



## Műhelytanulmányok

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# **Knowledge management support in decision making**

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"There is little doubt that we have entered into the knowledge economy..."  
(KPMG,1998)

## **Abstract**

Many of business decisions require logical, step-by-step analysis of the available information or knowledge. This rigorous analysis complements other steps in the decision making process, such as identifying the problem, working with affected parties to develop options, selling the idea to the stakeholders. In the past consultants or experts helped the decision makers in this process. By now these actors are replaced by knowledge managers in those applications where decision makers are supported by decision support systems with built in knowledge base.

Keywords: Decision making, Knowledge management, Knowledge base, Business decisions

## **Összefoglalás**

A legtöbb üzleti döntés a rendelkezésre álló információ és tudás logikus, lépésről lépésre történő elemzését igényli. Ez az alapos elemzés kiegészíti a döntéshozatal egyéb lépéseit, mint pl. a probléma azonosítása, a különböző csoportokkal való együttműködés az alternatívák kidolgozásakor, az ötletek kommunikálása az érintettek felé. Régebben tanácsadók és szakértők segítették a döntéshozókat ebben a folyamatban. Mostanra az ő helyüket átvették a tudásmenedzserek, főként azokban az alkalmazásokban, amelyekben a döntéshozókat tudásbázissal rendelkező döntéstámogató rendszerek támogatják.

Kulcsszavak: Döntéshozatal, Tudásmenedzsment, Tudásbázis, Üzleti döntések

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## 1. THE RELEVANCE OF KNOWLEDGE MANAGEMENT

Nowadays, in our complex and turbulent environment, in the presence of strong and ever growing competition and a global economy, and continuously growing consumer sophistication businesses try to find new ways to survive and excel. There are some important organisational trends that we can observe: the need to reduce time-to-market, the need to globalise businesses, and the need to explore both external and internal data continuously and constantly. From these we can turn to another important need: namely to the need to support managers making better business decisions.

When we have a look at the possibilities and limitations that are imposed on knowledge management, the first step is to give a definition of what can be understood by knowledge management.

For Karl-Erik Sveiby knowledge management is the art of creating value from an organisation's intangible assets. He identifies two tracks of activities of knowledge management: (1) management of information i.e. knowledge as objects versus (2) management of people i.e. knowledge regarded as processes. (Sveiby, 1999) It is the first track which takes the ways of human thinking less into account thus where the cognitive limitations can cause more problems.

David Skyrme gives a more explicit definition: knowledge management is the *explicit* and *systematic* management of *vital knowledge* - and its associated *processes* of creation, organisation, diffusion, use and exploitation. (Skryme, 1998)

- Explicit - Surfacing assumptions, codifying which is known
- Systematic - Leaving things will not achieve the benefits
- Vital Knowledge - We have to focus since we do not have unlimited resources
- Processes - Knowledge Management is a set of activities with its own tools and techniques.

If we study the Knowledge Management White Paper published by the Delphi Group (Koulopoulos, 1997) we can see the different approaches cited from the well-known experts of the field. John Ladley says that knowledge management is a process for converging many disparate technologies into *new business models*, while reflecting the need to retain and value the intellectual capital in these processes.

According to David Moon knowledge management requires tools that focus on the relevancy and accessibility of information and the ability to tailor and present information effectively to people who need it most. He prefers terms such as knowledge sharing or knowledge networking.

Joseph S. Rubinfeld shares David Moon's view that knowledge management involves locating, organising, sharing and maintaining knowledge and intellectual assets. A knowledge management program will promote organisational learning, enhance innovation and improve organisation's ability to sense and respond to industry changes.

Richard Stuckey of Andersen Consulting defines knowledge management as a systematic process for achieving organisational goals through the creation, acquisition, synthesis and sharing of information, insights and experiences.

Peter Drucker, guru of management science said that the purpose of management is the productivity of knowledge. On the base of this statement Robert Turner gave an other definition: Knowledge management is the systematic weaving together of professional disciplines and organisational domains to leverage an enterprise's intellectual assets for learning, innovation and productivity to create value.

Karen Vander Linde uses knowledge management as the process of transforming information and intellectual assets into enduring strategic value for an organisation's clients and people. There are many different ways to promote the generation and leverage of knowledge, and technology plays a key role as an enabler of knowledge management.

After surveying these definitions Table 1 identifies their common characteristics and gives a meta-definition.

