

## PROFESSIONAL MONOGRAPH REVIEW

Mildeová, S.

Title of the monograph:

**Systems Approach to Knowledge Modelling**

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## Review

A starting comment to the review:

Knowledge science is a developing field that is still an open question in theory and practice. A lot of theoretical approaches to knowledge, knowledge modelling and knowledge management exist.

Academic research continues to explore the knowledge science and produce insights and tools that would be of great value to knowledge workers. A new book, **“Systems Approach to Knowledge Modelling”**, written by **Ludmila Dömeová, Milan Houška and Martina Houšková Beránková**, is a good example of such research, and a successful way of supporting practical use and further research.

In the subsequent narration I will try not just to scrutinize the text, but to realize the concealed and implied meaning of the authors. I will stand as an observer, who pretends to act as the reader him/herself would do by expressing own opinion, desires and expectations of the monograph “Systems Approach to Knowledge Modelling”. In other words, I hope some new scientific knowledge will be made meaningful by sorting and sifting the bits and pieces into the following book review, in order to provide a larger picture.

## Content

- The content
- The goal of the book
- The book structure

As A.P. Wierzbicki says that technology now changes civilization eras, from the industrial to informational and knowledge

civilization, similarly the authors understand “knowledge age” to be a natural development of society.

A lot of theoretical approaches to knowledge and knowledge management exist. As stated in the preface, the main purpose of this book is, from present state of knowledge science, to make two accesses to knowledge - the object-oriented and process-oriented approach - closer. The systems analysis is used for this purpose. (The application of the systems methodology and systems approach goes through the whole book.)

I think that one of the aims of the book is based on a very wide scope of literature. And we have to admit that from five professionals we will have five definitions of knowledge. Thus the authors’ objective could be to convince their target readers about it, and to make various approaches clear to each other.

The new environment of a knowledge society necessitates changes in managerial behaviour. In the context of these necessities, decision/makers need efficient support in contributing to the “building of knowledge” for future and current managers. Another goal of this book is to help people see the transfer of innovation from the academic/research environment to economic practice deals with knowledge support for the decision making process of managers for improving the competitiveness of organizations in the EU market, and thus to support networks formed from university teachers, researchers, students and practitioners.

Concerning the chapters' structure and judgment on the adequacy of the book topic to the content: *the book* begins with the list of dedications connected with the relevant projects and their financial support, and the work is divided into four main chapters: Part I, "FUNDAMENTALS"; Part II, "PRODUCT VIEW OF KNOWLEDGE"; Part III, "PROCESS VIEW OF KNOWLEDGE"; and Part IV, "APPLICATIONS AND CASE STUDIES". Each chapter begins with a short introduction and each chapter (and also subchapter) ends with a useful summary.

The first part provides a full explanation of relevant terms, plus summarizes the historical development of the sciences dealing with knowledge and describes the present status of the field. Based on my reviewer's assertion it is well done.

Also the objective of this chapter is to provide a theoretical foundation for the creation of knowledge-based organizations and knowledge management. But it is not a how-to guide for building such organizations. Rather, it is more like a nice attempt to convey as much as possible in a higher context: "The publication is also intended for those who need to work with knowledge. They are not necessarily only knowledge workers whose main scope of employment is to manage and realize processing knowledge in organizations. It can be also a inspiration for managers .....who can get a basic orientation in the current trends in the knowledge science", the authors said.

Perhaps a small critical comment could be made here. In the section "Knowledge in Decision Support Systems" a lot of space is concerned with the basic of DSS, and thus the connections between knowledge and DSS are not thoroughly covered.

The heart of the book is the object-oriented and process-oriented approach, and the differences between product and process

approaches to knowledge modelling are shown. The authors, in their book, write that the application of the systems approach to knowledge modelling shows how to proceed and make analysis in the knowledge science.

The book shows why a product view of knowledge and its modelling is more suitable in cases when a business company is stabilized and knows its business strategy and the strategy is ideally based on standardization. Unlike this, the process approach is connected by authors with knowledge sharing and developing unique expertise and opinions. It is absolutely correct - it makes a world of difference.

