

Knowledge audit concepts, processes and practice

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Abstract: - The paper considers the importance of knowledge management in the new economy, and focuses on the concept of knowledge audit and its need for developing and monitoring the knowledge management implementation. A special focus is made on knowledge audit concept and the approaches and processes proposed and used in practice. The paper highlights also some tools utilized in knowledge audit and the metrics used for knowledge measurement and evaluation of knowledge management benefits for organizations. A special attention is paid on balanced scorecard methodology and social network analysis use in knowledge audit. A new extended knowledge audit approach is proposed and some measurement considerations. The paper presents results of surveys carried out in some small and medium organizations for determining the knowledge management needs and usage, as well as knowledge audit pilot results.

Key-Words: - knowledge audit, knowledge metrics, knowledge management, knowledge audit approaches

1 Introduction

In the last century, an unprecedented speed of new knowledge creation was observed, leading to faster innovation, sophistication of products and services and their supply and demand, and deep changes in all areas of public life [17], [19], [21]. Business processes have become more dynamic than ever before, and the new technologies have contributed to a fast changing environment. In the new economy knowledge in both of its forms – tacit and explicit – has become one of the main factors for sustainable development and competitive advantage. Within the competitiveness and economic growth objectives of the European Union, the concept of knowledge has

emerged as main differentiator and unique resource, and European companies and organizations have become more concerned how to successfully manage their knowledge resources and gain benefits from them [10], [12], [44].

Knowledge management (KM) has emerged as response to the increased complexity in the business world and the need to take advantage of the available knowledge assets in organizations. It has developed as a new practice-oriented scientific discipline, exploring the opportunities of new management methods, cultural and organizational approaches and technology infrastructures in service of the companies. Initially, driven by information and communication technologies (ICT) uptake, later

KM has focused on human and culture-related issues. In order to grasp the KM benefits, companies need a serious change, including not just new technology deployment, but also their integration into knowledge and business processes and their proper usage by motivated employees [10].

In general we are witnessing today a wide shift in KM approach. Due to the emergence of social technologies and resulting appearance of collective intelligence, companies need to reformulate their overall KM strategy. Previously focused mainly on knowledge capturing within company repositories and development of sophisticated knowledge portals, KM today has been rebuilt as new social tool and perspective for cooperation and collaboration [21]. Social networks matching employees, customers and suppliers, are integrated around various projects, aiming to enhance company performance and to provide better customer service [28]. Thus, knowledge flows within and between companies has become much more intensive and demand better understanding and investigation within the context of value creation and knowledge exploitation.

Based on practical cases, the following essential factors were stressed for KM success [18]:

- Knowledge-oriented corporate culture
- Continuous learning and knowledge sharing
- Technical/ organizational infrastructure
- Senior management commitment and leadership
- Knowledge champions, such as chief knowledge officers (CKO)
- Link to economics or industry value

In addition, several authors note that the success in KM implementation strongly depends on starting with deep analysis of knowledge resources availability and gaps, their flows and usage in organizations [16], [17], [18], [19]. Carrying out knowledge audit (KA) should establish a sound base for determining the main goals and tools of the KM strategy, and at the same time, identify KM awareness levels and attitudes. Exploring the available tacit and explicit knowledge in the organization, and how knowledge processes underpin business processes and create value for them, which is the organizational framework related to technology, culture and leadership, the study of all these issues should provide input for building the knowledge management system (Fig. 1)

The scope and methodology of KA vary largely in scientific literature and business practice. This paper will, thus, provide an insight into different KA approaches, processes and measurement considerations, and on this base, propose an extended KA approach. The paper extends the work

presented at a WSEAS conference [10], and the work carried out within the TRAINMOR KNOWMORE [11], and the FP7 SISTER projects of Sofia University [1], [2].

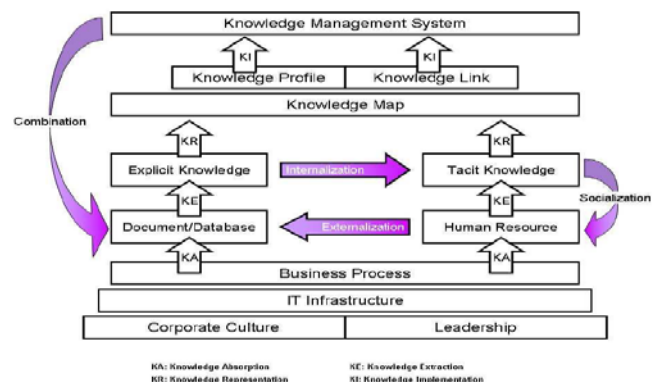


Fig. 1 The knowledge management framework, Source: [36]

2 Knowledge audit overview

2.1 The knowledge audit concept

The KM implementation should be based on KM strategy and action plan. However, in order to prepare them, it is necessary to identify knowledge assets and knowledge work in the organization, making them visible for any KM initiative [21]. As Liebowitz [16] stresses, there is a need to understand the organizational knowledge state on which to base strategy setting, prioritizing KM activities, and identifying specific KM needs and opportunities. Thus, he considers that a knowledge landscape map (Fig. 2) could be used for snapshot of the company knowledge assets and flows and later for assessment and monitoring of KM.

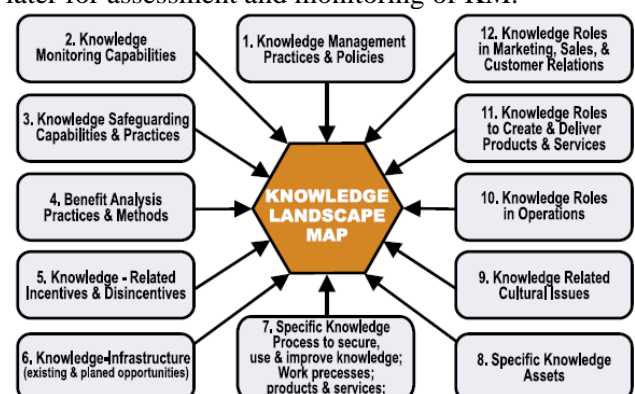


Fig. 2 The knowledge landscape map, Source: [16]

Linking corporate strategy with knowledge management strategy is the first step towards KM implementation in organizations [7], [16]. Here, a

clear understanding is necessary of the present state of the organization and the work needed for achieving its business objectives, as well as the skills, competences and knowledge presently available and needed for reaching the business goals. This is considered as filling-in existing knowledge gap (what the organization should know and what it does know) in order to bridge the recognized strategic gap (what your organization is doing and what it should be doing) [7], [17]. At the same time, it is important to estimate the organizational readiness for KM [38].

