PART 1

Theoretical Elements

1

A Knowledge Value Chain

1.1. Introduction

This chapter introduces the notion of knowledge through the concept of a value chain.

Its purpose is to clarify the relationships between the concepts of data, information, knowledge and skill, by relying on the abundant literature that has been written on these subjects. All of these concepts, which are rarely formalized and often conflated, are related and dependent, and they need to be better defined. In this chapter, this clarification results in a guidance tool to help managers understand the added value produced by knowledge and act to develop this resource.

In the "knowledge economy" [FOR 09], knowledge is viewed as a resource that is a key factor in success and the basis for a company's competitive advantage. The objective of knowledge management (KM) is to optimize this new resource. It is therefore important to analyze the added value that KM can bring to a company. This is a difficult problem to address. For example, cost/benefit analyses for KM have never really been completed successfully. The approach proposed here is not based on the unpromising cost analysis, but on the value analysis. It is based on the nature of knowledge and its use in a company. We will see that knowledge is the result of closed-loop, continuous and simultaneous transformations within a company. We can, however, distinguish several formal transformation steps that are known as the knowledge value chain (KVC) [ERM 12]. This value

chain is conceptual and does not presume any complexity in its implementation within a company. It is very useful for managers to locate potential sources of value of KM. The objective of the KVC is to provide an analysis and action framework that will make it possible to act on this value chain and thereby improve the company's performance.

1.2. Different KVCs

The value chain is a management concept that was developed and popularized by Michael Porter [POR 85]. A value chain is a chain of production activities in a company, from the input to the end user. The products or services pass successively through all of the activities in the chain and, with each step, the products and services acquire value. A value chain is a breakdown of a company's approach into activities that produce value. These components are the basic elements on which a company relies to create a product or provide a valuable service for their customers. The activity chain confers more added value to the products or services than the sum of the values added by each activity.

Identifying the value generated through this chain is the approach chosen by top management. The differences between the value chains of competitors are the key factors of competitiveness. In terms of competitiveness, the value is what customers are willing to pay for what the company provides them. A company is profitable if the value that it generates is greater than the costs to create the product or the service. Creating such a value is the goal of all competitive strategy. The value, instead of the cost, must be used to analyze competitive standing. The value chain characterizes the generic activities that add value to a company: the "primary activities" including logistics, production, marketing and sales and services; and the "secondary activities" including infrastructure, human resources management, R&D and supply. The vectors of cost and value are identified for each activity.

Classic value chains do not include knowledge, although it is now seen as a company's most important strategic resource [DAV 98, DRU 93, HAL 93, STA 92]. The value incorporated in products or services is essentially due to the development of resources derived from organizational knowledge

[QUI 92]. In fact, a company's ability to produce can be considered to be the integration and application of specialized knowledge collectively generated by the individuals in the company [GRA 91].

Consequently, the notion of value is not directed by the customer, as in Porter's chain, but by the incorporation of knowledge in products or services in the company's production process. This raises the question of defining more precisely what this "cognitive resource" is and how it is incorporated into the activity of a company. The goal of KM is to manage this resource integration in the company's process. KM is a fairly new perspective on companies. Its philosophy, which must still be strengthened of course, is that a company produces value for its customers when it best manages the incorporation of its cognitive resources in its products and services. Thus, very simply, KM supposes that the production of knowledge implies the production of value. KM is interested in knowledge as a strategic resource that optimizes the production processes of a company.

To support the success of KM, it is useful to analyze the chain of knowledge integration in a company in order to identify and manage the different fundamental stages of enrichment for this cognitive resource and its incorporation into company activities. This is the KVC, viewed from a global point of view in a company.

The definition of a KVC based on a financial analysis of performance is problematic [CHO 00, MPH 94]. The competence-based view business theory offers an alternative approach. This theory considers the company as a portfolio of competences. Its competitiveness is based on the creation and development of competences and on its realization of a strategy capable of creating a link between goals, resources and objectives [PRA 90]. These competences have a cognitive nature, and this allows managers to identify the basic processes, like knowledge creation and organizational learning [LEO 95, NEL 91, PRA 90]. Carlucci *et al*. [CAR 04, p. 579] assert that the cognitive perspective of competence can be summarized by the interpretation that defines the competence of a company as a combination of knowledge assets, which make up what is called the company's knowledge capital, and knowledge processes, which allow a company to successfully complete its operational processes. This provides a foundation for the definition of a KVC.

