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Knowledge transfer: a case study approach

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Abstract: The article builds on the growing importance of knowledge as a strategic resource for maintaining the competitive advantage of a business. We illustrate one of the initiatives contributing to effective knowledge transfer by describing a case study approach which suggests how universities might assist in disseminating knowledge and enhancing industry competitiveness. The case study approach is apparently an effective way to share best practices, and with the use of appropriate ICT tools, it provides for an enormous diffusion of codified (explicit) knowledge in the industry. The example in the focus of this article describes a Virtual Portal designed as a single-point access to information and tools (case studies, decision models and software), with the emphasis on case studies (their selection, coding and use).

Keywords: knowledge transfer, knowledge economy, decision-making support, agribusiness

Introduction

Knowledge is regarded as the most important strategic resource, and the ability to create and apply knowledge is a key skill for the establishment of a relatively sustainable competitive advantage. (*Pentrose,*1980). An expanding environment for creating and managing knowledge recasts a wide range of policy issues, including public investment priorities, program design, dissemination of research results, technology transfer, and the form and scope of private controls on information and knowledge. Tension arises from the fact that governments, universities, and private companies operate in different ways and under different rules, yet there are compelling reasons to encourage rapid movement of knowledge across sector and institutional borders.

The role of universities thus goes beyond simply being education or research provider: transferring knowledge to industry, the community and wider society is becoming the third cornerstone ("third stream") of universities missions. Knowledge transfer encompasses a wide variety of activities that range from appearances in the media and at public forums to participation in bilateral projects, the commercial development of research, the application of expertise through partnerships and internships, and the inclusion of broader community influences in the curriculum to enhance the capabilities of graduates. The most cited and accepted definition of activities encompassed in this area is those: "*concerned with the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments"* (*Science and Technology Policy Research Unit Report to the Russell Group of Universities,* 2002)

The importance of knowledge transfer in boosting competitiveness and contributing to the effectiveness of public research is increasingly recognised also by EU Member States. European universities and other research institutions are equally realising their changing role in the globalized economy and have undertaken interesting initiatives. This article illustrates one of the initiatives: a knowledge-based portal designed with the aim to facilitate the decision-making process by providing single-point access to information and tools (case studies, decision models and software). The knowledge base consists of a set of databases with a common structure, common searching and usage facilities, and common updating possibilities. The portal (VIrtual POrtal, VIPO) is tailored to meet the needs of both agribusiness facing major decision requiring support, and individuals who seek opportunities to develop their decision-making skills.

Objectives and methods

The objective of this article is to illustrate an approach facilitating the transfer of knowledge generated at the university level to its ultimate users by the use of codified case studies describing best practices. The article is theoretically embedded in the ongoing debate about the type and role of different type of knowledge in business competitiveness. The theoretical findings about the nature of knowledge and its contribution to the process of generating wealth is put into the context of transferring such knowledge: finding appropriate tools and formats facilitating effectiveness of their further diffusion.

Knowledge in the business context

Citing various authors Martennson (*Martennson,* 2000) identifies some of the attributes of knowledge:

- Knowledge cannot be easily stored;
- Information has little value and will not become knowledge unless processed by the human mind;
- Knowledge should be studied in context;
- Knowledge depreciates in value if not used.

Polanyi (*Polanyi,* 1966) makes the distinction between tacit (personal) knowledge and explicit (codified) knowledge. Polanyi understood tacit knowledge to mean "committed belief", embedded in context and difficult to express, sometimes inexpressible.

