# FROM PRACTICAL CHALLENGES TO VOCATIONAL TRAINING IN SMALL COMPANIES THROUGH KNOWLEDGE PILLS

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### Abstract

*The paper focuses on vocational training of essential knowledge management (KM) practices for managers and employees of small and medium-sized KIBS (Knowledge-Intensive Business Services). For these companies, KM is critical, but employees need to be trained to implement KM practices effectively. Especially in small and medium-sized KIBS, there is a lack of resources and competence, and the implementation of KM is generally based on informal and unstructured methods. The paper illustrates the steps and the main outcomes of an EU Erasmus+-funded project aimed at implementing an e-learning course targeted to KIBS. An international team, including Tallinn Technology University, Gdansk University of Technology, National University of Political Studies and Public Administration, University of Padova, Estonian Chamber of Commerce, and the Polish company 4Experience, carried out the project. The main outcome consists of a web-based platform where training content for KIBS professionals, managers, and employees was uploaded as "knowledge pills," i.e., small batches of training content focusing each on a specific topic, issue, or practical problem. The development of the e-learning platform is based on a sort of action-research approach. In fact, the course content and the training methodology approach were developed by implementing strict and continuous interactions between the research team and the companies. This modality proved effective because it effectively links the practical KM needs of companies with the KM experience of researchers.*

### Keywords

*Action research; E-learning; Knowledge Intensive Business Services; Knowledge management; Vocational training; Knowledge Pills.*

## Introduction

The paper focuses on vocational training of knowledge management (KM) practices for managers and employees of small and medium-sized KIBS (Knowledge-Intensive

Business Services). KIBS are companies (IT services, business consultants, legal or fiscal advisors, R&D and engineering services, marketing and communications, etc.) providing services whose main input and output is knowledge. Therefore, KM is a crucial element of competitiveness for these firms.

However, especially in the case of the smaller KIBS, these rarely have deliberate and planned strategies to implement KM practices. Although they may know the importance of knowledge and its management, they adopt informal, nonsystematic, or occasional KM solutions. This can depend on the lack of resources and the insufficient training of managers and employees.

The paper summarizes the main steps and results of a project funded under the European Union Erasmus+ scheme, which aimed to define and implement a KM course targeted at employees and managers of KIBS SMEs. The course is a series of "Knowledge pills," i.e., small learning modules focusing on a specific KM topic with a practical orientation. The project was conducted in collaboration between several Universities and Companies in four different EU countries. However, the paper specifically refers to the part of the work undertaken directly by the Italian team of the University of Padova and the general work conducted in collaboration with the other project partners. The work is described as a process of "action research," where there was a combination of applied research and the practical development of the implemented solution, with frequent interactions between researchers and a sample of potential users, i.e., target KIBS companies.

**Literature background**

*KM challenges in small KIBS*

Managing knowledge is becoming a challenge for smaller organizations, which often are unaware of the importance of their intangible assets, nor do they have proper management approaches. This project mainly focuses on KIBS, companies whose function and competitiveness are substantially based on knowledge (Palacios-Marques et al., 2011; Miles et al., 2018; Strambach, 2008). While the success of KIBS is closely linked to their ability to manage their cognitive resources effectively, these companies, particularly the smallest ones (Alexandru et al., 2020), usually manage them in a very informal and unplanned manner (Bolisani et al., 2016) and are not familiar with concepts and applications of KM. In short, small KIBS face obstacles to managing knowledge both due to their limited resources and the knowledge-intensive nature of their business (Siahtiri et al., 2020; Durst et al., 2022; Zbuchea et al., 2023; Massaro et al., 2016; Shekhar & Valeri, 2023). Some of the typical challenges related to KM that these companies must face include, among others (Bolisani et al., 2023):
- lack of time, which affects the effectiveness of KM processes and activities;
- lack of motivation due to insufficient understanding of the importance of KM for the company and the employees themselves;
- insufficient understanding of the different practices and methods that may or should be adopted in the distinct business activities;
- scarce attitude to knowledge sharing and free collaboration with others;
- constant pressure to innovate and to dynamically change the base of knowledge that is necessary for the business;

- insufficient capability to interact and exchange knowledge with external business partners and, especially with clients;
- difficulty adopting specific technological solutions when they are important for KM practices.

From what has just been said, it would be helpful and extremely important to provide these companies with training tools that would allow them and their employees to understand, quickly and flexibly, how to manage knowledge effectively and, specifically, what KM practices are more valuable to face the specific KM challenges that may arise.

