The Alchemy of Competence

by **Thomas Durand**

Professor, Ecole Centrale Paris

e-mail : thd@ecp.fr

A chapter in the book: " Strategic Flexibility : Managing in a Turbulent Environment " edited by G.Hamel, C.K. Prahalad, H. Thomas and D. O'Neal, John Wiley & Sons Ltd.

In medieval times, alchemists were seeking to turn base metals into gold. Today managers and firms seek to turn resources and assets into profit. A new form of alchemy is needed in the organization. Let's call it competence.

I. Introduction

The Resource based theory of the firm arose after Penrose (1959) work and was developed by Wernerfelt (1984), Rumelt (1984), Barney (1986), Collis (1991), Amit and Schoemaker (1993), Grant (1996) and several other contributions. This model very rightly pointed out that the firm's performance is not just the result of the external environment in the competitive game (Porter's five forces, the external positioning, ...); the firm's performance also varies according to the resources tapped and leveraged by the organization to satisfy clients' needs on the market place.

Interestingly enough, the resource based view of the firm did not really raise any interest among practitioners until Prahalad and Hamel (1990) published their core competence piece, as Wernefeld (1995) suggests.

This clearly stressed that indeed a unique combinaison of core competencies can generate a truly competitive advantage. In addition, Prahalad and Hamel suggested to re-think strategy in terms of competence rather than for organizational SBU's.

The resource based view lead to a knowledge based perspectives, Conner and Prahalad (1996), Kogut and Zander (1996). More recently an attempt was made to build a theory of competence-based strategy. The term competence is meant here to enlarge the concept of resource while building up on the resource based perspective.

The Prahalad and Hamel (1990) core competencies lead to Hamel and Heene (1994) and Sanchez, Heene and Thomas (1996) as well as to the Heene and Sanchez (1997) and Sanchez and Heene (1997) volumes.

One of the key intents of this paper is to discuss why we think that the competence concept has something more to offer than the resource based view, bringing into the picture this "organizational alchemy" which is necessary to properly leverage the resources and assets at hand.

In any case, the line of reasoning behind the resource / competence based view of the firm remains essentially as follows: the firm taps sources of resources and assets and combines these into products and services for the clients through ad hoc management processes taking place within the organization.

We choose to use the generic word competence to describe these capabilities to combine, bundle and integrate resources into products and services.

Some of these competencies are distinctive enough to labeled core competencies, i.e. leveraging specific sets of capabilities and assets which give the firm a potentially significant and sustainable competitive advantage over its competitors.

In Prahalad and Hamel's terminology, to be "core", the competencies have to meet three criteria, namely (1) offer real benefits to customers, (2) be difficult to imitate and (3) provide access to a variety of markets.

The heart of the matter has precisely to do with the uniqueness of the various recombinations of core competencies which the firm may achieve to design, manufacture and distribute products and services to the customers on the market place. A higher level resource bundling process is thus at work to create an offer which may be attractive to and valued by the clients.

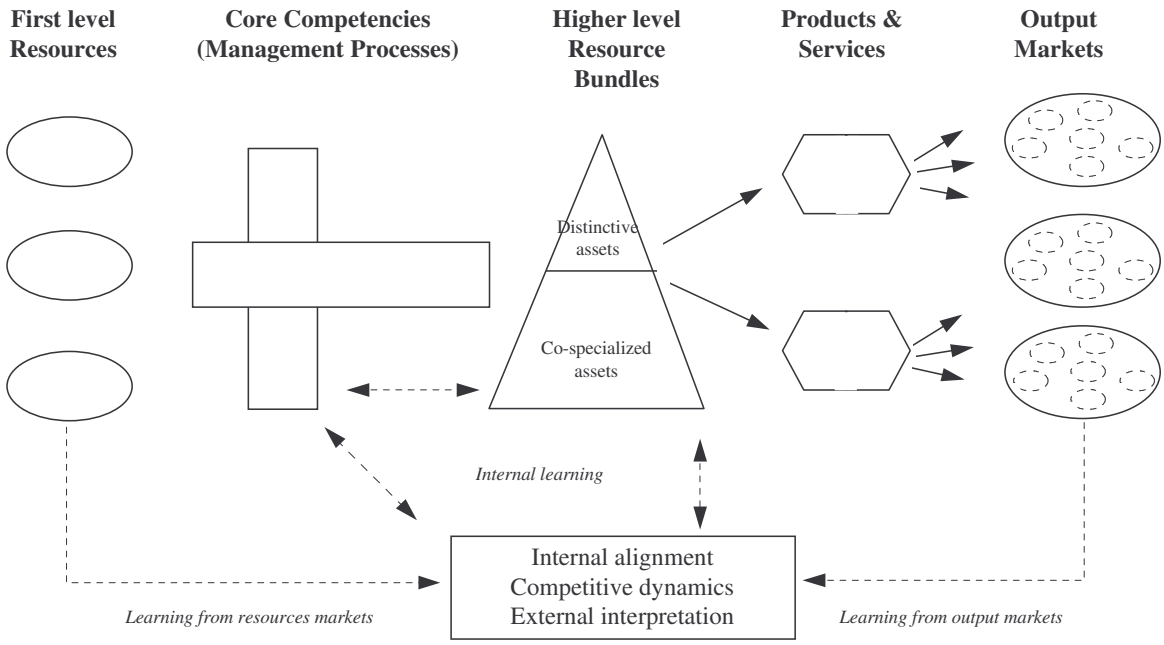
Figure 1 illustrates Mc Gee's (1995) symbolic representation of the argument. The figure also shows the dynamic learning loops taking place within the firm as well as in between the firm and its competitive environment.

