



AGRILINK
AGRICULTURAL KNOWLEDGE: LINKING FARMERS,
ADVISORS AND RESEARCHERS TO BOOST INNOVATION

AGRILINK'S MULTI-LEVEL CONCEPTUAL FRAMEWORK

**THEORY PRIMER: 13) KNOWLEDGE AND
ORGANISATIONAL LEARNING FOR INNOVATION**

Coordinated by **The James Hutton Institute**
Author: **Geneviève Nguyen**



This project has received funding from the European Union's
Horizon 2020 research and innovation programme under
grant agreement No. 727577.

AgriLink

Agricultural Knowledge: Linking farmers, advisors and researchers to boost innovation.

AgriLink’s multi-level conceptual framework
 Theory primer: 13) Knowledge and organisational learning for innovation

The elaboration of this Conceptual Framework has been coordinated by **The James Hutton Institute**, leader of AgriLink’s WP2.

List of contributors:

- **Lee-Ann Sutherland** (WP lead), **Pierre Labarthe**, **Boelie Elzen**, **Anda Adamsone-Fiskovica**,
- with the support and contributions of Chris Blackmore, Marianne Cerf, Danielle Galliano, Alberto Lafarga, Andy Lane, Catherine Laurent, Livia Madureira, Carla Marques, Cristina Micheloni, Geneviève Nguyen, Katrin Prager, Jaroslav Prazan, Herman Schoorlemmer, Egil Straete, Sandra Sumane, Talis Tisenkopfs, Freddy van Hulst



This document presents the multi-level conceptual framework of the research and innovation project AgriLink. It is a living document.

- A first version was submitted as deliverable D1.1 of AgriLink, Month 6 of the project (November 2017).
- **This updated version has been issued on 01/05/2018.**

It has gone through a transdisciplinary process, with implication of both practitioners and researchers in writing, editing or reviewing the manuscript. This participation has been organised within AgriLink’s consortium and beyond, with the involvement of members of the International Advisory Board of the project, including members of the Working Group on Agricultural Knowledge and Innovation System of the Standing Committee on Agricultural Research of the European Commission.





Theory Primers

The purpose of the primers is to provide AgriLink consortium members with an introduction to each topic, which outlines the key points and identifies options for further reading. The primers have also served to demonstrate the wide range of expertise in the consortium, and to highlight the specific research interests of consortium members. Primers are intended to act as a **foundation for academic journal articles, and an early opportunity for collaboration between consortium members.**

13) Knowledge and organisational learning for innovation

Geneviève Nguyen

1.0 General Overview of the Approach

1.1 Summary of the Approach

The paradigm shift towards sustainable agriculture over the last 30 years has led to questioning the linear and top-down innovation model based on the transfer to farmers of new techniques developed by researchers. The search for new innovation approaches requires overcoming the path dependency problem induced by the post-war model of intensive farming. From a knowledge-based perspective, the specialization of farming systems and the production of standardized technical references (*explicit knowledge*) and their top-down transfer towards farmers via technical advisors led to a progressive loss of *tacit knowledge*, whose interactions with explicit knowledge constitute a critical factor of innovation. *Tacit knowledge* is a form knowledge acquired by farmers themselves through a learning-by-doing process based on farmers' capacity to observe, make sense of change in their environment and adapt to their specific context. The creation and assemblage of new knowledge for innovation relies upon a complex *organisational learning* process. This latter generally involves different learning patterns, learned capabilities and institutional arrangements capable of fostering interactions between the different forms of knowledge in order to bring individuals and the associated organisation from a "know-what" level to a "know-how" level.

1.2 Major authors and their disciplines

The way a firm use information to build meaning, create knowledge and make decisions has always been a major concern for researchers in economics, management sciences and psychology. The body of research on this issue being amazingly rich, the idea here is not to offer a systematic literature review but to point out some approaches on knowledge and organisational learning, which can provide interesting inputs for the Agrilink framework.