**Knowledge pills for vocational training**

To tackle the challenges in KM implementation, the project mainly adopted Knowledge Pills, an innovative didactic approach to promoting interactive and effective training sessions, which is also appropriate in remote learning and training. Knowledge pills can strengthen professional competence by using short pieces of multimedia advice on particular topics. They can help employees acquire specific pieces of knowledge or practical skills in a few minutes, increase their level of literacy in a particular area, and reduce the costs of training while increasing its efficiency at the same time. With this method, it is easier for a company to create a context where knowledge can be more easily shared, and the new hires can be trained faster and more efficiently than if they had to learn from scratch.

Knowledge pills can be in the form of short texts, PowerPoint presentations, or instructional movies to illustrate either a piece of knowledge about a topic or how to conduct certain activities in the workplace by reproducing day-to-day tasks in an appealing format (Sánchez et al., 2010a). Knowledge Pills can be easily understood and assimilated by employees, whether they are low or high qualified. The electronic format, which can be made available online for easy access, allows easy distribution and can become a part of efficient distance and self-learning (Bakala, 2018; Bolisani et al., 2022). They can help learners acquire specific pieces of knowledge or practical skills in a few minutes through a "microteaching" approach where they can be involved in active and interactive exercises, quizzes, and games (Cancela et al., 2012). Finally, they particularly fit the characteristics of e-learning platforms and remote training systems.

The knowledge pill methodology has the following main innovations (Carrera, 2011):
- it fits the Social Learning theory, according to which people can learn with others, now using the social tools available;
- it delivers training according to the specific needs of each person in a "just-in-time" manner;
- it empowers people to be trainers and coaches at all times;
- it uses multimedia as a way to create and deliver content;
- it creates true learning organizations by using knowledge shared across the organizations.

Also, using knowledge pills in business offers some advantages (Mazur et al., 2015; Carrera, 2011):
- it facilitates know-how development;

- it transforms each employee into a training agent inside the organization to which she/he belongs;
- it consolidates the existing knowledge in the organization;
- it avoids the permanent repetition of informal training processes;
- it reduces the costs of traditional training
- it enables the training of employees, customers, and partners;
- with its different formats, it enables more involving learning processes than simply reading a text;
- it is particularly effective in environments where there is a high staff turnover.

**Approach to define a course based on knowledge pills**

A course can include different types of knowledge pills that are connected to one another to provide a comprehensive view of a topic but, at the same time, can be used independently from each other by learners and can, to some extent, be used in a different order. Three main categories of KPs can be identified (Sánchez et al., 2010b; Carral et al., 2010), and the use of a typology or another can be connected to the aim or expected impact of the educational and training approach (Franco et al., 2017).

- *Concept learning pills* can introduce or summarize some essential conceptual points that are important for the learners to assimilate to further understand other parts of a course.
- *Exercise learning pills* can be used to acquire competencies or skills that may involve both problem-solving and practical activities – of delimited scope – where learners are invited to apply pieces of knowledge acquired elsewhere (or in another part of the course).
- *Testing knowledge pills* can be used to evaluate trainers' knowledge levels. These can be proposed as intermediate or final tests in a training course. They can be used for learners to self-assess their level of acquired knowledge or as ways for teachers/trainers to assess what (and how) was learned by students/trainees, and can also serve as feedback for trainers themselves.

An advantage for instructors is that each knowledge pill has a limited scope, making it easier to focus on a specific learning outcome. However, some precautions must be taken in their design (Carrera, 2011).

- content has to be concise, targeted on specific issues, and clear to understand and listen to the recorded sound/video in case of audio and video formats; before starting the creation, the instructors must have a very clear idea of what they want to deliver, why, and whom the pill is intended for;
- to make it short to prevent loss of concentration in the listener or reader. It is advisable that a Knowledge Pill should not take more than 5 minutes to watch or read;
- the use of various multimedia formats (multimedia presentation, audio, video) is possible, but their choice must be strictly functional to the educational goal. The file format should allow the contents to be adequately delivered on the selected supports;
- the person who has the knowledge that is going to be delivered should be directly involved in creating the pills, but it is necessary also to ensure that the validation of the content is always done by someone who was not directly involved in the creation;

-   there should be some management support for using pills, so people in charge of KM, human resources, and training in the company should be involved.

