

Knowmap as a New System in the Assessment and Management of Knowledge

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Abstract — The successfulness of companies today is based on the quality of individual employees and their ability to work in team and effectively with the right information. Comprehensive methods have been created to work with information that deal either with acquiring new information or with mining additional, originally hidden, data from already available information. This, however, leads to the so-called explosion of information. For managers, such situation is equally adverse as, if not worse than, not having enough information. It has therefore become suitable to filter only the important information that actually helps in the decision making process. The main qualification prerequisite of an employee has turned more and more from their physical efforts to their intellectual abilities and skills and knowledge. For this reason the human work has to be viewed as a harmonious interconnection of physical and intellectual knowledge and abilities, i.e. as intellectual capital. The intellectual capital usually comprises of knowledge and information stored in the heads of individual employees, of information stored in transactional and analytic databases of information systems, of incorporated and functional processes in process-oriented applications, logical rules of company applications and also of perceiving the customers and their knowledge of the company. Management of this capital is no trivial task that is usually handled by some kind of knowledge management system. To help solve this task, an innovated method of effectivity assessment and optimization of work teams with focus on the knowledge management has been developed – the Knowmap. The method combines the CWA technique (colour-word associations) with questionnaire examination that stems from the Excellence Model (Common Assessment Framework, CAF). By combining the two methods and owing to the designed solutions, the available knowledge potential of a company can be better managed and utilized and the effectiveness of existing knowledge and information use is significantly improved. Main goal of the article is to briefly introduce the innovative system of knowledge evaluation in an organisation – Knowmap. The system can produce completely new views on management of knowledge and uncover hidden causes of problems.

Keywords - information, knowledge management, Common Assessment Framework, tacit knowledge, explicit knowledge component, Knowmap;

I. INTRODUCTION

Assessment and management of knowledge (KM) have become key factors of successful entrepreneurship across all fields. General level of expert knowledge and its wide array has become absolute commonplace today, the competitive advantage today, however, is the acquiring and keeping of top level knowledge and information in the given field [1]. Despite this reality being known for many years now, ordinary managers still have troubles identifying the true level of knowledge and knowledge management in their company. The main problem lies in the fact that knowledge is not a summary of professional expertise requirements of each employee, but a complex system of tacit and explicit knowledge that must be functionally shared and dispersed among individual employees [2]. This complex system (knowledge management) can then bring the expected and required competitive advantage [3].

The level of knowledge management is closely related with the concept of learning organisation, in which the personal and group knowledge is thoroughly diagnosed and acquired, used and shared [4]. A key to successful KM is to create a cognitive infrastructure that enables simultaneous adaptive learning and provides an organizational reliability infrastructure through the management of unwanted, unanticipated, and unexplainable failures in the KM's required capabilities [15]. It seems obvious that informed managing through knowledge management in an organisation is a key quality indicator, not only in its deployment, but also in its usage. Reference [5] presents 8 indicators of use of knowledge management in a company:

- Motivation (how well the employees are motivated to work productively).
- Knowledge capture (the ability to capture important knowledge).
- Stored knowledge (the usefulness of captured knowledge in solving new problems).
- Personnel training (the effectiveness of employee learning mechanisms).

- Knowledge transfer (the effectiveness of sharing important knowledge).
- Creative thinking (the ability of employees to create new solutions).
- Knowledge identification (the effectiveness of identifying knowledge).
- Knowledge access (the effectiveness of accessing important knowledge).

In terms of classification systems for knowledge management practices, the most widely cited is Nonaka's model (in Figure 1) known as Socialization-Externalization-Combination-Internalization processes. The model, that was adapted for instance by Baskerville and Dulipovici [18], proposes four classes of knowledge creation based on the conversion of knowledge between tacit and explicit forms. Those types of knowledge can be extended for sharing at different aspects from inside to outside such as personal, group, organization, and inter-organizational aspects. According to [14] human, structural and relational capital, enhance both operational and financial performance of firms. The effect of knowledge sharing on firm performance is mediated by intellectual capital. The spiral structure of knowledge shift makes knowledge shared by fostering innovation or refinement in community of practice continuously.

