaders of A and B.

5.5 Knowledge about knowledge sources

Employees are asked to describe their knowledge and to make this knowledge accessible in an intra- as well as in internet. We find this tendency of knowledge mapping not only in research institutes but, with growing importance, also in other non-profit organisations and in enterprises. This supplies other people with information, and, if this is attached to their personal knowledge, meta-knowledge about the knowledge of others which possibly is of relevance for themselves. By using the knowledge discussed in the last chapter one then can approach these others and ask them for details.
Such information is more and more included in databases about knowledge sources, knowledge portfolio, knowledge structures, knowledge applications and knowledge developments. [e.g. Eppler, 2002]

5.6 Knowledge about knowledge management

The statements about efficient and effective knowledge distribution made here are in principle an attempt to make the knowledge of the author about these problems explicit hoping that it is worth and the reader is capable to attach it to his own knowledge. The statements can be seen as part of a general doctrine of knowledge management though they should inform any individual employee whereas the general doctrine is more or less orientated towards knowledge managers. For them it is naturally valuable knowledge because “knowledge management means the whole body of organisational strategies to create an 'intelligent' organisation. In view of people it is concerned with the organisation wide level of competencies, training and learning capabilities of its members; in regard to the organisation as a system the problem is the creation, use and development of the collective intelligence and the 'collective mind'; and as to the technological infrastructure the question is mainly if, how and how efficiently the organisation uses a communication- and information-infrastructure congenial to its mode of operation.“ [Willke, 2001, p. 39, own transl.]. How much each individual person is affected by this content of knowledge management depends on the concrete view. If knowledge management is seen institutionally then it is the duty of a restricted number of knowledge managers. In contrast, if it is seen functionally then it is (recursively) the duty of each subsystem of each level of the organisation: top management, management of business units, departments etc. down to self-knowledge-management of the individual person. How much the doctrine of knowledge management assists this functional view needs to be tested but to answer this was not the intention of this contribution.

8 For its management see [Schiemenz, 1985].

6. Conclusions

An enterprise is a system of highly specialised people. It has to succeed in an increasingly competitive world economy. For this an efficient and effective distribution of knowledge in the sense of “who shall know what” becomes more and more important.
The answer to this question naturally depends on the individual position. But some general statements could be made. Firstly, one should concentrate more on structural than on accumulative knowledge. Secondly it could be shown that cybernetics, control theory, game theory, social system theory and the doctrine of knowledge management may be helpful.
The statements were made on a more or less deductive basis though controlled by experiences of the author in various fields. But I am quite sure that the practical application of the stated 'hypotheses' will prove useful.

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