Referring to the seminal work by Polanyi, Nonaka expanded on explicit and tacit knowledge in great detail – according to him explicit knowledge is documented and is made public, structured and can be structured and shared through information technology and other means; while tacit knowledge resides in people's minds, behaviour and perception and evolves from social interactions (*Nonaka,* 1991). In constructing his model, Nonaka identified four patterns for knowledge conversion in the business, namely:

1. From tacit to tacit – through social interactions and shared experiences, e.g. apprenticeship and mentoring;
2. From explicit to explicit – through the combination of various explicit knowledge forms, e.g. merging, categorizing and synthesizing;
3. From tacit to explicit – through externalization, e.g. articulation of best practices
4. From explicit to tacit – creation of new knowledge from explicit knowledge through internationalization, e.g. learning. *(see Fig. 1)*

	Tacit	**Explicit**
Tacit	**S Socialization**	**E Externalization**
Explicit	**I Internalization**	**C Combination**

Figure 1: Model of Knowledge creation (SECI Model according to Nonaka)

Another model that supports Nonaka and adds meaning to the discussion about different types of knowledge is Boisot´s knowledge category model (*Boisot,* 1998), depicted in *Figure 2.*

	Undiffused	Diffused
Codified	**Proprietary Knowledge**	**Public Knowledge**
Un-codified	**Personal Knowledge**	**Common Sense**

Figure 2: Knowledge Category Model

Boisot uses the term codified to refer to knowledge that is easy to capture and transmit, while the term un-codified refers to knowledge that cannot readily be transmitted, e.g. experience. The term diffused is used to refer to knowledge which can be easily shared, and undiffused refers to knowledge not easily shared.

While knowledge itself is not new, the recognition of knowledge as a corporate asset is new. (*Davenport, Prusak,* 1998) Neef (*Neef,* 1999) asserts that it is only possible to appreciate knowledge management if viewed in relation to the changes occurring in the global economy. Clark (*Clark,* 2001) notes that knowledge-based economies are heavily reliant on the production, distribution and use of knowledge and information, all at a rapid rate. He distinguishes between different types of knowledge, namely:

- Know-what (referring to the accumulation of facts); this type of knowledge is close to information.
- Know-why (refers to scientific knowledge of the principles and laws of nature).
- Know-how (skills and capability to do something; internal knowledge in organization.
- Know-who (who knows what, who knows who to do what); implies special relationship.

The same author suggests that, while knowledge might be expensive to generate, there is little cost to diffuse such knowledge. In addition, knowledge provides increasing returns as it is used; the more it is used, the more valuable it becomes. Clark also identifies key drivers of this new economy, including globalization, information technology, distributed organizational structures including network-type arrangements, and the growing knowledge intensity of goods and services.

Best practice

Best practice is focused on seeking those methods, processes and procedures used within an organisation which lead to the successful achievement of its goals and implementation of its policies, whatever these may be. Best practice can be: a method, a tool, an organisation, a system or a technology, i.e. anything used to achieve excellent performance. Identification of best practices facilitates the process of learning and applying these practices in new but similar circumstances. Best practice concept is more a statement of intent and part of a learning process with the aim of moving towards higher performance in achieving a given purpose in a given situation.

Users inspired by examples of good practices can start changes in their organisations in order to make the business better.

VIPO methodology

The VIPO methodology approach consists of a series of steps which include:

1. Research the background to the five fields and six domains of benchmarking and best practice.
2. Clarify user needs in the fields and domains.
3. Knowledge base structure and design.
4. Define criteria for case study selection.
5. Validate and update case studies including copyrights and permissions.
6. Case processing – coding case characteristics, iden-

tifying indicators and preparing best practice explanations in texts (stories).
7. Evaluate usefulness of knowledge base using pilot groups.
8. Analyse case studies for patterns – synthesise best practice.
9. Select useful and demanded study texts and materials.
10. Create and offer suitable software support for decision making.
11. Organise online professional help and assistance at departments.
12. Review and refinement of the methodology.

Results and discussion

VIPO is composed of three parts:
1. Knowledge base of the best practices.
2. Self-study materials and lines to other relevant information sources.
3. Free software tools for decision making support.

Knowledge base of the best practices

Knowledge base of the best practices is the basis of the VIPO and represents a comprehensive knowledge base, accessed via the Internet, which anyone can use to:
- Survey who has done what in a variety of selected fields of practice.
- Measure and compare (i.e. benchmark) themselves against the best examples in their selected field.
- Investigate what constitutes best practice in their selected field using real-life examples and achievements.
- Access a variety of up-to-date surveys and analyses of best practice in their selected field.