The concept of KA (sometimes refereed to as knowledge inventory or knowledge assessment) largely varies in research and business practice:

- According to Dalkir [17], and Hylton [4], the knowledge audit identifies the core information and knowledge needs and uses in an organization, their gaps, duplications and flows, how they contribute to business goals, and which areas need improvement.
- Liebowitz [16] stresses that KA answers the questions what knowledge exists and is missing in an organization, who needs it, and how will be used the knowledge in order to solve the business goals. He points out that KA assesses potential stores of knowledge and capturing tacit knowledge is an important step of this process.
- For Pfeifer et al. [26], KA focuses on the evaluation of required knowledge at a certain point of time, the carriers of this knowledge, the connections between the knowledge carriers and the need for additional connections. It serves as an instrument for uncovering weak points, for encouraging improvements and for controlling the existing measures of KM.
- Other authors [23] claim that KA identifies several issues linked to culture, people, content and processes in an organization, e.g.: knowledge-sharing bottlenecks, lacks of skills and capabilities, problems of understanding of the strategic value of knowledge and its correct interpretation, ineffective transfer of expertise.

KA is commonly used to quantify the value of organization's intellectual assets and knowledge health [8], [17], [18]. Therefore, KA should be performed regularly in order to monitor and quantify the progress and usefulness of the KM strategy and action plan. Theoretically, KA never ends – it is a continuous process of assessment of the KM status – before any KM initiative, as well as monitoring their effectiveness and further needs for improvement.

More generally, KA investigates how an organization applies KM within its business processes. It aims at the following objectives [18]:

- uncover strengths and weaknesses within the actual corporate management of knowledge assets and business processes
- analyze circumstances, barriers and enablers of KM as corporate culture, leadership, human resources management (HRM), information technology (IT), process organization and control
- increase awareness of KM within the company;
- design a roadmap for KM implementation and measure
- collect measurable data for control purposes.

It is important to stress that Information Audit (IA) differs from KA, whereas the former focuses on available documents and content, and the latter – on tacit knowledge of the employees. According to Henczel [24], IA finds out what information resources and services people need to do their jobs, and how these resources and services are actually used. Considering that “knowledge is information in context”, IA could be regarded as an important part of KA. Subsequently, taking into account that KM addresses the main knowledge dimensions – tacit and explicit, organizational KA should focus on both of them.

Finally, Wiig [19] provides a comprehensive list of techniques supporting the analysis before launching KM initiative:

- Knowledge surveys and Knowledge audits – with the purpose to ‘Provide tangible evidence of the enterprise’s knowledge-related strengths, weaknesses, opportunities, threats, and risks’
- Knowledge Assets mapping and Intellectual Capital (IC) Inventorying – to identify, locate, and assess knowledge and IC assets, and on this base set priorities and identify action needs
- Knowledge Landscape Mapping – aimed at determining initially KM practices, programs, projects, infrastructure elements, policies and procedures, etc., and on a later stage monitoring them
- Creating Knowledge Maps (K-maps) – to indicate locations, sources, representation and nature of knowledge assets, flows of knowledge and its application in business processes
- Competitive Knowledge Analysis – focused on identification of areas of expertise and important IC assets providing competitors strengths and opportunities
- Knowledge Flowcharting and Analysis (KFA) – aimed at improving knowledge flows on bases of identification of existing paths, means of

knowledge flows between individuals, groups and in the organization as a whole

- Knowledge Diagnostics – to understand knowledge-related mechanisms and processes in order to analyze situations and to conceptualize KM interventions and actions, both at individual, group and organizational levels
- Critical Knowledge Function Analysis (CKFA) – to identify critical operational, professional or managerial functions, and determine the potential value of their knowledge-related improvements;
- KM Benefit Assessment – focus on potential effects of KM initiatives as a base for planning, action, and monitoring of KM implementation.

To sum up: KA, similar to other audit processes and methodologies, aims to investigate the company status at a given moment, focusing, however, on knowledge availability and further needs, knowledge flows and sharing among employees, knowledge usage in business processes for adding value of the organization, as well as knowledge SWOT. KA is a repetitive process aiming to clarify whether knowledge resources are properly managed and what KM strategy, tools and solutions could contribute to gaining maximum benefits. KA is as well an important tool for monitoring of KM implementation and benefits [1], [3].

2.2 Knowledge audit measurement and tools

It is generally accepted that measurement of intellectual capital, and subsequently knowledge assets, creates large difficulties. Most companies are aware of the importance of measuring innovation and knowledge creation results, and have acknowledged their shortcomings. Nevertheless, few companies act towards improving these capabilities. They do not measure the right things, do not measure enough, and, in some cases, do not measure at all. Many companies advance their business at random when it comes to making critical decisions. Well known is the statement that if one cannot measure, one cannot manage [30].

There is a lack of a generally accepted methodology for valuing intangible assets. Sveiby [42] suggests four categories of measuring approaches for intangibles. These categories are an expansion of the classifications suggested by Luthy [41] and Williams [40], namely:

- Scorecard methods (SCM): The range of components of intangible assets or intellectual capital is identified and indicators and indices are generated and reported in scorecards or as graphs. SCM methods are similar to DIC methods. The difference is that SCM don't

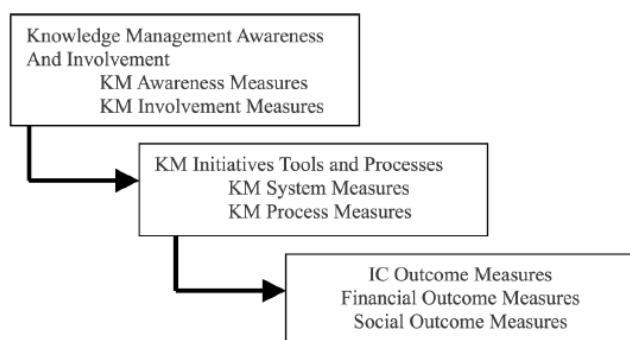
estimate the financial value of the intangible assets.