Yet, one should immediately note how vague and fuzzy the concepts of resource and competence used in most of the literature in management still remain. Either the competence concept is nothing else but the standard resource concept and the resource based theory stands as a self-sufficient relevant framework; or there is something more to the competence idea - and this is our opinion - and we should clarify in what sense. This is our objective in this paper.

We feel that the management literature has not paid enough attention to the issue of properly defining competence. Only recently have some contributions started to offer clearer and more precise definitions of terms and concepts, e.g. Sanchez, Heene and Thomas (1996).

Resources, Competences and Learning

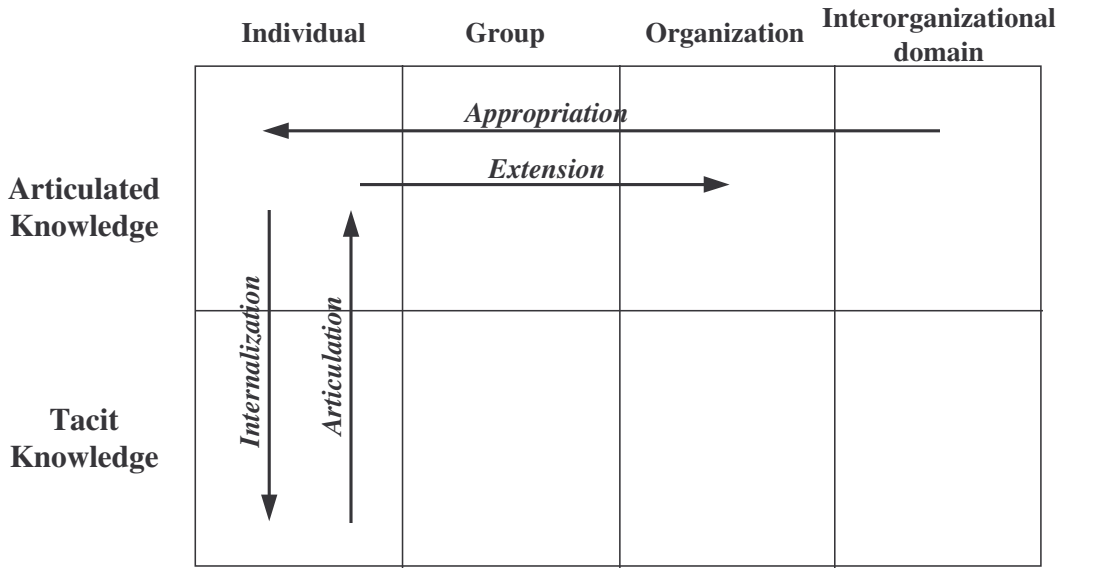
Figure 1



Source : John Mc GEE

Knowledge categories and Transformation processes

Figure 2



Source : Hedlund & Nonaka (1992)

Nevertheless, it seems to us that the available decompositions of competence into subcategories and sub-elements still deserve much attention.

We strongly believe that in order to be meaningful, a theory needs to be based on a solid, carefully enunciated set of definitions and classifications. This to us is a pre-requisite to consistency and articulation of the emerging theory as well as to its empirical testing. If the concepts used relate to no clear real managerial element, no subsequent empirical work can take place.

This paper aims at developing a renewed model of competence by reviewing the classical distinctions and characterization made in the literature around the various terms associated to the competence based theory of the firm.

The paper is thus mostly conceptual in its form and scope. We chose to illustrate its content using a set of graphical representations and short stories used as metaphors, shown in italics.

The next section of this paper, section II, is devoted to a brief survey and discussion of the many dimensions of competence identified in the management literature. Two concrete typologies of competence are discussed as a way to clarify what the content and scope of the discussion really are.

The following section, section III, deals with the issue of competence creation and building as well as the theme of learning.