VIPO provides users with a ready made Internet platform for inputting, analysing, benchmarking and accessing best practice examples, projects and cases. VIPO has initially selected five broad fields, such as:
- plant production,
- animal husbandry,
- forestry, pond culture and fishery,
- extra productive activities, services for agriculture,
- agriculture production processing,

but its approach can in principle be used to benchmark and access best practice in any other field.

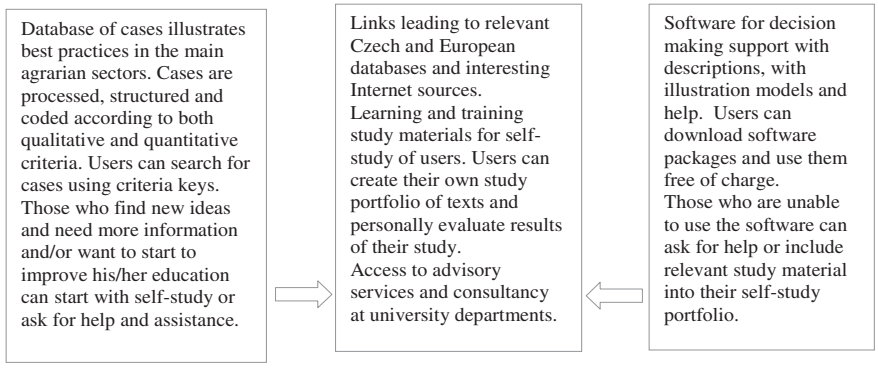

Figure 3: Structure of the VIPO knowledge base

Conceptual design of case coding

VIPO knowledge base can be depicted by three dimensional cube coordinates of which are "fields", "domains" and "k-units". Soft indicators express the relevance of the case with respect to given objectives.

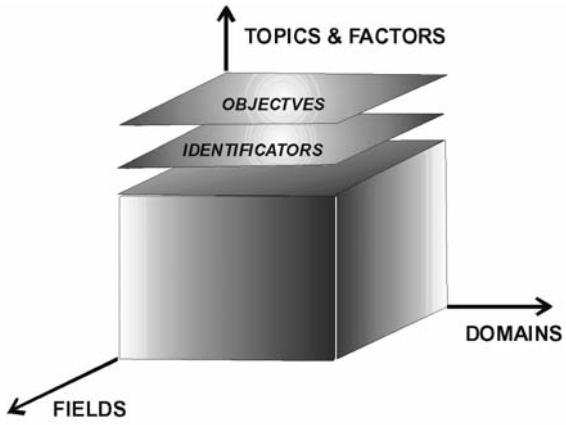

Figure 4: Three-dimensional design of case coding

This means that each case gets three main measures describing the level of consistency for the field, domain and objective. These data are topped up with a number of other characteristics namely managerial characteristics and best practice explanation.

This coding system makes it possible for users to find information according to his/her requirements.

It is obvious that „best practices" refer to different processes, settings and target groups, for instance in terms of economic sector, social background or type of activities analysed. Many cases will overlap. In the VIPO, a generic distinction among level of correspondence with field, domain and knowledge unit and the level of achieving the objective will be measured by a set of six soft identifiers. One case study can be denoted by more than one code in each criterion. Indicators express the fact that the item is in relation with chosen category and measure the correspondence with chosen topic.

The cases are classified and ranked into the VIPO base according to five selective criteria: (1) relevance to a field, (2) relevance to a domain, (3) satisfaction to the objective, (4) activity leading to achieving of the objective, (5) degree of the achieving of the objective.

The following figure describes the structure of the VIPO base:

STRUCTURE OF VIPO BASE

FIELDS: "Selected fields of agricultural production" – horizontal view

- Plant production
- Animal husbandry
- Forestry, pond culture and fishery
- Extra productive activities, services for agriculture
- Agriculture production processing

DOMAINS: "Main activities performed in fields of agricultural production" – vertical view

- Innovation, modernisation, new technologies
- Organisation and management
- Business environment
- Regional development
- Equal opportunities
- Virtual society

OBJECTIVES: "What do you want to achieve?"