- Direct intellectual capital (DIC) methods: DIC method estimates the financial value of intangible assets by identifying their diverse components. After identification of these components, they can be evaluated, either individually or as an aggregated coefficient.
- Return-on-assets (ROA) methods: The well known formula of ROA method is the average pre-tax company's earnings for a period of time divided by the average tangible assets of the company. The result is a company ROA that is then compared with its industry average. The difference is multiplied by the company's average tangible assets to calculate average annual earnings from the intangibles. Dividing the above average earnings by the company's average cost of capital or an interest rate, one can derive an estimate of the value of its intangible assets or IC.
- Market capitalization methods (MCM): calculate the difference between a company's market capitalization and the book value of its shareholders' equity as the value of its IC or intangible assets.

Sveiby [42] suggests that different measurement methods offer different advantages. In merger and acquisition situations or for stock market valuations ROA and MCM methods are useful as they are financial methods that offer financial valuation. These two methods can also be used for comparisons between companies within the same industry. Financial value of IC could be illustrated also by these two methods. DIC and SCM are much more of full value methods. Their advantages are that they can create a more comprehensive picture of a company's health than financial metrics. They measure closer to an event and reporting can, therefore, be faster and more accurate than purely financial measures.

Kannan and Aulbur [43] propose a three-step model for IC measurement shown in Fig. 3. The three steps include: identification and awareness, systems and output measures, and outcome measures of tangible financial returns. The first step, KM awareness, measures the organization's awareness and readiness for KM. This stage also identifies core-competencies, establishes knowledge milestones, and includes culture audits. Existing system and process effectiveness are measured in the second stage. This step involves a current status assessment, and indicators for future enhancement or change. In the third stage, the processes and

systems are linked to basic effectiveness standards and financial and social outcomes.



Source: Kannan and Aulbur (2004)

Fig.3 Three step model, Source: [43]

On bases of survey of measures used for intellectual capital measurement, Liebowitz et al. [30] consider some quantitative measures which could be used also in KM measurement. As possible new metrics are proposed [30]:

- number of new colleagues relationships
- reuse rate of knowledge
- capture of new expertise (number of new concepts) from knowledge repositories
- number of new ideas generating innovative products or services
- number of lessons-learned and best practices applied to create value-added
- number of new knowledge created (including patents, trademarks, articles, books written, conference talks, etc.) per employee
- investments for professional development/training and R&D per employee.

KM metrics should involve both, qualitative and quantitative measures focused on supporting the organization to [31]:

- help make a business case for implementation
- help guide and tune the implementation process by providing feedback
- provide a target or goal
- measure, retrospectively, the value of the initial investment decision and the lessons learned
- develop benchmarks for future comparisons and for others to use
- aid learning from the effort and develop lessons learned.

In order to provide the necessary background for strategic planning as well as to monitor and control future strategy implementation, it is important to integrate in the process suitable key performance indicators (KPI). In strategic management, for measuring the performance of organisations are used a number of recent approaches such as Balanced Scorecard (BSC) of Kaplan and Norton, Six Sigma, etc. [32], [33], [34]. For example,

Kaplan and Norton provide an approach for linking strategic planning with performance measurement, which gains popularity in last few years. Their BSC methodology evaluates four main different perspectives: Financial, Stakeholders, Internal processes, and Learning and Growth [32]. When implementing BSC methodology for the purposes of KM, by developing the steering perspectives are analysed both, the main internal and external aspects of the organisation, and on this base are defined strategy objectives for each perspective and developed cause-and-effect chains between the objectives [37]. Keyes [31] considers that the BSC methodology could be adapted successfully also to KM performance measurement including a new aspect – the strategic management of IT (Fig. 4).

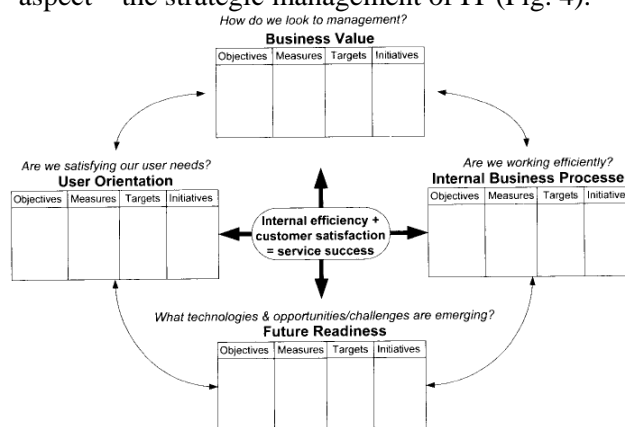


Fig. 4 IT balanced scorecard, Source: [31]

Generally, in KA dominate qualitative methods for collection of data needed for the analysis. For example, the following tools are used in KA moving across multiple levels (individual, team, department, organization) [7], [13], [19], [28]:

- questionnaires for collecting data
- interviews for in-depth analyses of problems
- focus groups
- observing the work in progress
- obtaining network traffic logs, policy documents, org charts, process documentation
- exploring common and individual file structures
- narration techniques for in-depth analysis of knowledge and its context-relations

Usage of semi-structured interviews with leaders and key stakeholders is one tool providing good results in identifying KM needs and opportunities. Open-ended interview provide a good opportunity to gain additional insights and understand perceptions of employees, and deepen them with individual interviews or focus group discussions.