Following the considerable development of KM in the past few years, the concept of the KVC appeared and was recently debated. The authors [CAR 04, EUS 03, HOL 01, LEE 00, WAN 05] define a KVC as a set of KM processes. A KVC is therefore a KM framework organizing the basic KM processes, such as the knowledge process wheel described in Carlucci *et al*. [CAR 04]. The main processes in these different KVCs are as follows:

– knowledge creation: this is definitely the most important process, because it creates knowledge capital, the purpose of all knowledge-based companies;

– knowledge codification: this process concerns the appropriation of tacit knowledge, which is a very complex problem;

– knowledge sharing: once a knowledge corpus is identified and a knowledge repository is elaborated, sharing this knowledge in a community is not really a standard task. This requires a lot of effort starting from the construction of the appropriate community to the implementation of access infrastructure;

– knowledge dissemination: access to knowledge for most people concerned ("the right information, the right person, the right time") is the famous problem of the "last kilometer", it involves information and communication infrastructure, and specialized designs of dedicated systems;

– knowledge portfolio analysis: the company, to implement a KM strategy, must implement a continuous process of analyzing and characterizing its knowledge portfolio: what is its strategic knowledge? What is its available knowledge? What are the risks associated with its knowledge? etc.;

– knowledge assessment: to carry out effective KM processes, it is necessary to have an evaluation matrix for their performance.

The KVC provides a KM framework to analyze the value added by each KM process. Figure 1.1 shows an example of a KVC (from [WAN 05]), with a series of KM processes in the form of a Porter-like model.