Knowledge Management is a	– value-driven organisational process
	– new business model focusing on intellectual assets
	– new technology of information management
	– knowledge-based approach of finding, compiling and distributing information
	– new management tool

Table 1. Definition of knowledge management

Knowledge management seems to be a new wisdom. (Newcombe,1999) Leading companies turned to knowledge management and nowadays they are using knowledge management systems of integrated databases. These systems enable smaller units, divisions or departments of the company to tap into the wealth of knowledge has assembled from different sources.

Why do companies put emphasis on knowledge? First of all companies that find and use knowledge to their advantage compete better in the market. Nowadays an average 70% of companies' value is in intangible assets. Companies do not compete in the production of tangible assets any more, but there is sharp competition in services, software development.

Companies would like to mine the knowledge possessed by their employees. There is no guarantee that a manager or a worker will stay with the company for ever. But the company needs their knowledge. That's why companies would like to share the intellectual property. Firms permanently invest in their employees when they are trained and they do not want to loose these investments when employees leave the firm. Knowledge management is a safe way of capturing employees knowledge.

Surveying the history of information systems there has been a growing realisation that investments in information technology (EDP, MIS, DSS, ES) have not paid off in performance. To be successful an information system must be designed and operated with due regard to organisation and behavioural principles as well as technical factors. Management do not always know what information they need and information specialists often do not know enough about management in order to produce relevant information for the managers they serve. Executives spend 30% of their time to know what they do not know. Knowledge management is a new experiment to overcome that trouble. Managers need both explicit knowledge and tacit knowledge. Tacit knowledge is in the minds of others and there is only hope that they are ready to share their knowledge.

**2. KNOWLEDGE MANAGEMENT AND DECISION MAKING**

The key question is how can we generate knowledge, capture the raw materials of knowledge, like data, information and experience from those who possess them. If we could get these ingredients, how can we transform them into knowledge to increase the quality of decision making.

At the beginning the task of knowledge eliciting was delegated to knowledge officers. Stacie Capshaw, a senior analyst at Delphi Group published that as many as 800 firms had

someone designated as a chief knowledge officer world-wide. (Newcombe, 1999) They were executives who had the power and the experience to share knowledge within the organisation. Being in a high position they applied centralised control in the process of knowledge finding, compiling and distributing.

In our days chief knowledge officers are replaced by knowledge managers, who belong to a certain business unit and represent the knowledge of that particular unit. There are two types of such knowledge managers: (1) brokers who connect people looking for knowledge to those who have the knowledge, and (2) analysts who build up knowledge systems and requirements for the systems. We might add a third role which can be called knowledge expert, who is responsible for the processing and presenting explicit and tacit knowledge in an appropriate format.

Managers are still eager to reach more and more information, even more information - as it is well known - can lead less knowledge. Knowledge depends - at least in the business - less on the amount of information than on the number of connections that link the information. Knowledge management systems allow managers to navigate and make sense of these connections easily.

When I tried to focus on the connection between knowledge management and decision making I have taken formal strategies, methods and other suggested means of determination used in various fields of management science and incorporated them into a hypothetical decision path framework based on Keeney’s research, which might be useful for describing that relation. (Keeney, 1992)

The following diagram helps to conceptualise the challenging and difficult processes surrounding decision making and I will discuss how knowledge management can support the different processes of this framework.

<b>Issue and cultural context</b>					
Goals and values	Perceptions and beliefs		Collective knowledge	Institutional structure	
<b>Planning and appraisal</b>					
Foresight		Monitoring		Evaluation	
Issue diagnosis					
<b>Decision making modes</b>					
Emergency action	Routine procedures	Analysis centred	Elite corps	Conflict management	Collaborative learning
<b>Decision actions</b>					
Issue familiarisation	Criteria setting	Option construction	Option assessment	Reaching a decision	

Figure 1: Framework processes in decision making

**2.1 Knowledge management contribution to problem identification**

It is important to realise that issue-related and cultural contexts of a certain problem are products of social constructions. In other words, what we know (or believe) as a reality is filtered through our social constructions of concepts, words, ideas, values, beliefs, morals and behaviours. Indeed, it can be argued that people socially construct the problem set. The social construction very often provides names or labels for the problems e.g. it indicates who is responsible for causing the problem and solving the problem. The social construction can specify how the various problems relate to each other e.g. they are independent or dependent.