In the subsequent Part 4, several demonstrations and examples are also provided. It covers implementation issues such as: a semantic network for the knowledge visualization, math models using linear programming and game theory, knowledge concept application in educational texts, knowledge creation and share by a knowledge interactive portal and learning modules.

In the preface, in partial summaries and in the final summary, to provide a general overview of a significant slice of science, the authors organize and synthesize the reported knowledge into a much larger, more meaningful package.

A list of literature and a final summary close the book.

## Analysis

- The evaluation
- The critical comments on the book

The important thing the reviewer has to do is to speculate on the topic him/herself. I should also undertake through my own research to discuss the theme, assess the authors' ability to express and explore this theme, and provide an opinion of the book.

The main point of the reviewed book is knowledge. The section defining knowledge covers general distinctions between knowledge, information and data; explicit versus tacit knowledge. This part of the book is devoted to clear, simple explanations of what's out there. (Read just this part of the book, and you would be talking like an expert).

In order to evaluate knowledge formulation the authors use the SECI model that is connected with Nonaka, I. and Takeuchi, H. Indeed they say

"..... an explosion of different approaches development could be dated to 1995, when the Knowledge Creating Company and the SECI Spiral (Nonaka, Takeuchi, 1995) was formulated." And they are completely correct.

While some aspects are less meaningful, others have to be marked out as prerogative issues. This is surely knowledge in organizations. That is helpful for readers thinking on this topic.

According to my own research the understanding of the term 'knowledge' in management practice is not clear. Some managers see knowledge as a result of the causal chain 'data – information – knowledge'. Others lean to the definition of knowledge as a state of mind (a result of mental processes, the

outcome of which is understanding), or they define knowledge as gnosis (insight) and point to its changing nature in terms of its dependence on interaction with the environment. The system environment contributes also to the support of the individual nature of knowledge (socially constituted from subjective experience). Similarly in firms, the term knowledge is explained in different ways. Such variability corresponds to the objective nature of knowledge in the context of technologically designed knowledge applications, in comparison to the clearly subjective nature of knowledge in soft systems approaches. Due to the modelling method used, the knowledge has an objective nature here. The system environment – the individual users – contributes also to the support of the subjective nature of knowledge. According to P. Drucker the knowledge workers are IT technologists, so we expected such an understanding in Czech companies. It is therefore surprising that firms in the questions "Which interpretation of knowledge management is applied in your enterprise?" and "Who is a knowledge user in your enterprise?", marked primarily tacit knowledge and personal growth of everyone.

The basic idea behind the book is that knowledge modelling is exhibited in two different ways. These are:

1. the "product" approach,
2. the "process" approach.

The book highlighted for a reader some of the overlaps, and distinctions between them. The authors, in their book *Systems Approach to Knowledge Modelling*, write: "The differences between product and process approach to knowledge generate a problem of suitability of these two approaches in different situations."

I absolutely agree with the statement that knowledge engineering

subordinates the formal representation to capacities of automated computerization and sometimes neglects the system aspects of knowledge modelling, and in contrast to knowledge engineering, the discipline of knowledge management deals with knowledge from the content point of view.

This approach are put in the context of the currently prevailing understanding in the Czech Republic as describe P. Berka, J. Havlíček, V. Sklenák, A. Rosický, etc: the recipient (human) is primarily in touch with data. Based on his present experiences and attitudes (i.e. knowledge) he interprets this data and derives information from it – thus receiving messages which are, in a way, new for him. On the basis of this information he alters his present knowledge and creates new knowledge, which he further uses in the evaluation and processing of data and information. This concept corresponds to famous word theories according to references that the authors show inside the text and in the list of literature in the end.

I enjoyed the sections on cases that are demonstrated by the examples that were being continuously solved. It is important for practitioners, the theories behind the techniques will be apparent. The theoretical and practical applications of the elementary knowledge concept is provided by semantic network – analysis (connections between semantic networks and knowledge maps are also mentioned), by individual learning and transforming educational texts into knowledge texts and by mathematical models (concretely by linear programming models and by the game theory models).

The description of the potential of math models as some specific type of elementary knowledge source, situated in the end, will be of particular interest to knowledge professionals as it is there that their expertise will be directly applicable. That's where the best and most useful part of the book comes into play: Part 4.