Section IV then presents our model, a revised view on competence using the "knowledge" / "know-how" / "attitudes" referential stemming from research in Education. This referential is used to further discuss key additional concepts such as the idea of vision in strategy, the coordinated deployment function, Sanchez's (1996) "know-what" / know-why", the

specificities of competence dynamics for each one of the three main dimensions of this model of competence, as well as the interactions among these three dimensions.

A brief summary concludes the paper.

Sections II and III are thus designed as building blocks which are to be used in a reconstruction of a model of competence in section IV.

II. Dimensions of competence

The literature recognizes many different distinctions around the concept of competence. Some of these relate more specifically to knowledge, other to resources or assets. We choose here to list them as if they all were suggested and applied to competencies, in the broad, generic sense of the word. Only later will it be possible to limit and specify the concept of competence more clearly.

♦ Classical distinctions

The **tacit / articulated** distinction has been frequently recognized as important. Organizational learning or technology are known to be at least partly tacit, i.e. embedded in the routines and informal processes of the organization.

This distinction can actually be challenged if one adopts Von Krogh and Roos (1995) perspective based on the auto-poeisis concept. They indeed suggest that knowledge (and thus more generally competence) can only be transmitted, recognized and thus evaluated through interaction. Thus the cognitive limits of both the speaker and listener (the enunciation, the languaging, the attention paid, the message received and understood given the existing

knowledge base of the listener, etc) will unavoidingly lead to a distorted recognition of the knowledge. In that sense, knowledge is thus necessarily tacit, at least to a certain extent.

Similarly the **individual / collective** duality of competence remains as one of the main espistemic challenges of management. Schneider and Angelmar (1993) or Durand, Mounoud and Ramanantsoa (1996) clearly make this point.

Hedlund and Nonaka (1992) actually combines these two dimensions to discuss the comparative dynamics of knowledge management in the Japanese vs. the western firm. See figure 2. They identify several key processes including articulation vs. internalization as well as appropriation vs. extension of knowledge. It should be noted that they suggest that a good way of protecting competence may actually be to have the individual members of an organization keep it as tacit as possible. This is indeed embeddedness.

The **cognitive** vs. **behavioral** dimension of competence has been paid less attention, or in our opinion not as much as it should have.

Competence based theory seems to have been more preoccupied with cognitive capabilities like knowledge, skills, patents or technologies than with individual or group behavior, culture or identity of an organization. However, we argue that certain firms may benefit from their corporate identity acting as an engine for change while in other cases the existing culture may represent a significant inertia, hindering adaptation and creative strategic moves, Durand (1996). This has to do with the issue of unlearning which will be discussed in section III. The lack of recognition of behavioral and cultural aspects may have to do with the uncoupling which occurred between strategic management and the human resources field where behavior and identity are known to be essential.

The **positive / negative** duality suggests that competence may be not only positive as an asset but also negative in the form of a liability. When a firms suffers from a capability, this should be regarded as incompetence. Some argue that one should not try to qualify and evaluate competence as positive or negative. We insist that the competence based theory needs to assess the value of the firm's portfolio of competence.

More classically found is the **tangible / intangible** distinction. Indeed in the broad sense of the competence based theory, tangible assets such as equipments, buildings, products, etc., and intangible assets like brandnames serve as ingredients to the firm's competence base, while more intangible elements such as organizational processes or culture contribute to the "organizational alchemy" of competence.

An interesting point is made by Sanchez, Heene and Thomas (1996) as they very rightly suggest to add a **coordinated deployment function** to the **assets and resources** categories. *"A football team is more than a set of skilled players, a dish is more than a set of ingredients",* Durand (1996). Management is precisely about organizing processes to make it happen, leveraging assets and resources and building new capabilities.

We suggest that the essence of competence is to be looked for in this intangible "organizational alchemy" which cannot be easily imitated. Porter (1996) indeed argues that any tangible resource can be identified, described and thus imitated if not acquired. The imitability criteria put forward by Prahalad and Hamel thus requires intangibility and difficulty to explain how it works. This is where, we think, we need to look for the real content of competence.

There is another interesting debate about the real nature of competence. Can a firm, performing well on some markets thanks to specific core competencies, be called competent

for some other markets which it never tried to enter yet but where the same competencies could be valorized ?

This actually relates to two possible distinctions : the **intended** vs. **contingent** and **demonstrated** vs. **potential** dualities.

As Barney puts it, is it being competent to be lucky ? *"Think of a farmer in Texas buying a piece of land to raise his cattle and finding oil there. Would you say that he built a competitive advantage ? No ; but he is lucky enough to tap a source of economic rent".*

In Barney's view, the rent may not have been created or tapped intentionally and may be purely contingent, while the competitive advantage comes from an intended, proactive strategy. This relates to the goal attainment and intention criteria put forward by Sanchez and Heene (1996).