The following four contexts are discussed in the framework:

- goals and values
- perceptions and beliefs and morals
- collective knowledge and
- institutional structures.

*Goals and values* refer to preferences for states or things. Examples of goals that drive business decision making include: growth, profitability, stability etc. A knowledge base must contain information about the actual goals and values, moreover it has to follow the changes in preferences. Many executives are struggling to articulate the relationship between their organisation's goal and its intellectual resources and capabilities. They should link knowledge oriented processes, technologies to business strategy. They have to translate the goals of the organisation into a strategic course of action. It requires a „knowing how” type knowledge from them.

*Perceptions, beliefs and morals* describe people's conceptions of their current situation and cultural context, and how they view how the world works. Much research in the field of psychology has shown that people's perceptions, beliefs and decision making heuristics are often biased, at odds with scientific data and at odds with normative theories. These findings provide additional explanations about why it is so difficult to build up a knowledge base, and why we should recognise that there are different types of knowledge.

*Collective knowledge* includes scientific knowledge as well as common knowledge. The structure of these two subsets is basically different. It is a big challenge how to represent both knowledge in the same knowledge base. Let us imagine that we can use a professional marketing report based on a big survey, and at the same time we have personal experiences about our costumers and these two types of information are contradictory. Which one should we use or integrate in our knowledge base?

*Institutions* are patterns of expected human behaviour which are enforced by both positive and negative sanctions. Formal and informal political institutions, legal institutions, economic institutions and community institutions all help to shape the context of business decision making. Requirements, laws, expectations must be incorporated in the knowledge base for the successful operation.

## **2.2 Knowledge management's role in the planning phase**

Planning and appraisal provide oversight and guidance functions for the entire decision making endeavour. Decision modes would be implemented based on the outcomes of the diagnostic process which comprised of four sub-components:

- foresight
- monitoring
- evaluation and
- issue diagnosis.

*Foresight* entails imaging future possible worlds and assessing opportunities and threats characterise those worlds. Scenario building, conducting scans of environmental, technological and other trends, and Delphi processes are widely used foresight techniques discussed in the literature of future research and planning. Through foresight an organisation can assess whether current issues may become even more problematic or loose their importance. Foresight can also reveal new issues and potential events that the organisation needs to consider. Given these aspects of foresight, it is clear that foresight is not about

predicting the future but concerns opening to the future with every means at our disposal. A knowledge based system should be able to support such kind of foresight.

*Monitoring* is a very straightforward concept. The goal of it is to collect data and information to keep track of existing situations and to warn new and emerging situations. Through these activities we can build up different data bases, but there are many practical questions associated with them. What data needs to be collected, how often and in how many places? In cases when data are collected in real-time, are computer resources capable of storing large amount of data and processing it in a flexible and efficient manner? Efforts to improve monitoring are increasing but typically face financial and administrative constraints. Furthermore efforts to monitor e.g. consumers' behaviour suffer from the above mentioned and additional problems, such as privacy.

*Evaluation* helps decision makers learn from the organisation's experiences. Evaluation needs to take place at top level to help understand how effective past decisions have been as related to the company's goals and values. In business sometimes it is advisable to probe hypothetical consequences of path not taken. It is hoped that such knowledge which is gained from the evaluation experiences is passed from top level to lower levels so everyone can build on the painfully gained wisdom. As we know one of the key function of knowledge management is to share experiences. Organisational learning is a topic of active knowledge management.

In organisations people use knowledge in different ways depending on the task they are performing. From a knowledge perspective foresight, monitoring and evaluation are knowledge intensive analytic tasks. Results from foresight and monitoring and evaluation activities feed into *issue diagnosis*. The goals of the diagnostic activity is to use information to identify states-of-the-world that require action or are in some sense abnormal and to relate diagnoses to decision making treatments or solutions. Major fields of knowledge, such as medicine and law, are organised around the basic concept of diagnoses and action. The construction of most expert systems also encompasses the IF-THEN framework. Many psychologists have argued that this type of knowledge representation is fundamental to human intelligence. Unfortunately the field of business decision making does not seem to be blessed with a set of diagnostic categories that can be linked to decision modes and then decision actions directly.

### **2.3 Knowledge requirements in different decision making modes**

Different decision making modes provide different requirements and challenges for knowledge management. We can describe at least six typical decision making modes:

- emergency action
- routine procedures
- analysis centred decision making
- élite corps
- conflict management
- collaborative learning.