- Sharing knowledge
- Improvement of education in agriculture
- Personal features and motivation improvement

KNOWLEDGE UNITS: "Topics and factors helping in achieving of the objective" – cross-sectional view

- New technologies (in husbandry, in pond culture, …)
- Improved innovation of products and services (in international influences for business environment in plant production, in organisation and management, …)
- Networks (in virtual society, in modernisation)
- Support for the mentally and physically disabled (in extra productive activities, in processing, …)

INDICATORS: "How well does the knowledge unit achieve the objective?"

- No correspondence (relevance?)
- Marginal correspondence
- Partial correspondence
- Important correspondence
- High correspondence
- Complete correspondence

In addition to fields, domains, objectives, k-units and indicators, and also the best practice explanations, which are clearly domain-specific, the VIPO knowledge base includes generic case characteristics. These describe background but important attributes of a case which will mainly be used for searching in the VIPO bases.

Case selection

The overall approach to the selection of cases demonstrating "best practice" is:

- to establish a conceptually sound and realistic framework for each domain, based upon objectives and knowledge units leading to the success practice;
- to look for cases which fit into assistance offered;
- to examine potential cases which have full and convincing documentation and explanation as to how this success has been achieved, and which can stimulate self learning and innovation by VIPO users;
- to incorporate cases taking account of the overall balance of geographic spread and type.

Although as a working rule 'excellent cases' are the primary focus, it is recognised that effective learning also comes from cases that give insights into problems or failures, and thus help contribute to the best practice learning strategy.

Case material is based on existing research, gathered through evaluation reports, the Internet, scientific and management journals, government reports, organisations, experts and potential **VIPO users.**

Cases are chosen by a team consisting of experts and technicians. Experts provide a selection of cases using multi-criteria methods of the complex analysis of the variants, such as e.g. the Saaty method, Fuller method or Sequence method. Generic case characteristics are then determined; the best case is structured, described and coded. The technician then places the case into the knowledge base and ensures its accessibility.

Case updating and validation

If selected for inclusion in VIPO, the case is:

- checked for accuracy;
- updated as required;
- validated if possible;
- referred to case contacts for appropriate approvals and release.

Updating captures the latest developments. It fills gaps in knowledge units to ensure that there is adequate coverage and to standardise against the measures used in other cases.

Where possible, the viewpoints of a variety of case stakeholders are sought, both in initial research of the case through secondary sources, and in any follow-up research. This is particularly undertaken in situations where it is suspected that significantly different views about case performance, and the winners and losers of this, are present.

As far as possible within the resources of the project, independent sources will be used to verify the content of a case. Such sources may include academics, the beneficiaries of such cases and other secondary sources. It is recognised that this may occasionally be impracticable, because of resource and time constraints, and in such instances the will be put into the knowledge base.

Conclusion

The knowledge based portal for agribusiness draws heavily from the experience gained through the EU funded project "Best eEuropean Practices", which was successfully

completed in 2004 and applies the methodology of case study coding. However, by providing single-point access to other resources it goes beyond the BEEP database potential. The VIPO has been undergoing a pilot testing; close monitoring of the testing phase is likely to bring new insights which will facilitate its further development. The project is to be completed by the end of 2007, when the tested and updated portal will go public for the benefit of the Czech farming community.

Universities across Europe are under a growing pressure to engage in knowledge transfer activities in order to increase competitiveness of European economy. In some countries schemes to facilitate knowledge transfer function of universities and other research institutions have been developed and serve the society, vast majority of EU member states, however, is yet to address this challenge and find the appropriate set of tools to initiate the process. Most studies dealing with the issue of knowledge transfer reveal that the knowledge transfer for commercial benefit represents only a sub-set of the broader concept of knowledge transfer which is directed towards enhancing material, human, social and environmental wellbeing. This by its nature multi-purpose function of the universities is difficult to implement. The implementation support scheme should include not only financial incentives (which tend to be naturally the most discussed issue) but also a combination of measures ranging from training knowledge transfer personnel, setting appropriate metrics to assess the performance of knowledge transfer processes, quality assurance schemes as well as barriers-removing policies to enhance mobility of staff and free exchange of knowledge.

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