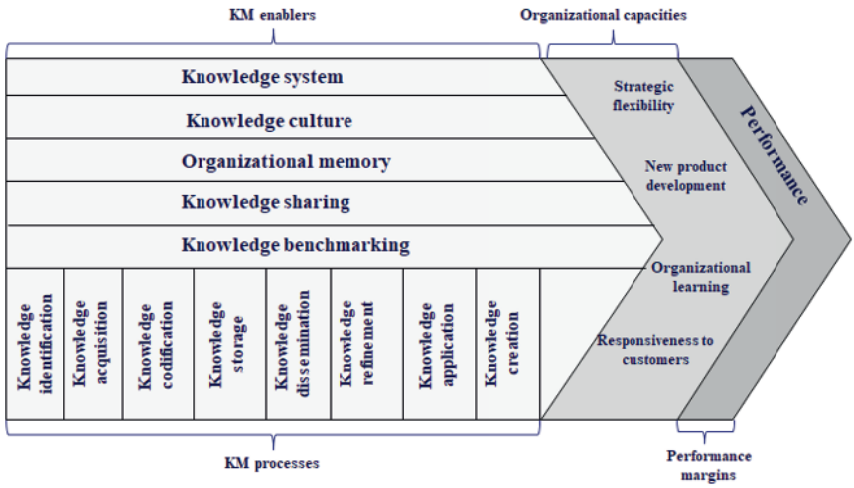

Figure 1.1. *An example of a KVC based on KM processes*

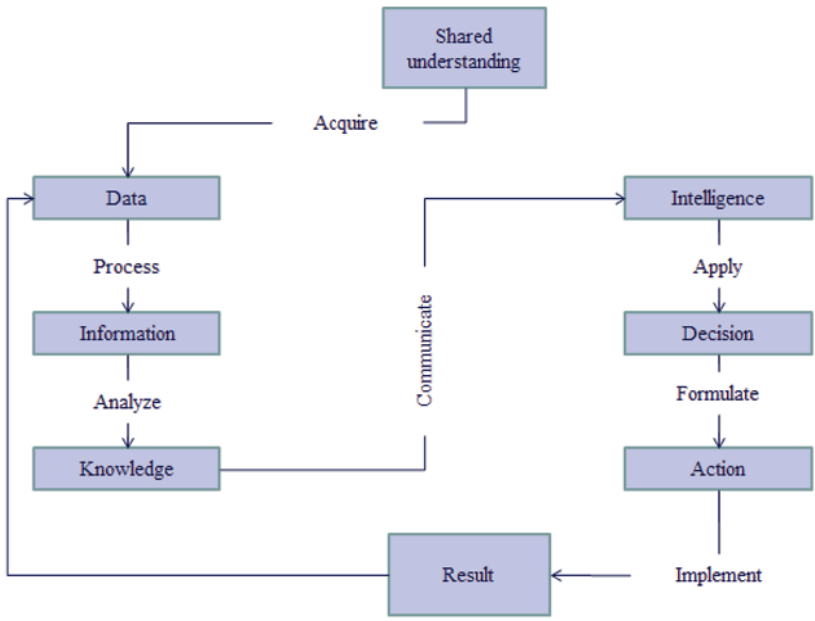

Figure 1.2. *An example of a KVC based on cognitive tasks*

Figure 1.2, from Powell [POW 01], proposes another type of KVC, which is a sequence of tasks whereby knowledge workers transform data into decisions and actions to construct the unique competitive advantage of their employer and/or social and environmental benefits. These tasks are intellectual tasks, which we call "cognitive tasks", that successively enrich available information to act in line with the company's objectives. Here, the value chain is not a sequence of KM processes that act on the knowledge capital of the company, but a sequence of cognitive tasks, realized by Knowledge Workers, that initially rely on the available information capital in the company to gradually give it a strategic value resulting in decision and action.

In this chapter, we will develop a KVC based on cognitive tasks. The objective is to use a chain of information transformations, to identify the cognitive tasks associated with each step and to define a transformation sequence whose management makes it possible to add value to the knowledge capital in a manner aligned with the company's strategy.

A well-known transformation chain, partially taken up in [POW 01], exists in the domain of information management. It is the chain: data → information → knowledge → wisdom. We will examine it in the following sections and adapt it to our problem.

1.3. The DIKW model

The DIKW (Data, Information, Knowledge, Wisdom) model is one of the most famous models in the literature about information and knowledge and it is considered to be a self-evident truth. It is mostly used in information and KM, but this model remains somewhat vague and has not been discussed or verified in an in-depth way. For a history of this model and a critical study, see [ROW 07].

The most popular visual representation of DIKW is a pyramid, like the famous Maslow pyramid, with data at the base and wisdom at the peak (Figure 1.3). This representation implicitly supposes that the higher elements in the pyramid require the lower elements to be defined, and that they can be attained through the transformation of the lower elements. The DIKW model is therefore a chain where information is the result of data processing,

knowledge is the result of information processing and wisdom is the result of knowledge processing.

Another visual representation of the DIKW model is a flow chart where the relationship between the components are less hierarchical, with return loops and controls, which show the complex interconnection of the transformations in the chain (Figure 1.4).

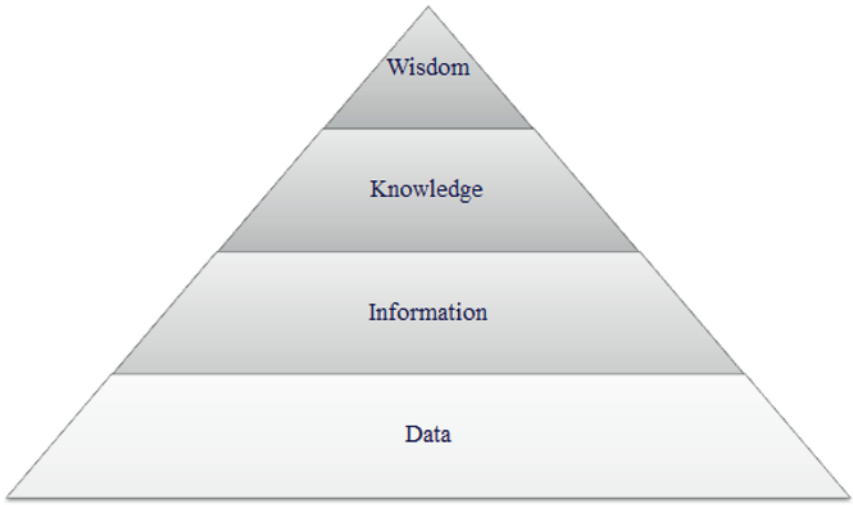

Figure 1.3. *The DIKW Pyramid*

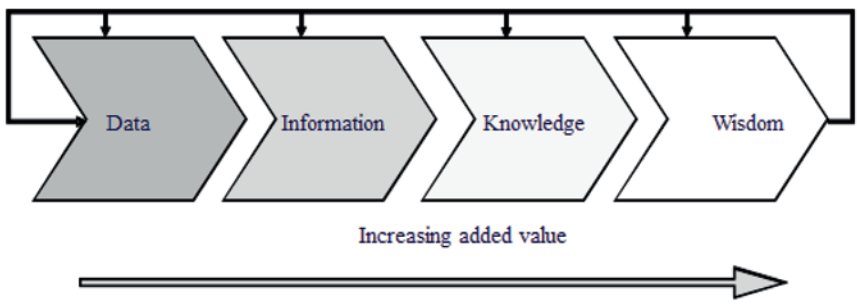

Figure 1.4. *The DIKW value chain*

There seems to be little consensus in the abundant literature (notably studied in [ROW 07]) about the DIKW model. Below, we will set out our own definitions for the different levels in order to provide a refutable framework for DIKW. In general, they reflect the usual definitions, elaborated in the references cited. This voluntary choice, which is based on classic works, is deliberate. It is reductive but necessary to avoid ambiguity and to make it possible to study the different possible transformations.