Social-network analysis (SNA) is another useful technique for KA. SNA is the mapping and measuring of relationships and flows between people, groups, organizations, computers or other

information/knowledge processing entities, and involves actors and relations within the organization and with the outside world. The SNA investigates how the individual is embedded within a structure and how the structure emerges from the micro-relations between individual parts [28]. For SNA, information is usually gathered through interviews, questionnaires and observations and three main data collection methods are used [29]:

- Full network method – data collection about the links of each actor with all other actors in the organisation
- Snowball method – data collection begins with a focal actor or set of actors who are asked to provide information on all their links to other actors, after that their contacts are asked to also provide information on their links with others, etc. Data collection stops when no new actors are identified or when sufficient sample size is reached.
- Ego-centric networks – data collection begins with a list of predefined focal actors, who similar to the snowball method name all their links to other actors.

2.3 Knowledge audit methods and processes

Similarly to the variety of concepts related to KA and the type of analysis before launching any KM initiative, different KA approaches could be found in research and practice:

- The Knowledge Management Assessment Tool (KMAT) is developed by Arthur Andersen Consulting in co-operation with the American Productivity and Quality Center (APQC), quoted in [18]. It is based on the Organizational KM model, and the KMAT strives to achieve two aims: to ascertain the position of one company with regard to KM in comparison to other companies, and secondly to evaluate the efficiency of the realization of the knowledge management process.
- Bukowitz et al. [27] developed Knowledge management diagnostic (KMD), based on the model of the “KM Process Framework” which consists of 7 activities (get, use, learn, contribute, assess, build/sustain, divest). The KMD is designed as a tool for self-evaluation, and collects subjective qualitative data, and enables users to determine how well the different KM processes have been realized in the company through a number of questionnaires.
- The KM maturity model (KMMM) is developed in the Competence Center of KM in Siemens AG [18]. It is based on a model for analyses of

8 fields of design of KM (strategy and aims, environment and partnerships, employees and competencies, collaboration and culture, leadership and support, forms of knowledge and knowledge structures, technology and infrastructure, processes, roles and organizations). In the model are described the demands of the organization in each field, and depending on how the company meets the demands maturity levels are assigned. The maturity levels are ranged from one to five (initial, repeated, defined, managed, optimized), evaluating the KM activities and deriving a suitable step for development and improvement of the KM.

- Jurinjak et al. [13] focus on KA adapted to the needs of IT companies. The method is aimed to overcome some limitations identified in other methods, such as: insufficient project orientation, targeting the KA to part of the organisation, inclusion of people who are not staff members. A proposed focus of method are project members, and collecting their knowledge profiles, identifying knowledge assets, creating a knowledge map with relations and knowledge flows between individuals, and creating knowledge value chain representing processes basic for knowledge.
- Choy et al. [25] integrate various KA-related techniques into pre-audit preparation (focused on culture assessment and KM awareness raising), in-audit process (including structured interviews to capture process-critical knowledge) and post-audit analysis (including knowledge inventory, knowledge maps and knowledge flow analysis). Knowledge mapping and social network analysis are used to show the knowledge exchange in the organization and make the key knowledge suppliers and customers visible. On this base is made a knowledge flow analysis, pointing out the strength and weakness of the knowledge flow.
- Fai et al. [9] propose an 8-steps KA approach. It starts with orientation and background study in order to get insight into the organization and prepare the KA plan. The second step is focused on KM readiness assessment, and in particular, organizational culture, knowledge sharing, learning abilities and communication tools. On this base are conducted a survey and interviews with experts to collect more qualitative data. Building knowledge inventory is an important step focused on available tacit and explicit knowledge assets in the organization which is used for visual representation on the next step

by knowledge mapping. The audit result analysis, knowledge audit reporting and continuous-based knowledge re-auditing are the final steps of KA.

- Perez-Soltero et al. [6] consider the diversity of KA concepts and methodologies, and stress the need for better focus of KA, namely on core processes essential for meeting organizational goals and customer expectations (Fig. 5). With their approach they focus KA and save time for not studying the whole organization.

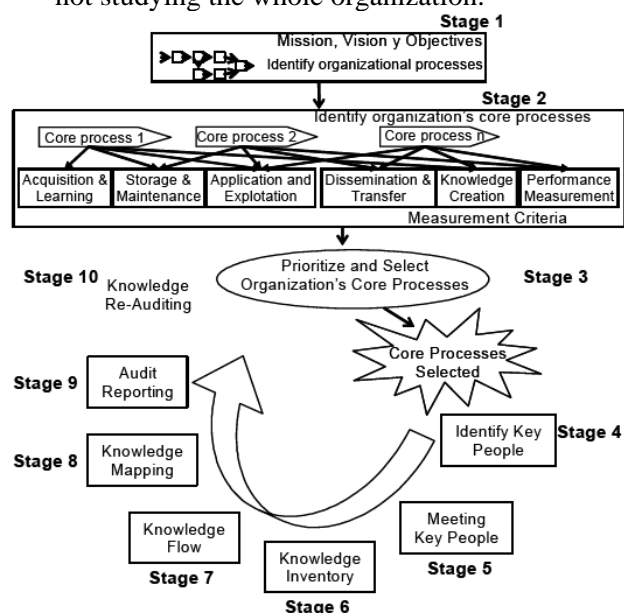


Fig. 5 Knowledge Audit Methodology with emphasis on core processes, Source: [6]

Tiwana [7] focuses on several steps for implementing KM, whereas inventories take an important place in strategy formulation, both analysis of available infrastructure, as well as making knowledge-based SWOT and thorough KA. He suggests a 6-step KA process including: defining the goals, selecting the audit method, determining the ideal state, performing the knowledge audit, documenting existing knowledge assets, and determining the organization strategic position within the technology framework. Before KA he considers, however, a need for assessment of knowledge system infrastructure, whereas he pays attention to the following components:

- Knowledge flow: components that facilitate knowledge flow within the KM system
- Information mapping: links and maps the flow of information that might later be converted to knowledge across the enterprise
- Information sources: feed raw data and information into the KM system
- Information and knowledge exchange: tools and nontechnological facilitators that enable

exchange of information across tacit (such as people) and explicit (such as databases, transaction processing repositories, and data warehouses) sources, help create and share context (the process itself is called contextualization), and facilitate sensemaking

- Intelligent agent and network mining: knowledge mining, linking, retrieval, and intelligence tools facilitate finding knowledge using intelligent agents and pattern mining tools.