None of these modes exists as a discrete type, instead various modes are likely to act in combination, simultaneously or over time. Over the past several decades, the first four modes - the routine procedures, emergency actions, analysis centred decision making and elite corps modes have been typically dominant. Consequently knowledge management supported mainly these forms of decision making. Since the early 1980s, conflict management has been increasingly recognised as a vital part of decision making since management practice tends to

be opened and participatory. Nowadays the concept of collaborative learning (generating a collaborative knowledge) is receiving widespread attention as a way to deal with highly complex issues where values are diverse and knowledge is limited.

*Emergency actions* require rapid decisions concerning the crisis situation. Knowledge of the situation must be gathered quickly and may be incomplete and it is typical that predetermined procedures and judgements are used. These procedures and judgements may come from a knowledge base which is quite often a documentation describing the procedure itself and the key parameters which should be controlled. There is high risk that even in the case of clear signals and instructions decision makers will not be able to handle the situation. (Turner, 1996)

Day-to-day decisions concerning familiar situations typically require specified, standardised information. Confronting the issue requires experience and common sense, but does not require extensive and unique policy analysis. Although others within and outside the decision making organisation may have participated in establishing the broad policies and knowledge that led to *routine procedures*, few others participate in implementation of the procedures. So the building and implementation phases of decision making can be separated. This happens when a decision support system is developed for bankers to evaluate loan applications. (Bohanec, 1998)

In most of the organisations analysts are employed to develop carefully-crafted technical or policy recommendations on an issue for the ultimate decision maker who is typically the head of the unit or the whole organisation. The problems are usually more complex than routine day-to-day problems, have not been solved many times before, entail higher consequences and may cause some threat or conflict. Due to the need for analysis, response times must be hours, weeks or even months. Quantifiable information often is more preferred. While external or internal people may participate in the decision making process, they typically provide only input concerning their goals and values. *Analysis centred decisions* are based on research and evaluation and the results are stored in a knowledge base for permanent usage for years. A research report or a feasibility study could be good examples for that type of knowledge base.

In the case of *élite corps* senior members of the organisation reach agreement or a majority view on the issue at hand. Staff presentations are followed by discussions and negotiations among the senior members only. Knowledge comes from these presentations or in many cases remains hidden in the senior members' mind. These decisions are mainly based on tacit knowledge which cannot be articulated easily. (Shadbolt, 1999) Issues undertaken by *élite corps* processes always have major consequences for the institution and these decisions are typically made by intuition.

*Conflict management* typically begins with a meeting of people who represent various sides of the conflict. The process may be kicked off with issue immersion, which might itself be a source of conflict. Knowledge is presented by variety of people in different structures and forms. These presentations are followed by discussion and negotiation. This may lead to more information being sought, leading to further discussion and negotiation. Alternative dispute resolution methods such as mediation, negotiation and arbitration are used to settle conflicts. A conflict resolution process needs to be implemented where the knowledge of the problem is substantial. Conflict management is able to enrich the knowledge of the participants, but only in those cases where they are opened to new and different information. Decision conferences e.g. can provide appropriate atmosphere for information gathering and sharing. (Phillips, 1992)

In case of *collaborative learning* various members of the decision making organisation work together as equals to address an issue which is widely acknowledged to be neither easily addressed nor understood. It is an iterative process for information gathering and distribution,

which helps to restructure of the knowledge concerning an issue. As information is obtained, people involved in the learning process are encouraged to revisit their original goals and beliefs, and the nature of the issue may be collectively rethought. The goal of the process is to force people to check seriously the issue and change their opinion to accommodate new realities. A collaborative learning process which is practically a knowledge change process takes time. Leaders must know when to push and when to have patience in the process. (Cohen, 1990)

#### **2.4 Need of procedural knowledge in decision actions**

In the decision making literature of corporate planning and management science the normative model is typical that have been proposed as an ideal way of problem solving which can provide logical means for making decisions. Normative models describe how decisions should be made, rather than how they are made in practice. In a typical decision making process according to the normative model there are actions like:

- issue familiarisation
- criteria setting
- option construction
- option assessment and
- reaching a decision.

On the base of field studies and review of the literature we can identify a basic structure or shared knowledge in case of unstructured decisions as well. There are three basic phases: identification, development and selection. Both approaches confirm that decision making is a process that uses time in order to gain knowledge and commitment through a prolonged process of exploration and learning.