**Research methodology**

This study is based on an Action research approach. Action research is a term used in applied research where the purpose is not to develop or verify theories about a phenomenon but, instead, to analyze a practice in an experience field during its introduction and implementation and to improve it "in the field" by reflecting on the feedbacks collected during the implementation of the practice itself. It requires the direct involvement of both the applied researchers and the target group of users who will be affected by the use of the practice. Firstly introduced by Kurt Levin in social sciences in the 1950s (Greenwood & Levin, 2006), it has been implemented in various forms in different fields, from education to management and organizational development, especially to facilitate and introduce organizational changes (Austin and Bartunek, 2003).

Action Research in organizational development provides a scientific methodology for managing planned change. The change agent is usually a researcher or a consultant external to the organization and is involved in the change process from diagnosis to evaluation. The target organization is engaged in organizational research during the change process and developing the practice to implement this change. A virtuous cycle of action, implementation, measuring, assessment, and refining involves all parties.

The action research process can be described as follows.
Problem identification: information about problems, issues, and points that need some change in organizations is gathered by researchers with the help of organizations' members. The information is collected by asking questions, conducting interviews, reviewing records, document analysis, and using other typical methods used in social sciences. The diagnosis will help the researchers discover what is essential in the target organizations.
Analysis: The information gathered in the first step is then analyzed. Consistency and recurring patterns of problems can be studied and singled out. The collected information can be schematized and classified into issues, problem areas, and possible actions.
Feedback: In this step, the researchers will share the analysis results with the members of organizations who will be actively involved in any change programme in their organizations. In determining the problem and how to create the solution, they can provide useful feedback to researchers and, simultaneously become aware of the issues and problems identified through the analysis.
Action: Action plans decided in the previous step are set in motion in this step. This can imply a direct engagement of both researchers and organization members.
Evaluation: In the final step, researchers find a way to measure and assess the effectiveness of the implemented actions, and any subsequent improvement can be planned.

The proposed scheme can be repeated in iterative cycles and adapted to the specific case.

**Project description**

As mentioned, the project aimed to develop, test, and deliver knowledge pills to understand and apply KM concepts and tools in small and medium-sized KIBS (https://knowmanproject.eu/). The project was carried out by a team of international researchers from four universities in different countries (Estonia, Poland, Romania, and Italy). The team was supported by an ICT service company, which mainly dealt with the technical aspects of the project, and by the Estonian Chamber of Commerce for managerial validation. The international composition of the team allowed the researchers to extend the base of analysis, identify many different challenges and possible solutions, and hence create knowledge pills usable in various contexts and address a broad spectrum of issues.

The project was developed in several phases, as described in the following.

*Planning*

Planning was not just a time schedule of the project activities; above all, it involved choosing the approaches and methods to develop and create the pills. In this phase, it was decided to proceed as follows:
- identification of the challenges through interviews with a group of critical informants belonging to companies and KIBS organizations in different countries;
- analysis and comparison of the interviews to identify some recurring and common challenges;
- identification of possible solutions to each challenge by integrating the experience of researchers (all experts in KM), the information provided by companies, and the suggestions drawn from the specialized literature;
- collection of feedback from a selected sample of companies to help design the further steps of the project;
- transformation of the analyzed information into packages of knowledge or content to be provided to companies in the form of learning modules that can be included in single knowledge pills;
- choice of the topics of the pills and development of their content into pills;
- production of the knowledge pills ;
- preliminary use test of the pills;
- final delivery.

During the planning phase, a decision was made about collecting information through interviews with company informants, which was the basis of the topics of the knowledge pills, i.e., the training materials. In particular, it was decided to refer to the processes in which KM is typically articulated and implemented in real-life companies, as commonly identified by the literature (Anand & Singh, 2011; Areed et al., 2021). The main processes considered in the project are a) identification of knowledge gaps and needs; b) knowledge acquisition/creation; c) knowledge documentation and storage; d) knowledge sharing; e) knowledge protection; and f) knowledge application in business.

*Identification of practical challenges*

Given the goal of this phase, that is, to identify and examine the main KM challenges in each KM process and the possible solutions to face them, detailed semi-structured interviews with managers and/or owners (referred to as "key informants") of a sample of KIBS SMEs located in the four countries were conducted. In total, 72 interviews were made. Interviewers used a common guideline, divided into the abovementioned topics covering different aspects/processes of KM.

Data was collected, offline and online, between May and September 2022 from KIBS SMEs in the four countries. Table 1 provides an overview of the number of KIBS SMEs and interviews conducted.