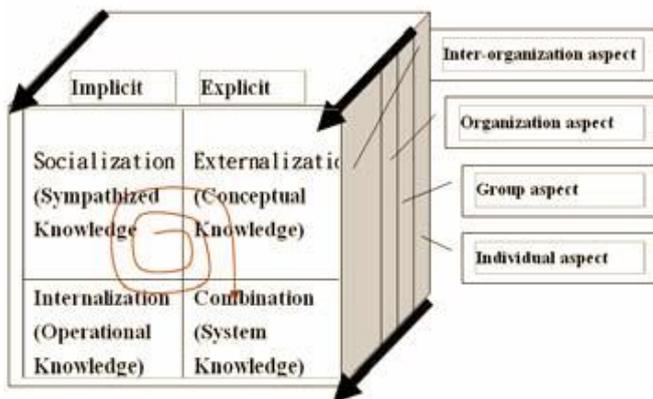


Figure 1 Knowledge sharing and shifting (Data source: [8])

There are several approaches of knowledge utilization that are usually based on differences between Western and Japanese patterns of knowledge management. These are related to organizational characteristics, such as employment systems, career patterns, and organization structure. Effective knowledge management is argued to require departures from the logic of hierarchical organization and the M-form structure. But it appears that in most cases N-form knowledge management is characterized and suggested as more appropriate [6].

The primary carrier of knowledge is a person, in our case an employee or a member of a solving team. These individual people then form work or project teams that solve specific tasks and projects. These teams carry collective knowledge and within their environments further consolidation of this knowledge occurs [7]. This simple reasoning shows that in practice 3 main factors are important for successful deployment of such team:

- Separate level of knowledge of each individual.
- Level of cooperation and communication of individuals when sharing knowledge in team.
- Management and placing of internal processes in individual teams for complete achievement and use of required collective knowledge.

The responsible manager thus has these fundamental questions to answer:

- Have I chosen the right people?
- Have I put the team together well?
- Have I created the conditions to make this work?

Probably the easiest way is to check these facts in practice, which is also the most commonly used method. If the current arrangement of the team and conditions of their work does not show results, it is iterated until it gradually becomes a truly high performing work “instrument” of the company. Unfortunately this method has a fundamental enemy and that is time. Today's companies cannot afford such experiments, which is why managers try to get as much information in advance and optimize with the shortest possible time. Sometimes new knowledge management technologies will fall into misuse or produce unintended consequences if they are not properly understood and administrated in the proper organizational and business context [13].

To solve this problem, we have created an innovated method of effectivity evaluation and optimization of work teams with focus on knowledge management – the Knowmap. This method is based on applying psycho-diagnostic method of CWA, together with a dynamically adapted questionnaire that is based on the principles of the Excellence Model CAF (Common Assessment Framework) [12]. This paper is structured as follows; section 1 describes the literature study carried out to conduct this development work; section 2 illustrates the proposed solution Knowmap system; section 3 provide results of our work and discussion of advantages and disadvantages.

II. MATERIAL AND METHODS

To solve some of the issues mentioned above Knowmap system was developed and implemented. By combining the two methods, we were able to significantly improve the diagnostics of efficiency of knowledge organisation and utilization in company. The essential innovation lies in the fact that our proposed solution does not use one method to verify or expand the other, but they are genuinely intertwined and

used together. At the same time, the original character of both approaches has been kept as much as possible. The Knowmap system is based on CWA (colour-word associations) method and a dynamically adapted questionnaire that is based on the principles of the Excellence Model.

1. Psycho-diagnostic technique of CWA.

The CWA technique has been long used to analyse the potential of human resources in specific situations and processes. It is a combined projective technique that uses calibrated word sets (word modules) and a palette of 8 colours by M. Lüscher. The basic principle of the CWA technique is to evoke association based on an external stimulus (e.g. word). This association (thought) happens all the time, immediately after presenting the stimulus (see Fig. 2).