– Data

The data are defined as raw facts, and learning from the data is defined as a fact accumulation process [BIE 00]. The data are raw materials that have been gathered by people or machines through observation. According to Rowley [ROW 07], some authors ([JAS 05, CHO 05]) introduce a new element in the DIKW chain, the "signal,", which represents the reality that is perceived, selected and processed by our senses to acquire data. In fact, in semiotic theory [ECO 76], founded by Pierce [PIE 34], it is assumed that reality is always perceived as a "sign system". We define data as the perception of reality by the senses (which can be extended by observations made by machines with artificial sensors). The data are therefore the result of a perception process through a sign system.

– Information

The only unambiguous definition of information is the mathematical definition proposed by Shannon and Weaver [SHA 49]. This theory of information is a probabilistic perspective of information produced by a system. During the communication process, the receiver expects a certain message. Consider the case of a traffic light. When a person looks at a given light (the observed sign system), they already have an idea of the set of messages transmitted by this light. *A priori*, they do not know what message specifically will be transmitted to them. However, because of their experience, they expect to receive certain messages with different probabilities (red, green and yellow lights, or combinations of these colors). The quantity of information received through a set of messages (the observed sign system) is calculated as the average probability of occurrence for this set of messages, called entropy. In information theory, the introduction of the notion of entropy was a significant innovation that has been incredibly productive, even as a metaphorical tool to understand what information is.

When information is considered as a concept, this theory of information is not often mentioned. According to Nonaka-Takeuchi [NON 95], information can be viewed from two perspectives: syntactic (volume of information) and semantic (meaning of information). The syntactic perspective is based on Shannon's theory, but the semantic perspective is more important for knowledge creation because it focuses on the transfer of meaning. According to Floridi's analysis [FLO 10], during the past 10 years, a General Definition of Information (GDI) has emerged as data + meaning. A simple way to formulate a GDI, that we will use here, is a tripartite definition: information is made of data, the data are well-formed (remember that "information" comes from the Latin "in-formare", or "to give form to") and well-formed data have meaning (e.g., the data must be compatible with the meanings – the semantics – of the system in question).

– Knowledge

The most common definition of knowledge is a Justified True Belief (JTB) [CHI 82]. This means: "I know something if I believe it, if I have a proof that it is true, and if it is true". But in the perspective of KM, the definitions of knowledge are much more diverse and complex than the definitions of data or information. By summarizing all of the definitions given in the literature about the DIKW chain, Rowley [ROW 07] established that knowledge can be seen as a mix of information, comprehension, capability, experience, skills and values. Knowledge is a resource for an entity's capacity to act effectively. For example, Spender [SPE 96] considers knowledge to be data, meaning and practice. In the content of KM, there is a well-known distinction between explicit and tacit knowledge: generally, tacit knowledge is defined as internal to an individual and explicit knowledge is defined as residing in documents, databases and other recorded formats.

In [ERM 07], the authors outline an attempt at a formal theory of knowledge that is an extension of Shannon's theory of information. In this theory, knowledge has three interconnected components: information, meaning and context. Information is governed by Shannon's theory, meaning is governed by semiotic theory and context is governed by the connected graph theory. It is possible to define formal entropy that represents knowledge based on these three components. Meaning is strongly dependent on context, which can be social, professional or operational. This theory was fully developed in [ERM 00]. We will define knowledge as

information (a set of messages produced by a system) that has a specific meaning in a specific context. This is detailed in Chapters 2 and 4 of this book.

– Wisdom

If the definition of knowledge is complex and contested, then the definition of wisdom is almost non-existent. Rowley [ROW 07] shows that there are very limited discussions about it in the literature related to the DIKW model. We have therefore decided to provide a definition that suits our own purposes. Wisdom is defined, in the common sense, as a "deep understanding of people, things, events and situations that confers the capacity to choose or act in order to produce optimal results with a minimum amount of time and energy". Thus, wisdom is the capacity to use knowledge optimally to establish and achieve the desired objectives. We will retain this definition while making a distinction between the individual level and the collective level.