The data collected involved KIBS SMEs from different branches, such as different types of consultancies (i.e., technology, management, ICT, strategy, marketing, tax, human resources (HR), research and development (R&D); advisory (legal, fiscal, financial, services); education and training; construction and design; software engineering; advertising, digital marketing, and public relations (PR)). Regarding the size of the companies involved, there was a range between 3 and 249 employees. The companies were founded between 1967 and 2020, and the interviewees were either SME owners, managers, or employees who had detailed insight into the firm's KM.

*Table 1. Number of firms and interviews by country*
*(Source: Authors' own research results)*

| Country | Number of KIBS SMEs | Numbers of interviews |
|---|---|---|
| Estonia | 13 | 16 |
| Italy | 13 | 16 |
| Poland | 10 | 24 |
| Romania | 4 | 16 |

The interviews were recorded and then transcribed for scrutiny and collated with field notes and information available on company websites and other media sources. All this supported the validation of the data obtained, as suggested in the literature (Suter, 2011). To perform the analysis, an Excel file was created in which all answers were reported. This helped researchers compare the data, find similarities or differences, and draw conclusions (Miles & Huberman, 1994). In the end, several common challenges and adopted solutions belonging to the different KM processes were identified. For instance, the main challenges related to knowledge documentation and storage concern organizing internal document systems, making knowledge easily retrievable, stimulating people to contribute to common repositories, archiving and updating contents.

Based on the results, an "interactive guide" was initially developed. This text summarizes the interview analysis results and is of purpose for the research team and also directly for companies. The guide was also presented to a sample of companies,

and feedback was collected through direct contact with researchers and through a workshop organized at the University of Padova in October 2022.

### From practical challenges to knowledge pills

The next step was to decide which topics, challenges, and solutions to address with the knowledge pills. Based on the results of the previous analysis, themes concerning the most reported challenges were proposed for the various processes. For example, regarding knowledge documentation, the research team decided to produce pills about document classification, document standardization, and document writing style, as well as promote knowledge searching.

The creation of the pills was subdivided among the various researchers who first proposed the title of the pill and broadly defined its contents. The matrix produced in the previous phase of analysis was helpful in the identification of the solutions adopted by the companies analyzed. It was decided to adopt a common format. Each pill opens with a definition of the topic (e.g., what "document standardization" is) generally described based on the literature. In this regard, it should be remembered that the research team comprised scholars/experts in KM. This step also included a preliminary collection and selection of documentary material to be included in the pills for further information.

### Implementation of knowledge pills

The implementation of knowledge pills was based on the material produced in the previous phase and took place in steps. As said, a researcher created each pill, and it was first checked by the other researchers of the same country and successively by all the research teams from all partner countries.

Two versions of the pills were created. The first version was a "long" version and consisted of a commented PPT. Therefore, each pill was developed as a PPT presentation, including a series of slides following a standard template. Each slide generally contains a bulleted list of the main notions/suggestions associated with the addressed topic and an evocative picture. The last one is devoted to "sources and finds out more." The synthetic text of the slide was commented on in more detail in the speaker notes. Lastly, slides and speaker notes were printed as PDFs, the final format made available to the users (Figure 1).

***Figure 1. Example of a PPT slide concerning the document standardization pill***
*(Source: Authors' own contribution)*

The video version of the pill was derived from the PPT version and was based on the free educational version of the Simpleshow video maker platform (https://app.simpleshow.com). Due to the limitations of the used version in terms of the maximum number of characters (2750) of a single video speech, in some cases, two video pills were derived from one PPT pill. Therefore, the duration of a video does not exceed, on average, three minutes, which is in line with producing a short and easy-to-use video.

All pills were classified and included in two e-learning platforms: a Moodle course and a dedicated app created dedicatedly by the project team's IT partner.

The Moodle course uses the well-known Moodle software (www.moodle.com) used in a partner's university to support online teaching. In the course Moodle platform, there are a variety of knowledge pills on topics related to KM in KIBS. The pills are in two forms: a video and a PDF file, where trainees can have the presentation with explanations. The pills are organized into several categories, as shown in Figure 2. At the end of each pill, trainees can also find a short quiz checking their absorption of the material.