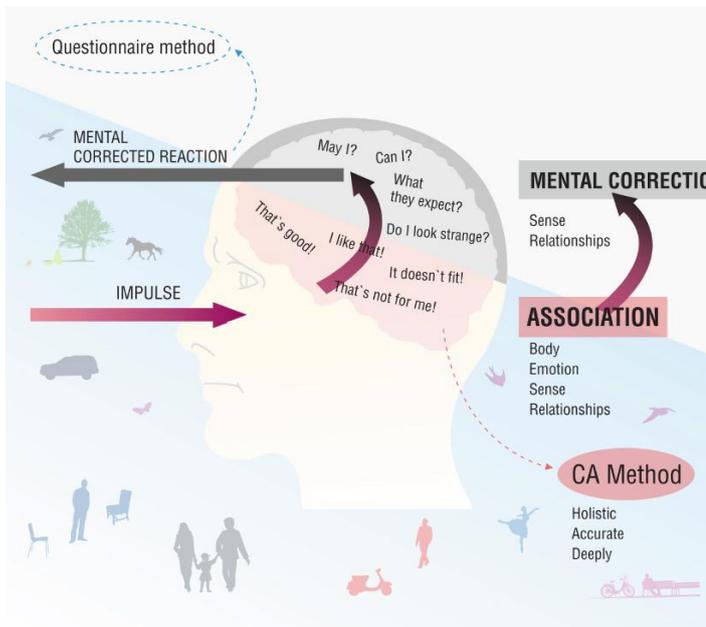


Figure 2 Basic principle of the CWA technique

The CWA technique (CA Method) is one of the few methods that deals with **measuring and evaluating these “primal uncensored associations”**. With this method people can be presented with stimuli in any form (words, images, movies, sounds or scents). The stimuli **evoke associations, which we let people react to through colours**. By evaluating their responses and comparing them with the norms we can precisely describe the psychological qualities of their associations. The execution of the testing itself is done via an online scanner that captures the mentioned associations using the 8 colour combinations and carries out further analytic processing. The whole method is based on neurobiology. Further information on the method can be founded at www.camethod.com/en [19].

During the testing, the respondent is not limited by the amount or quality of “known” information or the level of their

thought process, because the answers are provided through association mechanisms that occur almost identically with all people. The associations only differ in their content quality and targeted focus; this however already reflects the individuality of each person. This undeniable advantage also becomes the key limitation of interpreting the testing results however. The word module is thematically focused, but the unevenness of results for individual words can be significant. This leads to criticism to decrease the credibility and validity of output information and relatively difficult extrapolation of conclusions of the testing, and specifically to recommendations for follow up interventions (i.e. how to solve the inadequacies).

2. Extending the CWA technique with Excellence Model elements

To be able to successfully utilize the abovementioned CWA technique for knowledge and knowledge management evaluation, it is critical to prepare a field-specific, suitable and relevant set of words that will serve as basis to evoke the sought after associations. The word module should contain at least 40 words from the selected thematic field, i.e. specifically from the field of knowledge management in our case. Under the CWA testing evaluation, each word is reviewed by a standardised parameter. Among typical parameters are “communication”, “cooperation”, “information sharing”, etc. These parameters cannot be chosen at will as they are already part of currently valid interpretation of CWA testing.

It is obvious that to objectively evaluate the state of knowledge and knowledge management, it is necessary to set up criteria or indicators that will unequivocally evaluate the quality of knowledge and knowledge management in a company. After considering various forms of audits and questionnaires, we decided for the excellence model as framework that will define the evaluation criteria. The Excellence Model as a tool for quality evaluation (TQM – Total Quality Management) introduces 5 main criteria to evaluate the prerequisites of attaining excellent results:

- a. Organisation management
- b. Strategy and planning
- c. Employees (HR management)
- d. Partnerships and resources
- e. Organisation processes

Under these main criteria, additional subcriteria are defined according to the specific requirements and the setting of the given evaluation. E.g. the C criterion in knowledge evaluation has 3 additional subcriteria defined:

- c1) Employees – qualifications;
- c2) Employees – knowledge sharing;
- c3) Employees – training and coaching.