Table 1 The Capability Framework for Positioning Knowledge Related Assets, Source: [7]

Regulatory Capability	Positional Capability
Patents	Path-dependent capabilities
Trademarks	Reputation
Registered designs	Value chain configuration
Trade secrets	Distribution networks
Licenses	Installed base
Proprietary technology	Customer base
Methodologies	Market share
Databases	Liquidity
	Product reputation
	Service reputation
	Service product (such as consulting outcomes) reputation
Functional Capability	Cultural Capability
Lead times	Tradition or corporate culture of being the best
Accessibility of past knowledge	Tradition of sharing
Innovative capabilities	The tradition of co-opetition
Individual and team skills	The tradition of co-operation
Distributor know-how	Perception of quality standards
Employee skills	Ability of employees to work in teams
	Capability to respond to market challenges
	Innovation
	Entrepreneurial and intrapreneurial drive in employees
	Employee initiative and motivation

The KA should start with analysis of the type of knowledge used to produce goods and services, characteristics of knowledge work and processes, and knowledge growth in the organization [7]. Documenting knowledge assets of the organization (Table 1) is an important goal of the KA, which helps also to identify ‘k-spots’ (knowledge niches) on which to focus the KM efforts.

Although a large variety of KA approaches and steps are described in the literature, most of them comply with the FKM-audit method (Fraunhofer KM Audit), which includes a 7 step process [18]:

1. Initial state- analyses of the documents about processes, procedures and structures
2. Focus setting – choosing the target group – company, department or team

3. Adjustment of inventory – customizing the audit to the company requirements
4. Survey – gathering the data (questionnaires for the selected target group and face-to-face interviews with the process owners)
5. Analyses and evaluation – analyses of the data; modelling of the business process for a description of the procedures, creating a roadmap with recommendation for further actions
6. Feedback workshop – by means of workshop, the results are reported back and the suggested measures prioritized – roadmap and action plan
7. Project start – projects recommended in the roadmap are planned and realized.

All KA approaches considered above have a common feature – their focus on the current status of the company knowledge – locating it throughout the organization, and examining knowledge flows and processes. It is important, however, to focus also on the future development scenarios. The real KA should, therefore, go beyond the company internal status and deliver a broader picture of the global processes and stakeholders, and the knowledge position of the company against its competitors. It should include, in addition to the competition or industry branch analysis, an analysis of the level of technology development, current research state, available resources and macroeconomic perspectives, customer demands and requirements, industry growth trends, leading industry experts and human factors. This analysis will guarantee more successful level of KM implementation and better action plans, while designing KM tools, IT systems or HRM techniques. In fact, a wider understanding of company interests, global situation and processes could facilitate all employees to contribute better to the competitive position of the company and the management of its knowledge. This means not only better acquiring (learning) and generating (innovating and experimenting) knowledge, sharing it (communicating) and storing it (codifying), but also better anticipating the future, and finally, better preparing for it [1].

2.4 Knowledge audit report

The KA report provides the scientific evidence from which the KM team and senior decision makers can make informed decisions concerning KM strategy, implementation of KM systems, tools and instruments, improvements in knowledge lifecycles and knowledge flows. It also provides recommendations for KM roadmap and steps for action plan, identifies key KM enablers and

potential barriers, etc. The KA report is research and analysis tool, serving for KM evaluation, progress measurement and time comparison. It must examine, analyze, assess, verify, validate, review and report the findings about the current state and recommendations for future steps for developing new knowledge assets in the organization [5].

In order to become complete, useful and focused on the company needs, the KA report should include multiple sources of information about the organization and its knowledge assets, analyzed in a proper and detailed manner. According to Hylton [5], the KA report should comprise a questionnaire survey and/or interviews, followed by a basic analysis of the results, and a brief report. The questionnaire-survey and proceeding interviews are only the first, and indeed, the easiest stages of KA. These surveys can only offer first level qualitative, subjective indicators for the true nature and management of knowledge assets.

Other researchers consider [15] that the structure of the KA report should include executive summary, highlighting the major findings of the KA, discovering a clear statement of the reason for conducting the KA and description of the audit process; followed by a "block map" – a diagram displaying the various knowledge blocks audited, their relationships to one another and the knowledge repositories in which they reside. According to [8], the KA report is composed of two parts – to draw up a knowledge inventory and prepare a knowledge flow analysis:

- *knowledge inventory* identifies and locates knowledge assets and resources, e.g. counting and categorizing explicit (documents, databases, systems, quality, access and usage) and tacit knowledge (people in organization, job levels, qualifications, trainings). Comparing the knowledge inventory with analyses of knowledge needs can determine the knowledge gaps and areas of unnecessary duplication in the organization.
- The *knowledge flow analysis* describes how the knowledge moves around the organization. The knowledge flow analysis looks at explicit and tacit knowledge, addressing people (their attitude of sharing and using knowledge), processes (business processes, organization policies and practices, daily routines, best practices), and systems (IT systems, information access, content management, usability, actual use). An assessment of the knowledge flows completes the auditing process and allows better understanding of the knowledge gaps, barriers and good practices in the organizations. It

focuses attention on the KM initiatives improving knowledge demand and supply within the organization.

The knowledge map is a visual representation of an organization's knowledge. Often KA is finally presented or leads to composition of detailed map, visualizing knowledge assets and knowledge flows, describing relationships, business processes and daily routines. KA report could be presented in a substantial part as knowledge map and its analyses. This approach is useful in order to better understand and present to the wider audience (for example – staff) the knowledge life-cycle in the organization and to track the progress of KM initiatives implementation [1]. As stressed by [16], the knowledge map is an essential tool of KA and provides insight for improving business and organizational processes.