We would challenge this view. We feel that the bottom line remains the firm's performance, wherever it originally came from. Luck may have played a role or not, an asset or a capability, if exploited, makes the firm more competent than those who do not hold this element of competence. If the farmer does not exploit the oil source, he ignores his asset and has no rent. If he does, he benefits from a lucky move and indeed performs better economically and financially than his neighbor farmer with no oil. In our view, contingency may thus be part of the competence game. This actually relates to the path dependence concept of industrial economics; Dosi, Teece and Winter (1991). History clearly matters as experience shaped up competence which was built through various learnings mechanisms along the way. Luck may thus have played a significant role in the historical competence building.

Along similar lines but with a slightly different perspective, one may distinguish the set of **demonstrated** capabilities from those which are **potential** or latent. Is your firm really

competent if it holds core competencies which you claim could be used to develop new products / services for markets totally new to your firm ?

There is often more than a giant step from potentiality to reality. Could your firm be regarded as competent as a company already fully established on these new markets with resources and capabilities already bundled into effective products and services ? Obviously no.

Electric utilities have a real potential in Telecoms. Indeed both business may be seen as a matter of cables and distribution. Yet those which did not enter the telecom market yet are certainly not as competent as existing telecom operators.

♦ Two examples of competence classifications

All in all, these many distinctions encountered throughout the literature help characterize what competence is about. We shall call upon some of them in our reconstruction of section IV. As a first attempt, we actually used them as segmentation tools to suggest a preliminary typology of competence, Durand (1996). This is shown on Figure 3a. We also compared this classification to Sanchez, Heene and Thomas (1996) categories, as shown on Figure 3b. These tables are discussed in Durand (1996).

We believe that these classifications have at least one merit : they help root a theoretical discussion into the ground of reality and thus may contribute in keeping any further theorizing exercise from drifting too far away from meaningful managerial concerns.

A key point should be stressed here: a clear distinction is made between (a) assets and resources of the firm and (b) individual and organizational capabilities, knowledge, processes, routines and culture. In other words, on one hand there are ingredients, - tangible and intangible - which can be acquired and exchanged with basically no need for human resource transfers. These may be called non social assets and resources.

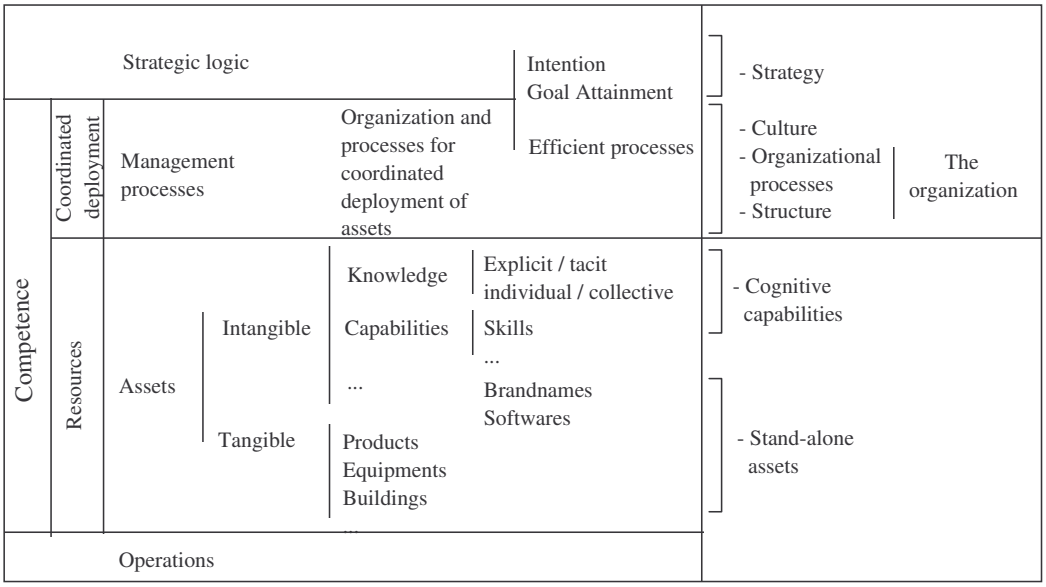
Competence

Figure 3-a

↗ **Stand-alone assets** ***tangible and intangible***	**Equipments, buildings, products, softwares, brandnames, ...**
↗ **Cognitive capabilities** ***individual and collective, explicit and tacit***	**Knowledge, know-how skills, technologies, patents, ...**
↗ **Organizational processes and routines** ***related to the coordinated deployment of Sanchez, Heene and Thomas (1996)***	**Coordinating mechanisms in the organization, combining individual actions into collective functioning**
↗ **Organizational structure** ***may facilitate or hinder the ability of a firm to adapt to certain changes***	**The structural design of the organization and its linkages to the environment (suppliers, clients, etc)**
↗ **Identity** ***may facilitate or hinder the ability of a firm to adapt to certain changes***	**Behavioural and cultural characteristics of the firm. Shared values, beliefs, rites and taboos are symptoms of the identity**

Compared definitions and categories

Figure 3-b



On the other hand, there is what we regard as the "organizational alchemy", i.e. intangible, difficult-to-buy and difficult-to-imitate capabilities. These clearly relate to the "integrated coordinated deployment of resources and assets" suggested by Heene, Sanchez and Thomas (1996). In short, they view competence as management processes in the organization. We shall use this point as a building block of our model is section IV, extending this idea to include other elements as discussed below.