## References

- The information source working
- The quotations and references to the ideas in the book
- The list of literature

At first the goal of the book reviewer is to discuss the content of the book; deduce if the authors managed to reveal the core; whether they properly achieved the purpose of the book and to make the critical comments on the book. I hope I have covered all of this.

Secondly the goal of the book reviewer is to provide analysis of what they had read. The problem is the quality and a quantity of the quotations and applied literature sources generally.

I think the information source working, research and studying of literature are correct. The authors used all relevant literature sources that are shown in the list of literature. With respect to the lack of information in the Czech Republic, it was necessary for book working to read foreign literature that deals with the discussed topics. That seems a reasonable quotation under the “fair use” doctrine of copyright law, with proper attribution to the source.

For prospective extension of the book I recommend in part related to knowledge in decision making process and its support by decision support systems use some work by D.J. Power, S.L. Alter, and E.F. Mallach, and for the connections between complexity theory (not systems theory) and knowledge management practice use publications by ISCE and by K. Richardson.

## Originality

- The comparing the book with a similar work by a contemporary
- The expertise of the contents authenticity
- The opinion of new outcomes

In the previous step my function as the book reviewer was to determine whether the subject of the text is treated clearly, in a way that is likely to enable readers to grasp and to appreciate the knowledge presented. My additional responsibility is to provide appropriate comparisons with similar books (and find out if other texts on the same subject exist) and provide expertise of the contents authenticity.

The book "Systems Approach to Knowledge Modelling", summarizes and enlarges results of long time systematic work of the author's collective. By comparing the reviewed book to other books in the given category, I have found the book authentic and unique. It is the same in the context of scientific peer reviewed journals, such as the Journal of Knowledge and Systems Sciences and relative to conference presentations I have seen in the last few years.

The main purpose of the book is to bring unheard of pieces of information and a new point of view to the knowledge workers community. With a focus on the systems approach to knowledge modelling, the authors try to form a new framework for thinking about knowledge and create a new collection of tools and methods. Particularly in part concerned with the process approach to knowledge the authors bring a new view to knowledge transfer and sharing, an original micro theory "Combined model of learning" is newly introduced, and new findings are shown by applied mathematics and operational research in illustration examples.

## Book authors

- The identification of the author's qualifications
- The reference to the author's other writing

The book is written by three authors, Ludmila Dömeová, Milan Houška and Martina Houšková Beránková. They work in the Czech University of Life Sciences Prague, which defines the specialization of the book authors.

The authors are mainly academics with specialties in the area of systems science. They are scientists as well. In the last few years Ludmila Dömeová, Milan Houška and Martina Houšková Beránková have also been working on research projects: first of all the Leonardo da Vinci project "TRANSFAIR", No. FR/06/B/P/PP-152513, the project "Interactive Portal for Knowledge Management and Share", No. CZ.04.3.07/4.2.01.1/0035, and the grant project of the Ministry of Education of the Czech Republic, No. MSM6046070904 "Information and Knowledge Support of Strategic Management".

As far as the reference to the author's other writings, some outputs of their work have already been presented in books and in articles in scientific journals (for example the International Journal of Knowledge and System Science), and also in conference proceedings. New knowledge was defended within the domestic conferences (for example Systems Approaches) and at important international specialized forums - scientific congress and conferences (for example The New Roles of System Science for a Knowledge Based Society), and as I am informed, there have been positive international responses.

### Pay attention to:

Beránková, M., Dömeová, L. (2006): "Knowledge Points in Communication Interface", *International Journal of Knowledge and System Science* 3 (3), pp. 29-34, ISSN 1349-7030.

Dömeová, L., Houška, M. (2005): "Objectives Evaluation as Knowledge Development", In: *The New Roles of System Science for a Knowledge Based Society*, JAIST Press, Japan, ISBN 4-903092-02-X.

Houška, M., Beránková, M. (2007a): "Elementary Knowledge Representation by Linear Programming Model", *Journal of Knowledge and Systems Sciences* 3 (3), ISSN 1349-7030.