The first phase generally is devoted to problem identification. At the beginning of a decision making exercise work is needed to identify what is the problem, which needs attention and solutions. This step of *issue familiarisation* focuses on getting everybody involved in the process who is familiar with the issue at hand and put their knowledge together. People with different background, knowledge and perspectives have to develop a common language in order to discuss and understand the issue. Knowledge will not be available for them until they cannot find the appropriate ways of representing knowledge. The same is true for the task of communicating knowledge.

*Criteria setting* involves specifying criteria to judge the reasonableness of decision options. Goals and criteria are in close connection. The strategic choices, that companies make regarding technologies, products, services, markets, processes have a profound influence on the knowledge, skills and core competencies. We do not have to start the criteria setting process from scratch each time if we have stored criteria sets of similar cases. We should tailor them according to the actual case, moreover consideration should be given to applying actual weights.

*Option construction* phase involves identifying decision options. For familiar issues the option set may have been already defined. In other cases options constructed by others may be borrowed. This is the base of benchmarking. When the issue is unique and complex we can gain knowledge using other ways e.g. brainstorming to generate options. In case of great uncertainty the option set has to built up using an incremental strategy: small steps, monitoring, reassessment, additional small steps, etc.

*Option assessment* involves the use of analytical methods to evaluate how well each options satisfies the evaluation criteria mentioned earlier. For well known problems

experience may substitute for analysis. An ideal knowledge base contains not only data or information, but different methods, techniques to assist quantitative assessment of the options. Most of DSS focus on the assessment phase of the decision making process, so it is rather easy to build up a DSS library containing different packages. with different models and techniques inside.

*Reaching a decision* means that we have to choose from the set of the options. Not only for the assessment process, but for the choice there are numerous methods. The business literature favours the application of cost/benefit type techniques. Other approaches suggest different rules. Requisite decision modelling by Phillips represents a shared reality that is created by a group of people considering the issues. Requisite models are developed by comparing, at any appropriate stage in the development of the model, the current results with the holistic view and judgements of participants. These are all well documented methods like HIVIEW and EQUITY which can be easily implemented for such purpose. Decision conference can be an ideal framework for knowledge sharing and applying a DSS where there are discrepancies between the intuitive judgements of the participants.

### **2.5 Knowledge management as a support function**

It is quite clear that a decision making process can be supported successfully by knowledge management., but what should we do to reach that ideal mode of operation. Someone has to carry out the following knowledge management activities:

1. Appointment of a knowledge leader - to promote the agenda, develop a framework
2. Creation of knowledge teams - collect people from different disciplines
3. Develop knowledge bases - collect best practices, experts directories, market intelligence
4. Active process management - of knowledge generation, knowledge gathering and storing
5. Set up Knowledge Centres - facilitating knowledge flow
6. Use collaborative technologies - intranets or groupware for rapid information access
7. Creation of intellectual capital teams - to identify and audit intangible assets (knowledge)
8. Creation of Knowledge Webs - networks of experts who collaborate across divisions
9. Shareware - provide occasions and locations that encourage knowledge exchange.

The knowledge manager can co-ordinate these activities since he/she is a key player in the process of knowledge management. He works like a conductor. His job requires special abilities and skills. Herewith I try to collect those characteristics and challenges which are important to be successful in this field. Deep knowledge of the field: he does not have to know everything, because in that case he could build up a system and solve the problems on his own, but he should be able to understand, analyse and sort others' contribution. He should be able to accept others' approaches or views. He must be sensitive to time and costs: time pressure is quite usual and the budget is always limited. He should manage conflicts. Experts have strong personalities and he has to work with them. Last but not least he should have excellent communication skills.

Co-ordinating a knowledge based project is challenging and difficult. One source of frustration and anxiety is related to the process. Experts often do not know what kind of decision making process they are participating, they often do not know what their roles and responsibilities are and what kind of expectations they should meet. Moreover they also - like ordinary people - use unconscious routines to cope with complexity. These routines, known as heuristics serve us well in most situations, but when we build on knowledge these traps might be dangerous.

### **3. CONCLUSIONS**

This paper tried to analyse the link between decision making and knowledge management therefore used a special decision path framework. The role of the framework was to demonstrate that knowledge management can provide valuable contribution at different phases of the decision making process. The required knowledge however highly depend on the context and nature of the problem and the mode of the problem solving process.

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## BIOGRAPHY

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