Criteria defined in this way are of principal importance for the new methodology of knowledge testing that we call the “Knowmap“ (Knowledge Mapping).

III. RESULTS AND DISCUSSION

The process of knowledge mapping in an organisation is represented in Fig. 3. In the preprocessing phase, diagnostic methods are adjusted to the specific organisation according to its needs. In this case, it is about defining a calibrated set of words and selecting areas to be evaluated in the Excellence Model SAEM (Self Assessment Evaluation Method). The second phase – processing – is about carrying out the diagnostic methods and processing the results online. In the third phase – postprocessing – the user is presented with the final reports of diagnostic methods and with proposals on possible improvements in the organisation.

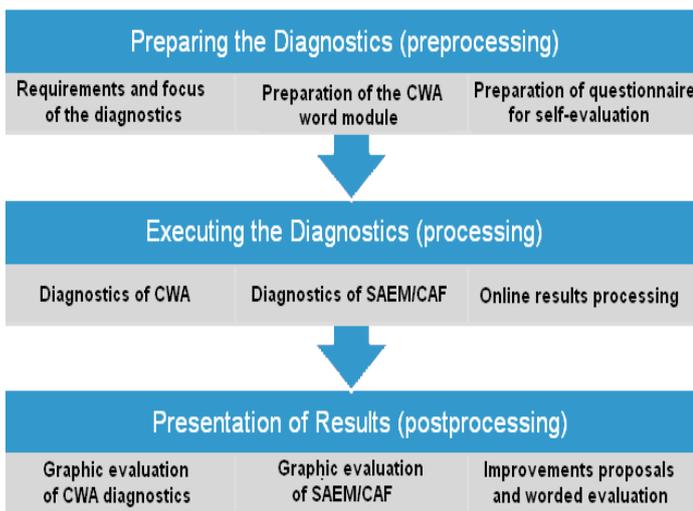


Figure 3 Schematic process of the KNOWMAP methodology

The above demonstrates that Knowmap is based on the innovative interconnection of the psycho-diagnostic CWA method with basic principles of the Excellence Model. Knowmap connects the immediate associations in the given thematic field (CWA) with the elaborated approach to key criteria evaluation of the Excellence Model, CAF.

I. Before commencing the testing and evaluation, the Knowmap methodology requires us to carry out the following steps:

- Create a set of words that is the basic input for the CWA technique. The words are generated in respect of the clear characteristics of knowledge (explicit and tacit) in the given organisation and are also focusing on the knowledge management field. There should be 40 words at minimum, 80 at maximum.
- Define subcriteria that stem from the Excellence Model and are relevant for the evaluation of knowledge and its management in the given

organisation. There should be at least 8 subcriteria, 20 at most.

- Assign the words to individual subcriteria in a way that the division of words into subcriteria is as balanced as possible. This step is crucial and often requires further modification of the input word module to precisely match the given evaluation.
- Create questionnaire for additional evaluation of the Excellence Model – at least 2 questions for each subcriterion.

II. The actual realization of the whole testing is actually considerably fast and simple as all the diagnostic processes are carried out online [19]. Each respondent first has to go through the interactive scanner in the CWA test.

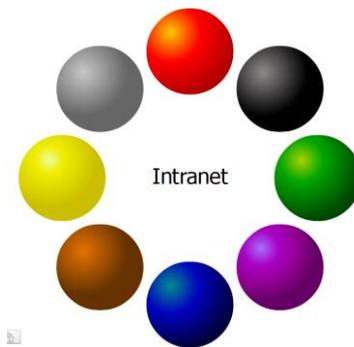


Figure 4 Interactive online scanner of the CWA technique

After going through the scanner, the respondent fills out a self-evaluation questionnaire in accordance with the Excellence Model standard and the results are immediately processed with the appropriate SW tools in real time.