We are in debt in particular to the works of Polanyi (1966, 2009) who first provided an analysis of the nature of knowledge and distinguished *tacit* from *explicit knowledge*. Cyert and March (1963), Nelson and Winter (1982), Aoki (1986), Teece et al. (1990) offered a dynamic framework of the firm as a knowledge-based system in which different types of knowledge are organized and assembled to build the firm's dynamic capabilities. Their analyses are complementary to those of Argyris and Schon (1978), Kolb (1984), Nonaka and Tadeuchi (1995), Spender (1996), who provided a more in depth analysis of ways of learning, and more precisely of the organisational learning process and of its role in the firm's innovation process.

1.3 Key references

Cerf, M., Gibbon, D., Hubert, B., Ison, R., Jiggins, J., Paine, M., Proost, J., Röling, N. (Eds.) (2000). *Cow Up A Tree. Knowing and Learning for Change in Agriculture. Case Studies from Industrialized Countries*. INRA Editions.



Choo, C. W. (1996). The knowing organization: How organizations use information to construct meaning, create knowledge and make decisions. *International journal of information management*, 16(5), 329-340.

Lam, A. (2000). Tacit knowledge, organizational learning and societal institutions: An integrated framework. *Organization studies*, 21(3), 487-513.

Nonaka, I., Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press.

Wolf, S., & Zilberman, D. (Eds.). (2012). *Knowledge generation and technical change: Institutional innovation in agriculture*. Springer Science & Business Media.

1.4 Brief history of how the theory has developed and been applied

If the theories cited above on knowledge and organizational learning have long been widely applied to the analysis of the industrial firms, they have only been recently mobilized by only a few researchers to analyze agrofood innovation systems and changes in farmers' attitudes and practices (Cerf et al., 2000; Girard and Navarette, 2005; Gross et al., 2010; Rivaud and Mathé, 2011; Wolf and Zilberman, 2012; Touzard et al., 2014).

1.5 Basic concepts

In a world of uncertainty, complexity and change, the capacity of a firm to construct and organize knowledge is indeed a major factor of competitiveness and sustainability. There are two types of knowledge, *explicit* and *tacit*. *Explicit knowledge* is defined as knowledge, which can be codified and easily transferred and shared within an organization. Conversely, *tacit knowledge* is acquired only through learning-by-doing and practical experiences. *Tacit knowledge* cannot theoretically be codified. It is by nature personal and contextual.

A firm is not the sum of knowledge individually generated by the different stakeholders. A firm, as an organisation (structure and governance), is a complex system in which different types of knowledge hold by its members (*individual knowledge*) are articulated and structured in *shared rules/routines/norms/beliefs* (*collective knowledge*) and *organisational learning processes*. Four types of knowledge can thus be distinguished according to whether they are tacit/explicit and individual/collective. *Explicit collective knowledge*, such as *shared written rules and norms*, facilitates coordination within the firm and ensures its stability in time. *Tacit collective knowledge*, such as *routines, shared beliefs and implicit norms*, is the foundation of *communities-of-practice* and what is commonly qualified as the firm's DNA.

The way these different types of knowledge are acquired, organized, stored and articulated with each other, through the *organisational learning process*, determines the firm's dynamic capabilities. However, it is *tacit knowledge*, which favours in the first stage the firm's learning and innovative capabilities. Learning involves indeed at a first stage the detection and correction of errors (*single-loop learning*) and in a second stage the conversion of *tacit knowledge* into *explicit knowledge*, and the modification of the firm's routines (*double-loop learning*). In other words, through *organisational learning*, a firm observes changes in its environment (acquisition of data and information), interprets and makes sense of these latter, creates new knowledge then makes strategic management decisions.

Certain firms, according to the way they are structured and governed (refer to Mintzberg's and Aoki's organisational forms, to the notions of *networks* and *communities-of-practice*, etc.), are more capable of fostering the development of *tacit knowledge* (individual and collective) and the *organisational learning process*. Allowing for the entry of new members/leaders holding strategic knowledge, developing deliberation and legitimation processes, creating trust and common culture, building efficient procedures to solve conflicts among members are examples of factors facilitating learning within an organisation. Finally, it is important to point

out a firm's *organisational learning process* can not be analysed without taking account the economic, social, environmental and institutional environment in which the firm is embedded.