– Individual wisdom (competence)

According to this definition, for an individual, wisdom is similar to the common notion of competence or expertise. Competence is what allows an individual to correctly complete a specific job. It includes a combination of knowledge, abilities and behaviors used to improve performance. In terms of human resources, it traditionally includes knowledge, know-how and social skills. Expertise, for its part, is a characteristic of individuals and is a consequence of the human capacity to adapt to physical and social environments. Thus, competence (or expertise) can be defined as the individual integration and transfer of knowledge and capacities in order to obtain the expected results. It is in this sense that we will define and integrate the notion of competence as "individual wisdom" in the KVC.

– Organizational wisdom (capacity)

Capacity is the ability to complete actions. According to [GRA 96], organizational capacity is the result of the integration of knowledge and complex productive team activities as well as being dependent on a company's potential to develop and integrate the knowledge of several individual specialists. It is a capacity that is specific to each company, which corresponds to the definition of "wisdom" at the collective level. This notion of organizational capacity appears in the literature in many ways and under a variety of terms: "absorptive" capacity [COH 90] (the organizational capacity to assimilate new exterior knowledge), "combinative" capability

[KOG 92] (the organizational capacity to combine existing internal knowledge), "dynamic" capability [TEE 97], core competence [PRA 90], organizational learning [HUB 91], agility [ROT 96], etc. It is in this sense that we will define and integrate the notion of capacity as "organizational wisdom" into the KVC.

1.4. KVC and management

In the previous section, the DIKW chain, adapted to the context of KM in a company, was chosen as the foundation for the definition of a KVC. It is a chain of transformation from "data → information → knowledge → competence → capacity", in which each transformation provides additional cognitive value, making it possible, based on data gathered by the company, to build meaning, then potential for action, then individual capacity and finally collective capacity. In terms of management, each transformation corresponds to a specific kind of management, the combination of which forms the management chain of the KVC. This will be explained below.

– Data management: In terms of management activity, the role of data management is to control, protect, make available and add value to a company's data. It ensures the continuous existence and quality of the organizational memory. In "cognitive" terms, data management functions as the company's memory.

– Information management: Considering the definition of information (data + meaning), the role of information management is to give meaning to data and to help workers and managers to make decisions about their tasks at different levels (operational, tactical, strategic). Information processing is crucial for decision making, as we have known for a long time [SIM 58]. Information management allows for conceptualization and provides understanding as added value for the company.

– Knowledge management: In [AVE 10], KM is viewed as a strategic management activity from the perspective of learning and growth, according to the framework of Intellectual Capital provided by Balanced Scorecards [KAP 04]: "a learning organization that is growing is an organization where KM activities are deployed and developed in order to optimize the creativity of all collaborators in a company". An internal learning process is necessary for the development and preservation of competence [NEL 91, PRA 90]. One of the conclusions of the study by Carlucci *et al*. [CAR 04] is that KM supports the organizational learning dynamic and an increase in the

performance of organizational processes while also allowing a company to grow and develop its organizational competence. KM is a tool for several learning capacities including synthesizing different types of information and acquiring knowledge, abilities and new behaviors. In a company, KM facilitates the learning process of its members, who are engaged in continuous collective learning and thereby bring about the continuous transformation of the company itself. This is what is called a "learning company" [ARG 99, PED 97]. Therefore, in a KVC, the added value of KM is learning in the sense defined here.

– Competence management: Competence is knowledge in action. In the DIKW chain, Rowley [ROW 07] cites different definitions of "wisdom" that correspond to the concept of competence as effective knowledge in action. Competence reflects a large and deep capacity to understand an environment and to adapt to it by making good decisions and actions. It is the appropriate use of knowledge to improve performance (usually, we mainly consider the personal point of view, but there can be a collective aspect). This capacity is generally called "intelligence" in its etymological sense (in Latin, "intelligere" means to realize, to understand, to recognize). In this sense, in the KVC, the value added by competence is intelligence.

– Capacity management: The difference between the implementation of competence management and capacity management resides in the collective, global and organizational nature of capacity. Capacity management results in increased success for the company and general well-being. The Competence Based View and Knowledge Based View [GRA 91, SVE 01] theories consider knowledge to be a driving force for formulating and developing strategy. Capacities are therefore totally integrated into a company's goals. The benefit for the company is a general capacity for innovation, such as a global change (incremental or radical) in thought, products, process or organizations. If competence ("individual wisdom") is a superior cognitive attribute that uses knowledge, judgment and awareness, leading to an appropriate behavior [ROW 07], then capacity management corresponds to a high level of creativity in a company that innovates in an appropriate way, in relation to its commitments and its environment.