3 An extended knowledge audit approach

3.1 Knowledge audit processes

As main KA phases and processes could be included the following (Fig. 6) [2]:

- The first phase defines the main parameters of the Knowledge Audit:
 - Planning of its scope, activities and time schedule
 - Selecting the right Knowledge Audit Team plays an important role for the KA outcomes
 - Methodology how to perform and implement successfully specific Knowledge Audit tasks and activities.
- The second phase is related to the actual KA implementation:
 - How to select, compose or adapt KA Questionnaire according to specific company needs
 - Methodology for KA distribution (via e-mail, paper or electronic questionnaires, conducting interviews, mixed approach), and notification of the target audience
 - Analyses of the KA results, testing and verifying hypothesis based on the collected quantitative and qualitative data. First feedback of the results.
- The third phase is KA finalization:
 - Preparation and presentation of meaningful KA Report as the major outcome of KA
 - KM Roadmap consideration.

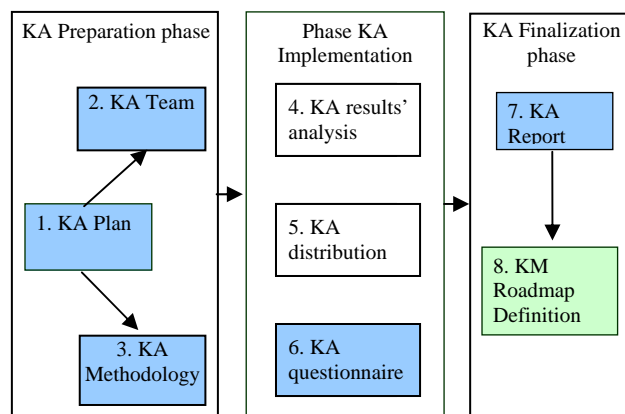


Fig. 6 KA phases and processes

It is obvious that before launching a KA it is important to set up its team. A wider composition of the KA team could especially contribute to the successful KM implementation process, as the different employees bring different perspectives into the analysis. According to the company size and management, the KA team could be composed of company experts and managers possessing profound knowledge on the corporate strategy and long-term vision, marketing and HRM, finances and IT, and last but not least, a knowledge manager (or knowledge analyst) [1].

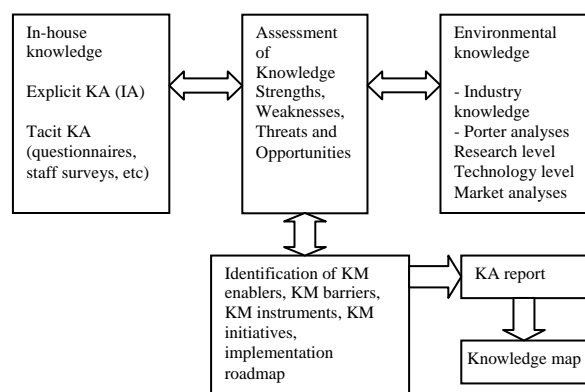


Fig. 7: Knowledge audit process

Taking into account the importance of KA, a new approach could be considered, which focuses not only on explicit and tacit knowledge assets, but includes also the internal and external factors for knowledge development (Fig. 7).

- It starts with in-house knowledge overview and general information audit, including knowledge resources, people, key organizational knowledge assets – patents, trademarks, experts; then business processes (innovations, learning, sharing) and knowledge flows, IT systems, social aspects and culture.
- The second part comprises tacit dimensions of the company knowledge or assessment of the

individual and group knowledge with questionnaires and surveys among staff.

- Finally, analyses of the company environment provides a short description of the industry knowledge (global aspects, demand and supply curves, fluctuations, main players), Porter analyses (for knowledge possessed and acquired from customers, partners, suppliers, competitors and substitutes), research achievements (university and research centers, key achievements, key researchers working in the area, recent inventions and publications, conferences), technology level (technologies in the sector, trade fairs and events, publications, PR). The environment analysis allows the company to assess how and from where it could supply valuable new knowledge and faster identify and profit from messages.
- On the base of the information collected within the initial three steps, the knowledge strengths and weaknesses and knowledge opportunities and threats are identified and assessed. Thus, the KA report will provide sound recommendations for further KM initiatives assessing the current state-of-the-art and scenarios for future development. Knowledge is not appearing from nowhere – and sooner organizations discover it, they have better chances to adapt and to profit.
- The KA report identifies finally organization readiness to adopt a KM initiative – pointing out the KM enabling factors and persons, what are potential barriers, suitable KM instruments and initiatives to start with, and finally – implementation roadmap. The KA report should become a reference guide of the organization KM journey, supporting decision-making and allowing better planning and assessment of the knowledge management strategy.

3.2 Knowledge audit metrics

Knowledge audit metrics should enable organizations to evaluate and assess the state-of-the-art, track changes, quantify achievements and results, and finally, measure areas of improvement. In today's competitive environment organizations need to evaluate dynamic and complex concepts as opportunity recognition, learning speed, innovation, cycle time, quality, flexibility, reliability and networking position [39]. As Ahmed et al. describe further, effective KM measurement systems are balanced, integrated and designed to highlight the knowledge flows occurring across firm's critical inputs, outputs and process variables [39]. However, even integrated KPI standards cannot provide adequate vision for company position and

measurement of dynamic knowledge flows among various external and internal networks. Social Networks Analyses techniques in combination with data mining (DM) technologies enable extraction of meaningful and dynamic indicators for complex relationships within and outside organizations [21]. This approach allows further specification of data, based on quantitative and qualitative characteristics of relationships (density of network, intensity of contacts, type of contacts, frequency of interactions, formal and informal interactions, recommendations and activity of interactions, preferred type of communication and others). The SNA and data mining approach could be used further to discover and map interrelated social networks, to trace and survey dynamic knowledge flows, to measure expert centres performance, to find outliers, to measure complexity (interdependences of elements) and assess importance of external-internal interaction points.

There is no consensus on what to measure at each level and each stage of knowledge management, how to measure it, how often to measure it, or what would be an appropriate point of comparison. But, like other things that matter, innovation and knowledge can and must be measured – and linked to both financial and nonfinancial incentives – to ensure that they receive the attention and the focus they deserve.