Note in passing that, in their classification, "operations" seem to be left apart. We feel this may be misleading. We suggest to consider operations as management processes which indeed contribute to the overall set of processes performing the coordinated deployment of assets and capabilities. This is clearly what Total Quality Management (TQM) has repeatedly claimed over the last fifteen years.

At the same time as we suggest to include operations (and operational processes) into the idea of coordinated deployment, we feel that it should be relevant to extend this coordinated deployment function to strategy and culture as well.

Indeed, internal strategic alignment or policy deployment in TQM terminology, precisely aims at sharing a strategic overall vision within the firm and bringing it down to clear and meaningful orientations for each and every single member of the organization. *This relates to the polarization of particles in physics, e.g. photons in a laser beam.*

In this sense, strategic vision when shared throughout the layers of the firm contributes to the coordinated deployment of assets and capabilities, including the energy and commitment of the human resources. We shall come back to this in section IV, when discussing will and motivation as key elements of competence.

Also note that this point may be extended even further to include the Identity or the Culture as a cement or a glue holding the organization together and thus as an element of what we chose to call the "organizational alchemy" of competence.

III. Learning, Competence Building and Leveraging

Interestingly enough, the literature paid much more attention to learning, i.e. the flux, than to competence, i.e. the cumulated stock. We believe that this results from the difficulty to grasp competence (*"I know that I don't know; I don't know what I know, etc")* while it is apparently easier to study learning mechanisms.

♦ Learning

The literature classically identifies various forms of learning.

Arrow (1962) or Atkinson and Stiglitz (1969) pointed out to **learning by doing** as action empirically helps building up know-how and knowledge. In turn, Rosenberg (1972) described as **learning by using** the learning process which takes place when a client uses a new product and/or service, thus building up knowledge and know-how about using it.

This idea was extended through the **learning by interacting**, Von Hippel (1976) or Lundvall (1988) where the user-designer interaction again helps building up capabilities and thus improvement on both the product itself and how to use it.

Many other forms of learning mechanisms may be added here. Among these, we insist here on two which will prove useful in building our model of section IV. First comes "**learning by learning**". The process of learning helps build an ability to learn and learn again. *Teachers*

indeed know that the role of education is as much in helping individuals learn how to learn than in providing them with knowledge. The content of what is learnt may not be as important as the process of helping students to build a capability to learn more later by themselves. Second, we insist on the paradox of **learning by unlearning**, Durand (1992). This is an essential point as, too often, individuals as well as organizations are stuck with routines and habits which put them in a difficult situation when change is needed. Bettis and Prahalad (1995) also point out to this aspect. Paradoxically one may argue that the most difficult part of learning for the experienced ones is to unlearn what is now becoming obsolete and a factor of inertia. This is particularly true for the behavioral and cultural side of competence. *The painful transition of Central and East European economies offers a good example of this. Another example is given by the many difficulties encountered by public utilities in their adaptation to deregulation.*

Another classical perspective on learning relates to the **formal** teaching and training part versus what one may call the **"companionship"** approach. Typically, articulated knowledge can be taught and learnt in the class room. Conversely, tacit know-how, by nature, cannot be transferred formally and needs some form of "do it with me" or "observe - imitate" as mechanisms relevant for competence transfer. This in part relates to the learning by doing mentioned above.

There is an additional important aspect of learning which will be needed in our model of section IV. Piaget (1970) clearly showed that children learn not only through formal teaching but also and simultaneously through sensory information stemming from action. Children thus build knowledge and know how at the same time. In turn this means that (a) formal teaching and (b) action are two sides of a same coin. This is also pointed by Senge (1990). We shall extend this idea further in section IV, applying it to interaction and attitudes as well.

♦ Stages of competence

An additional and important element of competence building needs to be brought in before our attempt to integrate these different ingredients into a model in section IV. We suggested, Durand (1992), that knowledge builds up as information is integrated and assimilated into frameworks which ensure coherence and structure to the accumulated knowledge base. Yet, information is not just data. Information is data which were acknowledged, sieved, transformed, adapted to fit into the pre-existing structure of knowledge. The psychology literature suggests that individuals tend to reject data which do not fit their previous knowledge while they overemphasize data which reinforce their existing understanding and beliefs, Hogarth (1980), Schwenck (1984, 1988), Barnes (1984), Stubbart (1989).