2.0 Application to the analysing the role of farm advisory services in innovation

2.1 Relevance to AgriLink Objectives

[tick relevant]	AgriLink Objectives
✓	Develop a theoretical framework utilising a multi-level perspective to integrate sociological and economic theories with inputs from psychology and learning studies; and assess the functions played by advisory organisations in innovation dynamics at multiple levels (micro-, meso-, macro-levels) [WP1];
✓	Assess the diversity of farmers' use of knowledge and services from both formal and informal sources (micro-AKIS), and how they translate this into changes on their own farms [WP2];
	Develop and utilise cutting edge research methods to assess new advisory service models and their innovation potential [WP2];
	Identify thoroughly the roles of the R-FAS (regional FAS) in innovation development, evaluation, adoption and dissemination in various EU rural and agricultural contexts [WP2];
	Test how various forms of (national and regional) governance and funding schemes of farm advice i) support (or not) farmers' micro-AKIS, ii) sustain the relation between research, advice, farmers and facilitate knowledge assemblage iii) enable evaluation of the (positive and negative) effects of innovation for sustainable development of agriculture [WP4];
	Assess the effectiveness of formal support to agricultural advisory organisations forming the R-FAS by combining quantitative and qualitative methods, with a focus on the EU-FAS policy instrument (the first and second version of the regulation) and by relating them to other findings of AgriLink. [WP4].
	At the applied level, the objectives of AgriLink are to:
✓	Develop recommendations to enhance farm advisory systems from a multi-level perspective, from the viewpoint of farmers' access to knowledge and services (micro-AKIS) up to the question of governance, also recommending supports to encourage advisors to utilise specific tools, methods to better link science and practice, encourage life-long learning and interactivity between advisors [WP5];
	Build socio-technical transition scenarios for improving the performance of advisory systems and achieving more sustainable systems - through interactive sessions with policy makers and advisory organisations; explore the practical relevance of AgriLink's recommendations in this process [WP5];
	Test and validate innovative advisory tools and services to better connect research and practice [WP3];
✓	Develop new learning and interaction methods for fruitful exchanges between farmers, researchers and advisors, with a focus on advisors' needs for new skills and new roles [WP3];



	Guarantee the quality of practitioners' involvement throughout the project to support the identification of best fit practices for various types of farm advisory services (use of new technologies, methods, tools) in different European contexts, and for the governance of their public supports [WP6].
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2.2 How this can be applied/developed in AgriLink

Theories of knowledge and of organisational learning provide help to understand the nature and the role of knowledge in developing an organisation's innovative capacity. A farm, as well as a farm advisory system can be viewed as a learning organisation, which has to react and adapt to changes in its environment (economic, institutional, social, natural) by mobilizing its repository of knowledge, correcting it and creating new knowledge. The information flows coming from the organisation's external environment is thus perceived, interpreted, assimilated, converted and processed into action. In this analytical approach, the innovation process is no longer viewed as a linear top-down model, but rather as a complex process, which involves different types of actors (farmers, advisors, other actors), different types of knowledge and different types of learning organisations and patterns.

Such an approach thus acknowledges the diversity of innovation systems and of situated learning organisations. It allows to embrace the diversity of micro-Akis situations and of innovation areas studied. Since it considers that not only successful trials but also errors are parts of learning, and that organisations are more or less efficient in setting up the organisational learning process, it could be interesting to include in the sample of case studies situations of failure.

2.3 Research questions relevant to AgriLink

- What are the types of knowledge used by farmers in their daily routines? What are those used when they have to make strategic decision (practice change, change in the farm organisation, investment decision, etc.)? How do these knowledge translated into their decision making process?
- What are the sources of these different types of knowledge?
- To what extent other actors (neighbouring farmers, advisors, etc.) participate to their "learning process"? How?
- What are the different types of knowledge mobilized in the advisory organisation studied? How do they flow and are organized? How do these different types of knowledge translated into the farmer's decisions?
- Can one associate particular patterns of organisational learning with particular types of learning organisation?
- What are the factors favouring organisational learning?

2.4 Methodological implications

Theories on knowledge and organizational learning were generally developed based on inductive research, and more precisely, on the observation and study of real-life cases of firms. Their application in empirical studies combines both inductive and hypothetico-deductive approaches, depending on the goals set and also on the methodologies mastered within the different disciplines (economics, management sciences, psychology). Because organisational learning process is complex and contextual, researchers in management sciences or in psychology often use the case study approach to gain an in depth understanding of the phenomena. They do desk and field research, collect desk information on the firm, interview



different stakeholders in order to draw a detailed picture of the firm's organisation and functioning. In contrast, the test of a particular hypothesis on a causal relationship relies most often upon a modelling exercise and econometric analysis. More recently, new approaches have been mobilized, such as network analysis and discourse analysis. They provide interesting insights about the knowledge sharing process within networks of firms and communities-of-practice of farmers.