The KVC and its management are summarized in Figure 1.5. Each element in the chain corresponds to a management system used in a company. The synergy between these management systems contributes to the progression of the company in what is called "cognitive performance",

which ultimately makes a company creative in the strategic sense (permanent innovation as a factor of competitive differentiation).

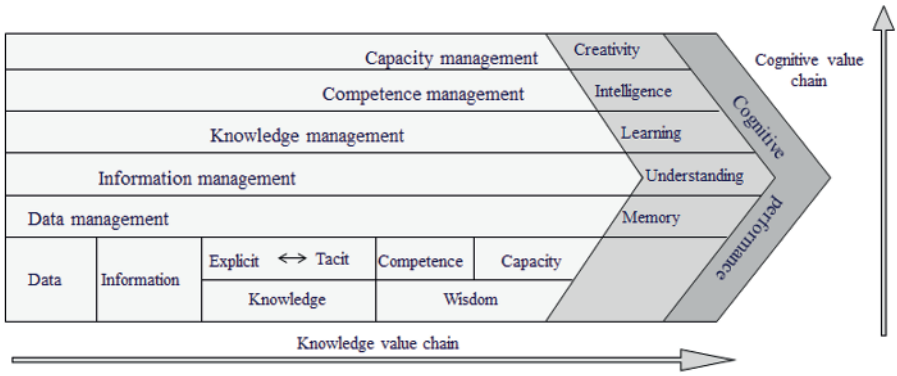

Figure 1.5. *KVC management chain*

1.5. Transformation processes in the KVC

According to Rowley [ROW 07, p. 174], if it is difficult to find a consensus about the different definitions of the concepts in the DIKW chain, then there is even less agreement about the processes that transform one concept into another in the chain.

According to [MOR 09, Chap. 4, p. 10], the transformation processes in the KVC can be divided into two categories. The first category is more tangible and objective, and can be carried out by human beings or "intelligent" machines. This type of transformation starts from reality and goes as far as explicit knowledge. For this category, the key role of information technologies is largely accepted. The second category starts from explicit knowledge and goes as far as capacity. For this category, human beings are key, and it consists of the intangible and the subjective, regarding beliefs, commitments and action. In this category, technology and information play the role of enablers, not the main elements. To describe the transformation processes in a clear and practical way, we will divide them down into three perspectives related to the definition of knowledge provided earlier:

– the "syntactic" point of view, which describes the form of the items managed by the transformation processes. This is the visible part of these processes;

– the "semantic" point of view, which describes the enablers that make it possible to construct the meaning of the processes. These enablers are filters that allow for the interpretation of activities in these processes;

– the "contextual" point of view, which describes the (cognitive) situations in which these processes take place.

This breakdown is called a "triple instrumentation" in [BRU 08] and [MOR 09]. Due to lack of space and critical studies that still need to be conducted, we will not discuss the different concepts in-depth, but we will give a few standard definitions that are generally recognized and accepted.

The point of departure for the transformations in the chain is reality, as a set of objects that possess an existence or an essence and exist independent of human consciousness.

1) *Transforming reality into data corresponds to acquiring signs (signals) through perceptive filters via observation.*

A sign is something that suggests the presence or existence of a fact, a condition or a quality. More specifically, a signal is an indicator that serves as a means of communication. It is the "semiotic assumption" that reality is communicated to us as a "sign system" [ECO 76].

The transformation process is a perception process that is the organization (in a sign system) of the unprocessed result of a stimulation of sensory receptors (which can be artificial sensors or sensory receptors like the eyes, ears, etc.).

Observation is a detailed examination of phenomena before analysis, diagnosis or interpretation. It usually involves the act of recording something, potentially with instruments.

2) *Transforming data into information corresponds to coding data through conceptual filters via a structuring activity.*

A code is a system of symbols with arbitrary meanings that are used to transmit messages [SHA 49].

The transformation process consists of constructing concepts that are formed in the mind; a thought or a notion that corresponds to a class of entities and the characteristics or essential features of this class.

Conceptualization requires a structuring posture with a mindset that is conducive to making interrelations or arrangements between parts of a complex entity.

3) *Transforming information into knowledge corresponds to building models through theories via learning.*

A model is a schematic description of a system, theory or phenomenon that accounts for its known or inferred properties and may be used for studies or subsequent actions [CAP 08].