One may thus consider that data need to be enacted before they reach the status of information which then can be integrated as an element of knowledge.

At the other end of the spectrum, expertise should be regarded as much higher a step than knowledge. Not only does expertise relate to a significantly more advanced level of competence, it also requires an integrated combination of knowledge and know-how, thus assuming a "state-of-the-art" ability to understand, explain and even act within the domain of competence. In a way expertise transcends competence, through both (a) a quantic jump in the level of competence and (b) a recombination and merger of various elements of competence (e.g. knowledge and know-how).

In other words, as Durand (1992) suggested, there is a sequence of stages from data and information, to knowledge and expertise as shown below :

In section IV, we shall extend this to other forms of competence than just knowledge (namely for know-how and attitudes).

This is also suggested in a way by Figure 4. A list of terms is presented. These were already used in this paper, but we now specify in what sense they relate to competence.

More specifically one should note that this list tends to mix two significantly different forms of competence, namely knowledge (as information) and know-how (as skill or capabilities). This thus reinforces the need to differentiate among at least two scales of increasing competence. At the same time the list helps better specify different degrees of competence e.g. data, information, knowledge, expertise. This list, once adapted, will constitute another building block of our reconstruction of section IV.

♦ A continuum of competence leveraging and building

The emerging competence-based theory pays a lot of attention to the question of competence building and leveraging. We suggested that there is more of a continuum than an opposition between these two aspects of the management of a competence portfolio, Durand (1996).

Figure 5 illustrates this point. As it stretches to adapt to new market requirements, the firm may "pivotate" around existing competencies, among which core competencies, thus leveraging its existing set of distinctive capabilities and assets, in turn "reinforcing" them. It may also have to build new competencies either from internal sources within the organization (thanks to a "synergetic fit" with other profit centers) or from the outside ("networking access") on an inter-organizational mode as discussed by Hedlund and Nonaka (1992).

"Adaptability" refers to the ability of some companies to keep a permanent ability to learn, unlearn and relearn again. This in turn relates to Teece and Pisano (1994) idea of "dynamic capabilities".

Along similar lines, although from a different angle, it is also possible to identify degrees in the difficulty encountered by the firm adapting its portfolio of competence when faced to change. Durand and Guerra-Vieira (1997) suggest strategies to bridge the "competence gap". Figure 6 illustrates this idea as it distinguishes the resource and asset gap versus the "organizational alchemy" or coordinated deployment gap. We suggest that it is significantly more difficult for the firm to build new competence than to access resources and assets. As was already discussed, Prahalad and Hamel (1990) imitability criteria leads to the idea that assets and resources may be identified and accessed while complex human and behavioral aspects of the organization may be more difficult not only to imitate but also to manage and transform.

Competence in a narrow sense should indeed be searched as the basis of this "organizational alchemy". This is exactly what we are after.

Most of the points discussed in sections II and III are now going to be integrated and in a way extended into a revised presentation of the dimensions of competence which we see as relevant for theory development. This is the focus of section IV.

Competence (Degree of Competence)

Figure 4

- ↗ **Data** ↘ **I have access to external pieces of information**
- ↗ **Information** ↘ **I know, I have learnt, I found out**
- ↗ **Knowledge** ↘ **I have integrated frameworks of information. I can explain to someone else**
- ↗ **Skill** ↘ **I can do it**
- ↗ **Know how** ↘ **I know how to do it, I can do it and I can show how to do it to someone else**
- ↗ **Competence** ↘ **I am more able than others at explaining what to do and how to do it (knowledge) but also at doing it (know how)**
- ↗ **Expertise** ↘ **I am an expert at doing it, as well as understanding what to do and explaining how do to it**

A continuum of competence leveraging and building

Figure 5

Accessing competence

	Holding		**Accessing**	
	Same competence required ***"Reinforcement"***	*Competence held elsewhere* ***"Synergetic Fit"***	*Inter-organizational competence* ***"Networking access"***	*Learning capability* ***"Adaptability"***
Leveraging	+ + + + Full leveraging	+ + + Internal leveraging	+ + External leveraging	+ Leveraging the learning capability
Building		and adaptation +	absorption and rebuilding + +	and competence building + + +

Static access to competence ***Dynamic access to competence***

Preliminary typology of competence gaps

Figure 6

Assets and Resources

Deployment capabilities	*Held*	*Not held*
Held	**Minor adjustment** (leveraging) 1	**Minor gap** (re-building the assets base) 2
Not held	**Significant gap** (rebuilding deployment capabilities) 3	**Major gap** (full re-building) 4

IV. Reconstructing a Competence Referential

♦ **Three generic forms of competence: Knowledge, Know-how and Attitudes**

We suggest to borrow from research on Education the three key dimensions of individual learning : knowledge, know-how and attitudes, following Pestallozzi (1972) who refered to "head, hard and heart". See Figure 7. Given the specific concern of this paper, we need to specify

⇒ what is meant by each of these categories of competence,

⇒ the dynamic accumulation of competence through learning mechanisms,

⇒ the interactions among these three interdependent dimensions,

⇒ how managerial levers can affect and leverage this potential of competence described by these three dimensions.