2.5 Strengths and weaknesses

See 2.2 for some of the strengths of the theories discussed above.

The main weakness of research on knowledge and organisational learning lies in the multiplicity of the approaches and the lack of a unified framework across disciplines and across levels of analysis (micro / meso / macro). Some other weaknesses can be pointed out:

- The theories remain vague on some aspects of knowledge and of organisational learning, in particular those related to the conversion of one type of knowledge into another, and to the interaction among individuals in an organisational setting.
- In the agricultural context, some major notions need to be clarified, such as routines and the frontiers of the firm. It is not clear whether the approach is perfectly relevant in the case of a farm managed and run by a single farmer-worker. In this case, the analysis has to include other actors involved in the learning process (advisory system).

2.6 Potential operational problems

Some aspects of the theories may be 'vague' and difficult to operationalise, such as the nature of knowledge and the interaction mechanisms involved in the organisational learning process. Studies in psychology and management sciences may provide useful advices on how to organise and structure the field data collection: questions to ask to interviewees and how to ask them. Case study approach developed in management sciences may also help but it can require labour-intensive data collection.

References

- Aoki, M. (1986). Horizontal vs. vertical information structure of the firm. *The American Economic Review*, 971-983.
- Argyris, C., & Schon, D. (1978). *Organizational learning: A theory of action approach*. Reading, MA: Addison Wesley.
- Cerf, M., Gibbon, D., Hubert, B., Ison, R., Jiggins, J., Paine, M., Proost, J., Röling, N. (Eds.) (2000). *Cow Up A Tree. Knowing and Learning for Change in Agriculture. Case Studies from Industrialized Countries*. INRA Editions.
- Choo, C. W. (1996). The knowing organization: How organizations use information to construct meaning, create knowledge and make decisions. *International journal of information management*, 16(5), 329-340.
- Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice Hall.
- Girard, N., & Navarrete, M. (2005). Quelles synergies entre connaissances scientifiques et empiriques? L'exemple des cultures du safran et de la truffe. *Natures Sciences Sociétés*, 13(1), 33-44.



- Gross, H., Girard, N., & Magda, D. (2011). Analyzing Theory and Use of Management Tools for Sustainable Agri-environmental Livestock Practices: The Case of the Pastoral Value in the French Pyrenees Mountains. *Journal of sustainable Agriculture*, 35(5), 550-573.
- Kolb, D. (1984). *Experiential learning as the science of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Lam, A. (2000). Tacit knowledge, organizational learning and societal institutions: An integrated framework. *Organization studies*, 21(3), 487-513.
- Polanyi, M. (1966). The logic of tacit inference. *Philosophy*, 41(155), 1-18.
- Polanyi, M. (2009). *The tacit dimension*. University of Chicago press.
- Nelson Richard, R., & Winter Sidney, G. (1982). *An evolutionary theory of economic change*. Harvard Business School Press, Cambridge.
- Nonaka, I., Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press.
- Rivaud, A., & Mathé, J. (2011). Les enjeux cognitifs du défi environnemental dans les exploitations agricoles. *Économie rurale. Agricultures, alimentations, territoires*, (323), 21-35.
- Spender, J. C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic management journal*, 17(S2), 45-62.
- Teece, D. J., Pisano, G. P., & Shuen, A. (1990). *Firm capabilities, resources, and the concept of strategy: four paradigms of strategic management*. University of California at Berkeley, Center for Research in Management, Consortium on Competitiveness & Cooperation.
- Touzard, J. M., Temple, L., Faure, G., & Triomphe, B. (2014). Systèmes d'innovation et communautés de connaissances dans le secteur agricole et agroalimentaire. *Innovations*, (1), 13-38.
- Wolf, S., & Zilberman, D. (Eds.). (2012). *Knowledge generation and technical change: Institutional innovation in agriculture*. Springer Science & Business Media.