A particular effort was made to classify pills and provide an appropriate order. However, the user can jump from one part to another depending on their personal interest and time to devote to a topic. This is very important to guarantee that the fruit is flexible enough and fits the needs of business users who may have little time.
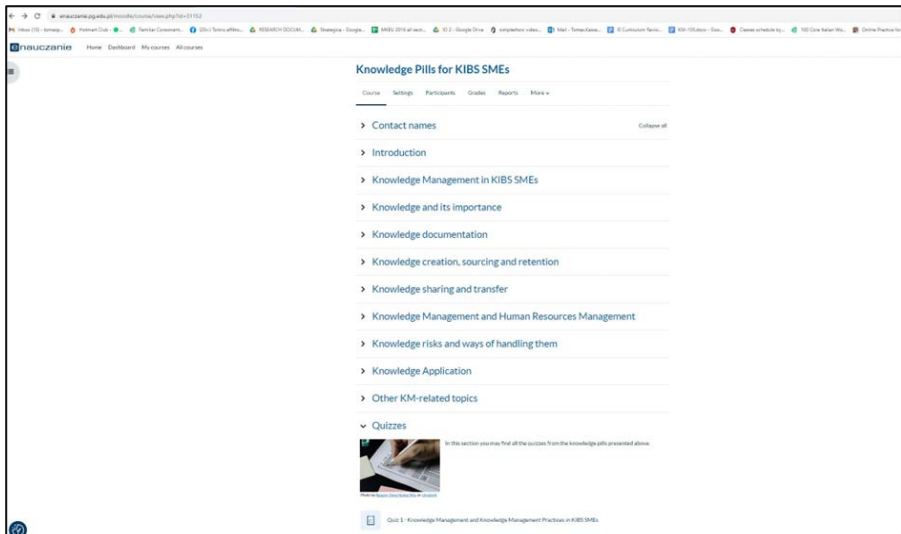
***Figure 2. Presentation of knowledge pills in Moodle platform***
*(Source: Authors' own contribution)*

After the Moodle course, a set of short quizzes was implemented, to facilitate the assimilation of contents. The same pills (and quizzes) can also be accessed via a mobile app (figure 3) that the partner IT company developed to make use even more flexible for companies.



***Figure 3. Presentation of knowledge pills in mobile app***
*(Source: Authors' own contribution)*

**Feedback from preliminary analysis**

The project, which will be completed by the end of November 2023, has received substantial company feedback, allowing the research team to validate the progressive results and steer the project in the right direction. The first feedback step was collected, as mentioned, during the interviews themselves and aimed at collecting professionals' evaluations about the general aims of the project and the idea of the e-learning platform using knowledge pills. The second step was after the first year, where the information collected regarding the main challenges was shared with a sample of companies. Finally, after implementing the preliminary version of the pills and the Moodle course, and aimed to collect opinions about the course organization and content. Table 2 reports some of the comments derived from company feedback (only Italian companies are reported).

As Table 2 shows, there is general appreciation regarding the idea and, especially, the clear intention to combine the general knowledge of KM processes with the practical needs of companies. The final implementation of the course is considered clear, although additional efforts should be made to classify contents appropriately and to guide users throughout the course.

***Table 2. Examples of company feedback and comments (names disguised for confidentiality)***
*(Source: Authors' own contribution)*

| Commenter/kind of company | Comment/feedback | Time of collection |
|---|---|---|
| M.R. / IT services | The idea of developing operative ideas is important because it fits real-life companies. | Oct. 2022 |
| M.F. / Legal services | Collecting and presenting "good KM practices" is an appropriate starting point because companies can gain from others' experience and can have a standard reference to KM approaches. | Oct. 2022 |
| S.M. / IT services | Knowledge pills can be helpful for new hires. A potential problem is that companies are different, which should be considered in the definition of the course. | Oct. 2022 |
| M.B. / Business consultant | This topic is substantially underexplored, so it would be helpful if practical recommendations could be delivered to companies. | Oct. 2022 |
| A.Z. / IT services | The Moodle course is clear and complete. However, the structure of the pills may need some rethinking, as it is not easy for a user to find the contents. Some real-life use case examples can be added to pills. | Sept. 2023 |

**Lessons learned and conclusions**

Although the project is not yet finished, and there is some time for ultimate finalizations, the results are, so far, satisfactory and promising. Generally speaking, the designed e-learning platform is considered helpful for delivering KM training to the selected sample of companies. The idea to develop small batches of learning modules combined together with a logic (i.e., the classification of the main KM processes) finds an immediate match with the real needs of companies in their daily practice.

A possible problem is the classification of contents. As in one of the comments (Table 2), users need to be guided throughout the course.

In general, the approach of knowledge pills can be extended to other courses regarding managerial practices that must be implemented in a company. The method presented here has the advantage of combining the general knowledge of experts/researchers with the practical experience of a sample of companies. Therefore, the study presented here can be proposed as guidelines for implementing vocational e-learning courses in other contexts.

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