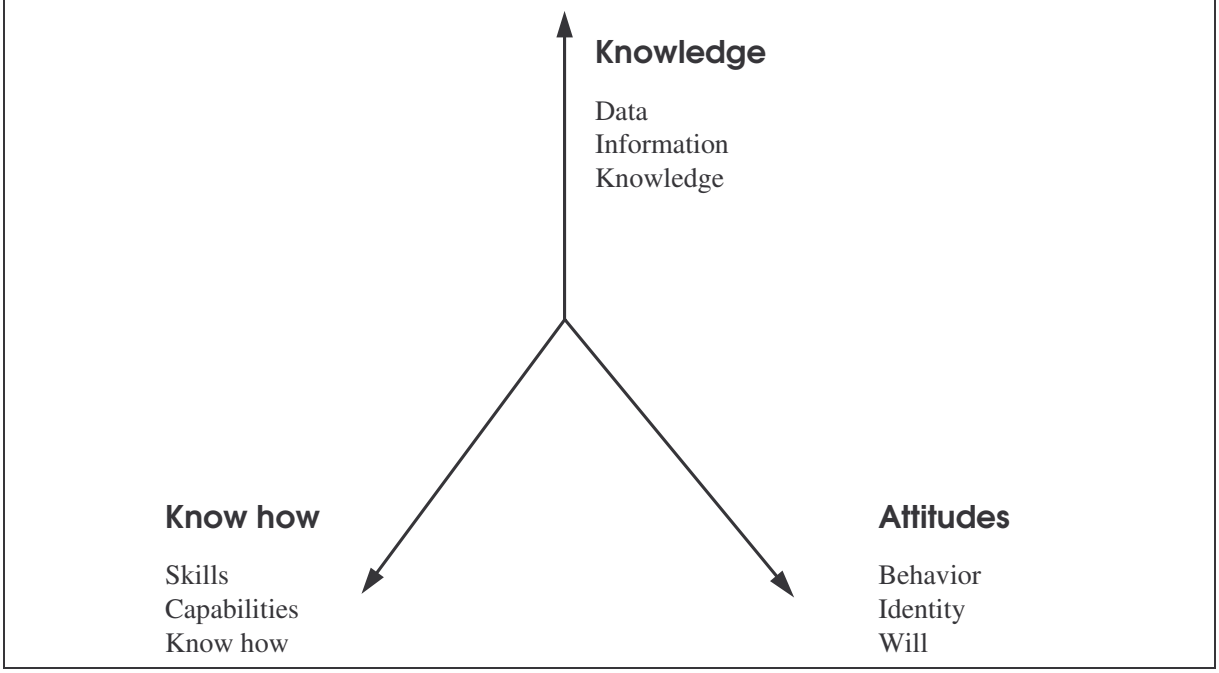
- **Knowledge** corresponds to the structured sets of assimilated information which make it possible to understand the world, obviously with partial and somewhat contradictory interpretations. Knowledge thus encompasses the access to data, the ability to enact them into acceptable information and to integrate them into pre-existing schemes which obviously evolve along the way.
- **Know-how** relates to the ability to act in a concrete way according to predefined objectives or processes. Know-how does not exclude knowledge but does not necessitate a full understanding of why the skills and capabilities, when put to operations, actually work. Know-how thus in part relates to empirism and tacitness.
- **Attitudes** are too often neglected in the resource based view as well as in the competence based theory of the firm. This may be due to the traditional lack of interest of economists

in behavioral and social aspects. We believe that behavior but even more so identity and will (determination) are essential part of the capability of an individual or an organization to achieve anything. This is a matter of choice in defining concepts. We argue that a dedicated organization, eager to succeed, is more competent than a demoralized, passive one with exactly the same knowledge and know-how.

These three dimensions will be the generic axes of our competence referential. *As an illustration, while the profile of competence of an historian should clearly be positioned close to the knowledge axis, the engineer would be placed further down the know-how dimension while the politician would be expected to be closer to the attitudes axis.* These are obviously caricatures.