4 Knowledge audit case

4.1 Project methodology

Studying KM theory and practice was one of the objectives of the Leonardo Da Vinci project TRAINMOR KNOWMORE which aimed to provide useful tools for KM implementation in small and medium enterprises (SME). KM needs analysis in SMEs, pilot KA in organizations were among the main results of the project. In the project participated 10 partners from Austria, Bulgaria, Cyprus, Germany, Greece, Ireland and Romania. The objective of the project was to study the needs of SMEs related to KM, and on base of the identified training needs, to prepare a practical guide for KM implementation – Organizational Knowledge Management Handbook accompanied with a Self Audit Knowledge Management Tool and Methodology. The initial survey included 106 questions, with attempt to precise factors for KM development across employees' positions, sectors and countries. It focused on availability and use of knowledge, organizational culture, KM

implementation issues and possible benefits for the organization. Its results were implemented for design of the training path for different types of employees and for determining the content and practical tools to be included in the Handbook [11].

The KA tool was pilotly tested in organizations in the partners' countries. The questionnaire included several sections which could be adapted to the organizations' specific needs, and the questions could be deepened according to the goals of the analyses [10]:

- Demographic analyses
- Knowledge Profile Analysis
- Work Nature Analysis
- Strategy and management style
- Knowledge and Information Sources
- Information Technologies use
- Social Network Analyses
- Corporate Culture and Staff fit
- Motives and salaries

4.2. Knowledge needs and barriers for KM

The initial survey provided inputs from respondents of Greece (31), Bulgaria (61), Cyprus (18), Germany (39), Ireland (17), Austria (17) and Romania (16). The survey found out which knowledge is considered "very important" by most respondents (Fig. 8). The biggest number of respondents from Germany (94%), Greece (61%) and Romania (75%) emphasized the knowledge of procedures and processes, tasks and systems (Know-how) or in-house knowledge, while those from Ireland (76%) and Austria (71%) stated as "very important" the ability to source external knowledge relevant to company activities (know-where) - (e.g. competitor, and customer information, market trends, attendance at trade fairs, etc.). It is interesting to note that "know-where" is ranked highest (61%) as very important on average for all countries, concluding that the value of external knowledge is highly recognized. The knowledge of the most suitable persons and key figures to fill key roles and functions within the organisation (know-who) is top-ranked in Cyprus (83%), Bulgaria (54%) and Romania (75%). Knowledge gained through previous work experience as well as theory-based and scientific knowledge relevant to the organisations activities (know-what), is admitted as very important for Germany (83%), while in the other countries it priority is ranked on average on low positions, explained by the volatility of the knowledge in the fast changing environment [11].

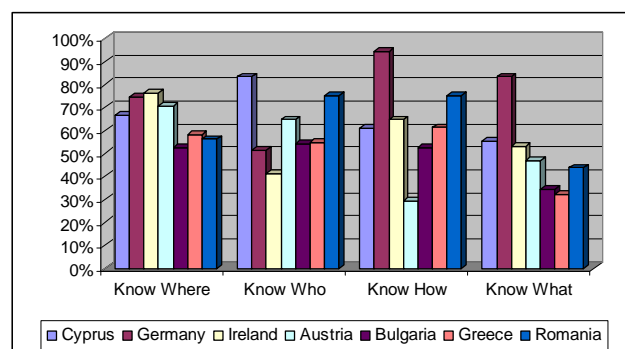


Fig. 8 Categories of knowledge marked as "very important"

Regarding barriers for KM implementation, most of the respondents marked that the lack of a "champion" to drive KM implementation is the most serious and definitive problem. Other respondents pointed out "Lack of experienced Managers", and "Resistance in senior management" highlighting the importance of the resistance in senior management and superiors as definitive barriers. It is interesting to note that lack of IT equipment, lack of finances, and lack of time represent a barrier only for 13%. In addition, the majority of the respondents state that lack of IT (38%), staff resistance (30%), lack of experienced staff and management (29%) are not subsistent barriers for their organizations [11].

These results show that the most important factors for KM implementation in SMEs are human factors and that the management of the organization should commit itself to the KM initiative. An important issue is to decide how to convince top management and senior management executives that KM use brings company benefits. In addition, all employees should be well motivated and guided by company leaders supporting the KM initiatives.

4.3 Knowledge audit main findings

The main objective of the KA within TRAINMOR KNOWMORE project was to investigate the factors within the organization which influence its knowledge processes, sharing and more generally the 'knowledge health'. Here will be provided some results of the KA carried out in 2 research organizations and 1 non-governmental organisation (NGO). The results obtained show that the NGO and both research organizations have very high educational profile of their staff – more than 70% with tertiary education [3], [20], [22]. The business objectives and the educational level of employees determine also the knowledge specifics of the different organizations:

- The research organization in Bulgaria (BG) is established at a university and the core staff

consists of university lecturers and PhD students engaged in research projects and training.

- The Greek research organization (GR) has focus on knowledge-intensive services and research projects.
- The core activities of the Romanian NGO (RO) are linked to SME support.

The core business of the organizations determines the difference in their training needs – in GR the highest needs are in business planning, consulting services and project management, while in RO the main needs are in the area of project and financial management, IT and law.

A common characteristic of these knowledge intensive organizations is that their staff has strong IT skills and devotes more work time for knowledge processing, and uses mainly own electronic files and resources found on the Internet or in the corporate network. Own professional and theoretical knowledge are equally high assessed by employees and applied in business processes. These knowledge elements are of high use also for the other employees in all three organizations. Personal networks are highly assessed and utilized in the GR and BG organizations, but less needed and used in the RO NGO. Besides, older employees assess higher their personal networking value than the younger ones.

The preferred way of communication of most employees is face-to-face, followed by phone and e-mail communications. The communication channels show some differences among these organizations:

- The internal communications among employees have less importance in the NGO, whereas in both research organizations team work and internal communications are essential.
- The meetings with customers bring highest value in GR, followed by the formal meetings, whereas in RO – business events and informal meetings are of higher importance, and in BG – internal meetings and meetings with partners and at research events are ranked higher than business events or meetings with customers.

The type of organization and the overall environment imply on the organizational culture and personal motivation. It is interesting to note that there is reported very high level of trust among staff, team work and cooperation resulting in satisfaction of internal relations in GR, however, motivation and satisfaction from salaries is at average level. Open debates, autonomy, flexibility and creativity support are characteristic of GR organizational climate. The RO and BG employees also rank high team work and satisfaction of internal relationships and own position, whereas staff motivation and trust are on average level of assessment.