III. Immediately after the test has been concluded by the last employee of the given organisation, the diagnostic admin can see the results and proposals on intervention measures that stem from the achieved results and proposed steps in the knowledge base of the online system (see fig. 3 and fig. 5). Afterwards, the results are transferred to the user with the possibility of consulting with the supplier of the tool.

The Knowmap system was used for analysis in two medium enterprises and five small enterprises in Czech Republic and Slovakia. There were analysed about 210 employees of the enterprises. The involved managers most valued the following ways of utilizing the gained outputs in the companies:

- Formulating information strategy in the company;
- Describing the system of knowledge sharing in the company;
- Identification of key knowledge resources;
- Characterisation of information infrastructure in the company;
- Application of customised quality assurance system of knowledge management.

The Knowmap system has some reasonable advantages in comparison with standard approaches:

- Knowmap is not a standard psychodiagnostic methods providing only assessment of the human potentials usually through questionnaires. Knowmap combines psychodiagnostic method with the model of excellence to get more possibilities in the phase of the results interpretation.
- Knowmap provides much more than only diagnostic of the problems. It is oriented on solving the problems. Users get not only description of the recent situation but also the list of the proper interventions to improve this situation.
- Generally it is very fast and interactive. By using on-line application clients can get almost instant results and helps.

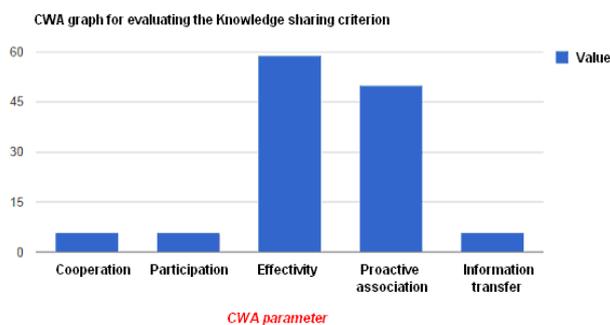


Figure 5 Example of graphic representation of the evaluation of “Knowledge Sharing” for individual CWA parameters

The Knowmap system is not suitable for everything. What are the recommendations and what are the constraints:

- Knowmap is based on the psychodiagnostic method and therefore the human and social aspect of the implementation is needed.
- Knowmap is the mainly supportive system for managers. Knowmap is not build as a tool for the direct management and execution.
- Knowmap is very strong in the crisis, when clients/managers cannot decide for the proper solution. The on-line solution and instant results are the big advantage in this case, too.
- Knowmap cannot solve the particular details of the problems, it is more oriented on the abstract level of knowledge management.

Knowmap is much more proper for the knowledge and problems oriented clients. Using in the fixed and conservative environment is not recommended.

IV. CONCLUSION

From the process design managers view, the knowledge processes are individually too unstructured to be managed by a knowledge management infrastructure. The success of the KM initiative depends on many factors, some within our control,

some without. Typically, critical success factors can be categorized into five primary categories:

- leadership;
- culture of organization;
- structure, roles, and responsibilities;
- information technology infrastructure;
- efficiency measurement.

Processing processes that are related to knowledge management in an organisation is a long term mission. Their longitudinal character destines them to be solved in a time scale of several years. If the knowledge management is to comply with the principles of systematicity, manageability and certain methodological correctness that secures the validity and reliability of using the knowledge, it has to be procedurally grounded in the culture of the organisation. This paper briefly introduces the innovative system of knowledge evaluation in an organisation – Knowmap. With regards to the need of complex evaluation of knowledge and its management, we decided to combine a psycho-diagnostic technique with the evaluation of quality of the given characteristic on the basis of the Model of Excellence. The proposed method has already been successfully tested and brings numerous possibilities of further use in practice, especially from the point of fresh approach to solving the given issues. Testing and evaluation can be carried out in little time and without direct involvement of external experts. A specific method of testing can also bring completely new views of the given field and uncover previously hidden causes of problems.

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