Houška, M., Beránková, M. (2007b): "Individual Learning Based on Elementary Knowledge Concept: Experiments and Results", In: *Proceedings of Conference ICBL, Florianopolis, Brazilie*, ISBN 978-3-89958-277-2.

Houška, M., Beránková, M. (2007c): "Specific Type of Knowledge Map: Mathematical Model", *International Journal of Knowledge and Systems Science* 3 (2), ISSN 1349-7030.

Houška, M., Beránková, M. (2008): *Semantic Network as a Form of Knowledge Representation and Knowledge Map*. *Scientia Agriculturae Bohemica*, 39 (Special Issue 2), pp. 139-147, ISSN 1211-3174.

### Readership

- The author's intentions
- The audience for which the book is intended

While especially valuable for knowledge workers (the value and relevance to records professionals is not questionable), a wider audience should find this book useful. In "Systems Approach to Knowledge Modelling", the authors lay it out for everybody who is interested in working with knowledge and/or use it for their professional purposes: university teachers, researchers, students and practitioners from managerial practice (all businesses are knowledge based). The reader could be a student or a manager, not a peer of the knowledge workers or the academics (= scientists) who wrote this monograph. The breadth of topics covered is relatively wide; however, their relevance to the broader audience varies.

Technical terms were used, of course, but each basic term was carefully defined at first use. I found this book easy to read and understand.

The authors take a reader through their thoughts and show very interesting examples. As was mentioned above, the author's professional area is systems engineering, especially operations research. Thus from this area there are practical applications and case studies.

## Style of writing

- The writing mechanics
- The language
- The relation of the book to a literary trend

The book "Systems Approach to Knowledge Modelling" is written in a professional style, in accordance with the present literary trend, clearly written, well organized, and with good editing.

Command of language is high, the authors express their thoughts excellently in English. Adequate proof reading was provided.

Clarity of reasoning is high and it is easy to follow the flow of logic and see how the conclusions follow the information presented. There is enough abstraction in the form of clustering to offer hands-on advice for a reader.

## Verdict

- The overall evaluation
- The experience while during the reading

The audience for which the book is best suited would similarly be knowledge professionals, though many essays will be of interest to everybody who is interested in working with knowledge in general. The topic is very interesting and it is not narrowly specific. It uses a broad definition of knowledge.

It has a lot of focus and depth required by a scientific communication and academic audience. Thus it is a very useful addition to the existing library of knowledge science literature.

The main research goal is achieved, the focus matches with the derived conclusions. They derive conclusions directly from their findings.

The absolute quality of the book and the command of language are high. I do think there is a lot of food for thought here and a lot of statements are helpful.

They have a very good set of references. References to relevant literature are considerable, built on reference to prior work, and not presenting old material.

The authors could be considered as professional writers of scientific books. I think the topic, quality of the book and new outcomes are such that the authors should be encouraged to submit this to the scientific publishing level such as ISCE publishing series books.

Closing comment to review, the recommendation for buying:

## What did I experience whilst reading?

I tried to communicate to the readers mind the ideas, new knowledge and sensations that I experienced during reading and while researching the content, in this way I was explaining to the reader the exact meaning that the authors - Ludmila Dömeová, Milan Houška and Martina Houšková Beránková - presumed to transmit. I tried to stand as a reporter, who briefly informs readers of the book "Systems Approach to Knowledge Modelling", as an analyst, who makes judgments basing them on my own experience. I hope these book review explanations make the reader feel this "that is just what I thought" sensation.

**I would recommend buying the book "Systems Approach to Knowledge Modelling" by the authors Ludmila Dömeová, Milan Houška and Martina Houšková Beránková. Even if you're not one of the knowledge modellers, everyone who works in a business today needs to understand this topic.**

I want to end with the wonderful words, that finished the book and that could stand as a motto for knowledge science everywhere:

“Reasons, purposes, aims, meanings, goals and objectives, these terms are keys to knowledge. It is only way how people can understand reasons of tasks that should be done, sense of curriculum that should be studied, etc. This is crucial for people’s motivation and creativity. Motivation, because people know why to work, creativity, because people know that problem and objective of its solution matters, but way of solution is up to them, up to their ability to apply their knowledge and experiences.”

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Review by Stanislava Mildeová, 31th July 2008