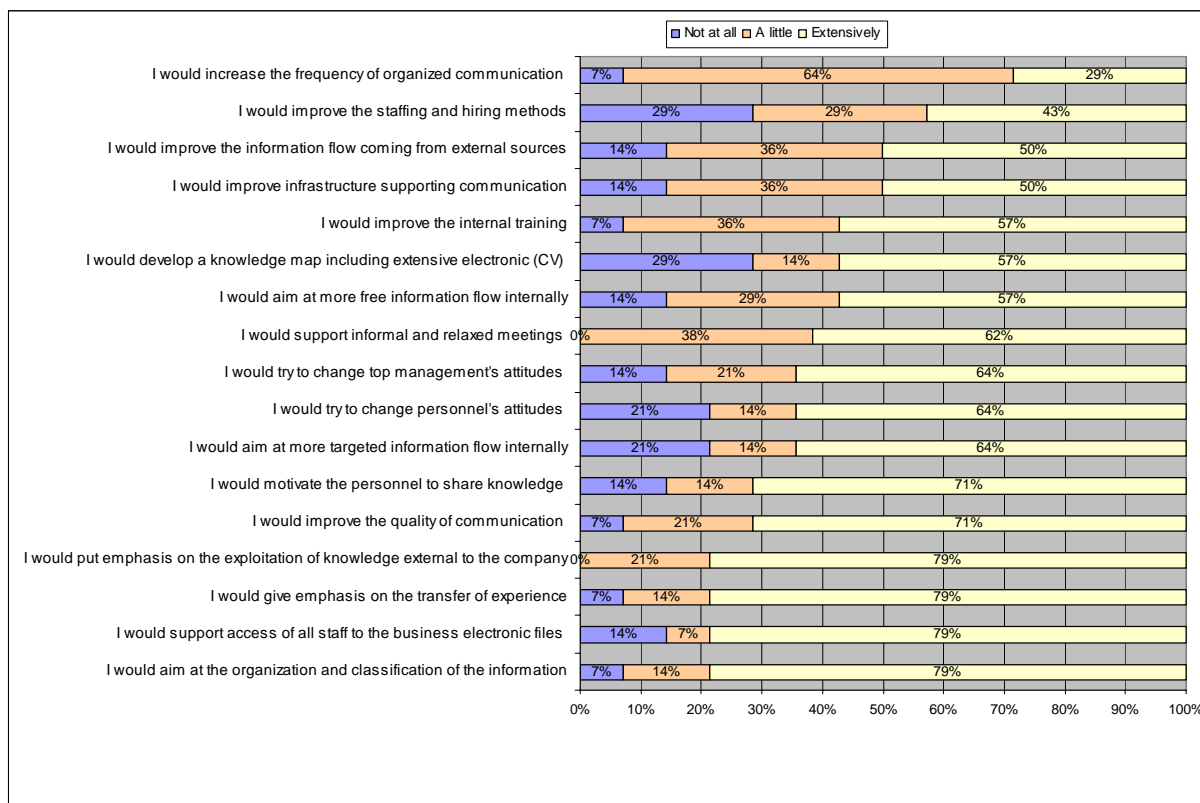


Fig. 9 Initiatives for better exploitation of organizational knowledge capital

Various technologies supporting KM are in place and used in all organizations, however, the main problems are related to human and cultural issues. Generally, lack of time is the most important barrier for KM in GR and BG, and the less significant in RO. Lack of motivation for knowledge sharing is the most important barrier in RO, and on a second place in BG and GR, followed by lack of willingness and flexibility for changes in the way of working. Organizational culture seems not to be an essential barrier in all three cases, as well as knowledge sharing is considered to bring benefits to them. For example, in BG are considered some important initiatives for KM and as the most important ones are pointed out sharing and classification of available resources (Fig. 9)

5 Further challenges for knowledge audit practice

The work carried out in TRAINMOR KNOWMORE project provided an insight into KM needs, implementation approaches and challenges of some European organizations. At the same time, it clearly pointed out that the most important factors for KM presently are 'soft' factors related to the overall organizational culture, trust and confidence among employees, team work and motivation. Lack of time is an important factor, too, but the initiatives for improvement of access and use of organizational knowledge resources might essentially imply on reducing duplication of work and losing time for searching of documents or knowledge resources which are available in the organization.

Knowledge audit is an essential tool for diagnostic of the state-of-the-art before KM implementation. It could be used also as a tool for repetitive analysis of KM effectiveness for the organization and for the individual employees. However, there is a need for a wider knowledge audit in order to assess knowledge gaps and flows, and serve as a basis for preparing knowledge maps of organizations, thus providing a tool for overcoming the gaps in finding the necessary skills and expertise. In addition, the SNA in combination with data mining technologies provides new reliable indicators for knowledge mapping and KM implementation [21].

While knowledge management was initially implemented by large companies, nowadays it is essential also for SMEs to grasp its benefits. To sustain the present financial crises SMEs need much more proper utilization of the existing knowledge and intellectual capital.

The knowledge audit process will become increasingly important factor for effective KM in

organizations today and tomorrow. The emergence of Web 2.0 and Enterprise 2.0 concepts and changing social factors require new forms of business relationships and lead to adoption of new business practices [35]. Organizations will have to work and cooperate on highly dynamic base with customers, suppliers, sub-contractors and employees. They have to acquire new methods to work and exchange knowledge with evolving class of independent workers, including freelancers, part-time employees, consultants and contractors with own choice of tools, connections and content. In highly competitive and global environment organizations have to achieve their competitive advantage relying on collaboration, communication, and management vision. The capacity to understand and exploit individual and group knowledge not only inside organization, but as well within mobile and fuzzy networks, will form new competitive advantage in networked economy.

Subsequently, KA could be considered not only as one necessary step for KM implementation. KA should become an essential tool and method for organizations to dynamically evaluate and grasp any opportunity for acquisition and exploitation of community-born knowledge. In contemporary world, knowledge makes the only difference, so only organizations that can assess and exploit internal and external knowledge will survive.

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