A model is based on a theory, which is, in the common sense, a well-reasoned explanation of an aspect of the natural world; an organized system of recognized knowledge that applies in many circumstances to explain a specific set of phenomena. It is a conceptualization (an explanation) of the way the world functions.

The use of models and theories in KM can be made in the context of learning, which is, by definition, the cognitive process of acquiring knowledge (and more generally skills or information).

4) *Transforming knowledge into competence corresponds to implementing a set of practices through action via experience.*

Practice is the repeated execution of an activity with the intention of learning or perfecting a skill, action or common or normal act (often several). Economists talk about routines [LAZ 00, NEL 82] as collective competences in the form of a detailed and prescribed progression of actions to follow regularly, although they are essentially personal and tacit. They have a global formulation to achieve collective tasks, but they are only collective in the results. This codified knowledge requires an individual experience so that it can be appropriated and used by actors.

These practices are constructed step-by-step through action, which usually denotes an organized activity to accomplish an objective. Action is seen as a cognitive filter, ensuring the relevance of the lessons learned or experience feedback.

The appropriate position in this type of transformation is experience, which is a situation in which a person acquires knowledge about the world, in contrast with a position based on logic. Experience is an active participation in events or activities, allowing for the accumulation of knowledge or skill.

5) *Transforming competence into capacity corresponds to constructing a KM strategy with strategic filters (alignment) via a vision.*

A strategy is a specific long-term plan for success.

Alignment, which is a coordination (correct or desired) of components, is the appropriate tool to integrate or harmonize objectives, practices, etc., in a company.

The capacity to build a strategy involving a company's knowledge aligned with the company's strategy requires a vision, seen as an exceptional competence of discernment or perception, an intelligent anticipation. The term "vision", especially for future developments, has a certain religious or spiritual connotation, but that is where the similarity with KM stops.

This analysis, summarized in Figure 1.6, gives us the tools (signs, codes, models, practices, strategy), the cognitive activities (perception, conceptualization, theorization, action, strategic alignment) and the attitudes (observation, structuring, learning, experience, vision) to implement in order to manage the KVC.

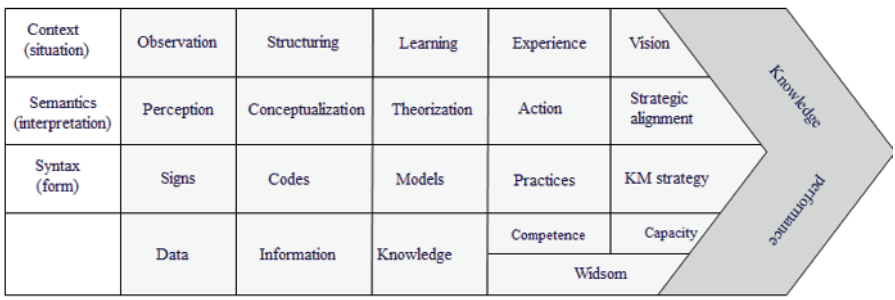

Figure 1.6. *Transformation processes in the KVC*

1.6. Practical application

To use the KVC in a company, the French Knowledge Management Club (*Club Gestion des Connaissances*)[1] created a value analysis tool called KMAV (*KM Added Value*)[2] where the challenge is to make the value added by KM intelligible for managers and raise awareness with the actors concerned by this project.

This tool is an analytical framework that includes 21 criteria corresponding to different transformations of levels in the KVC from data to capacities (Figure 1.7).

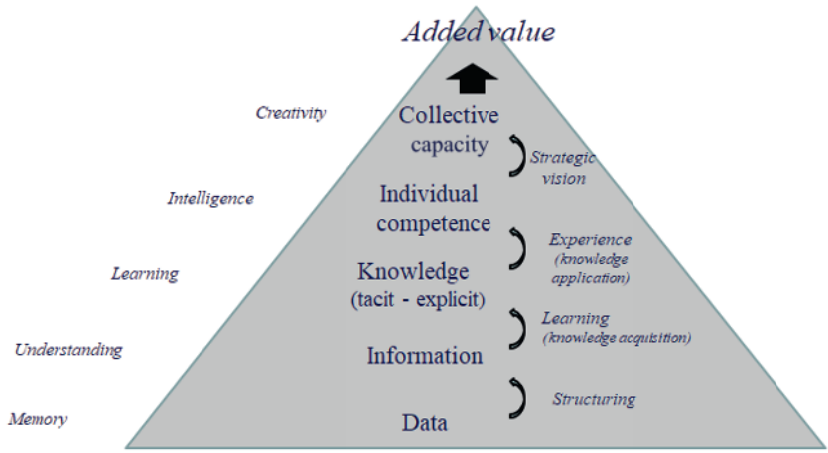

Figure 1.7. *The knowledge pyramid, a support for the KMAV tool*

Each criterion corresponds to a question to ask the respondents. Here are a few examples:

– From data to information

Criterion 2: Do we have a semantics for interpreting data?

1 http://www.club-gc.asso.fr/.

2 Creative Commons licence (CC-BY-NC-SA), *Club Gestion des Connaissances*, 2016–2017.

– From information to knowledge

Criterion 6: Is there a model allowing us to structure and contextualize information?

– From knowledge to competence

Criterion 15: Is knowledge used in practice? Is its effectiveness measured?

– From knowledge to capacity

Criterion 21: Does the top management control the implementation and correct functioning of collective capacities related to strategic objectives?

Each criterion is evaluated on a scale of 1–4, corresponding to the levels of increasing added value. For example, for criterion 2: "Do we have a semantics for interpreting data?" four answers are possible:

– Level 1: *It did not seem necessary to establish a shared semantics*. The project did not raise the question of data semantics. These cases are often compartmentalized projects: projects where tacit knowledge is strong or projects conducted without user involvement.

– Level 2: *A semantic exists but was imposed without explanation*. The project adopted the semantics of a software, a standard, etc., without ensuring that it was suitable and that it was adapted for the profession. It could be a software package imposed on a profession without really corresponding to the way things are done. Data can be distorted or even become insignificant.

– Level 3: *A first draft of a semantics was developed*. The project has started to establish or adopt a standard, a glossary with the meaning of different data and their context. This glossary has not yet been shared or related to all of the data.

– Level 4: *There is a clear and defined data semantics*. The data are standardized based on an external norm or one that was constructed internally. This standard makes it possible to make all of the data coherent and homogenous.

The process of implementing the framework in a company occurs in three steps:

– identifying the elements that make up the levels of added value. Based on the definition of the scope and the challenges, this consists of identifying the collective capacities associated with the challenges, the competence required, the knowledge underlying the competence, the information and the corresponding data, all while gathering the action proposals that emerge from the surveyed group;

– evaluating the value added in the current model. This is the goal of the audit conducted with the relevant groups;

– elaborating actions with high added value in the very short term (quick wins), medium term and long term.

Value levels	Criteria
From data to information	– Availability and quality of data – Data semantics – Data processing method – Data development potential
From information to knowledge	– Process of making necessary information available – Model providing modes of interpreting information – Frame of reference for understanding information – Efficiency of modes of interpreting information – Appropriation of modes of interpreting information – Capitalization in real time
From knowledge to competence	– Experience feedback – Integration of knowledge in the processes – Experience of application – Renewing competences on a life-cycle basis – Application of knowledge – Updating competences based on the evolution of knowledge
From competence to capacity	– Strategic vision – Integration of individual competences into collective capacities – Collaboration between individual competences – Actor mobilization factors – Evaluation of collective capacities

Table 1.1. *Analytical framework of a knowledge value chain*

These large steps involve the hierarchy, knowledge managers and operational managers. The communication plan accompanying the implementation is very important.

The analysis, conducted on the entire company or on a specific unit, can be presented simply with a clear graphic representation illustrated on the knowledge pyramid (Figure 1.7) and is a very useful support for what follows. The results of the analysis are presented and discussed in a top management committee to decide on actions that contribute to the continued progress of the company.

This tool has already been successfully tested in multinational companies, sometimes on a set of units in several countries. This method caused the interviewees to reflect, which developed their way of understanding KM. They made proposals, even after the audit interviews. The approach improved relations between collaborators. The re-establishment of work groups allowed them to see that they had contributed to a development. Incidentally, the managers also learned a lot.

1.7. Conclusion

This chapter proposed a KVC that takes into account the individual and collective nature of knowledge in a company. It is a chain of continuous transformation that starts from the perception of reality through the data until it reaches an organizational wisdom that reflects a company's creative maturity. KVC management gradually steers the company toward greater cognitive capacities, from memory to creativity. Operationally, processing the KVC occurs through gradual transformation processes from a company's data all the way to its strategy.

The contribution of this chapter is that it provides, in the strict framework of KM theories, a KVC that is internal to the company based on a sequence of cognitive tasks regarding information manipulation. An overview of some foundational ideas in information sciences made it possible to isolate and specify the characteristics of these tasks that could provide tools to work on this value chain.

This analytical framework of the value of knowledge can provide, as has been demonstrated, operational management tools.