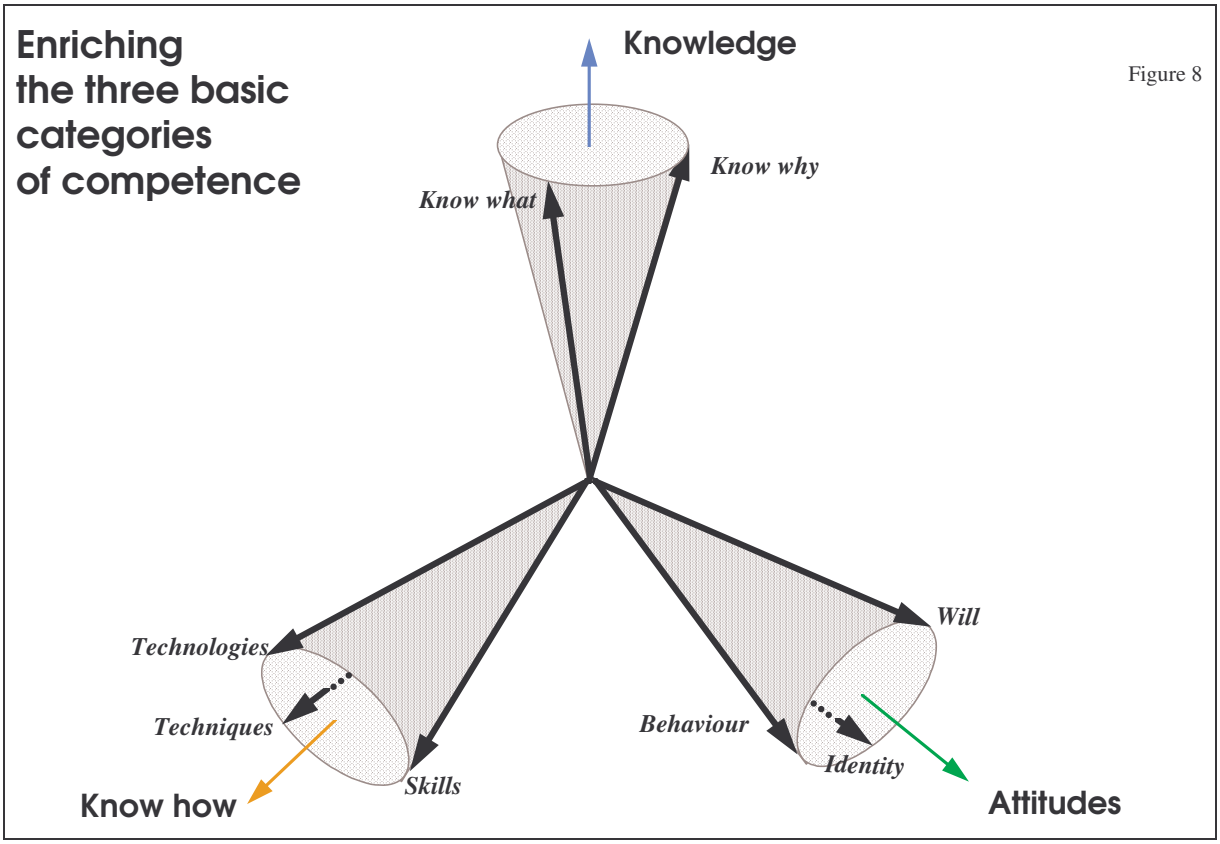
Three dimensions of competence

Figure 7



Enriching the three basic categories of competence

Figure 8



Note for example that the engineer does not only deal with empirical know-how but also attempts to introduce as much knowledge into his practice as possible. This is exactly the difference between techniques (empirically-based with little understanding of why it works) and technology (more science-based with clear explanations for why it works, thus making it possible to extend the technology to other applications much more easily and faster). Ansoff (1986) pointed out very rightly that technical skills are difficult to extend as they are empirically built, mostly tacit, context specific and locally embedded while the acceleration in technological development comes from the scientific base which increasingly helps technological diffusion and extension.

Also note that the knowledge side of the competence space shown on Figure 7 is characterized by articulated forms of competence, while the know-how / attitudes dimensions embed more tacitness.

We further suggest to extend this referential to collective learnings as well. This is naturally a risky shift which would need to be discussed at length as it requires a paradigmatic shift. This will not be done here. Some discussion of this matter may be found however in Durand, Mounoud and Ramanantsoa (1996) who advocate for interactionism and the theory of social representations, Moscovici (1988). They see it as a way out of the internal contradiction of managerial / organizational cognition, i.e. the trap of the so-called organizational mind.

♦ Enriching the referential

One may then further enrich the picture by introducing some of the elements discussed in the previous sections. See Figure 8.

The "attitudes" category is itself a composite dimension as we suggest that it combines the behavioral dimension (know-how-to-behave), the culture or identity of the organization as

well as the idea of will, i.e. determination and commitment. These are clearly distinct items which should be recognized as such.

As an illustration of the importance of organizational behavior and its links to competence and performance, Hambrick (1989) discusses how team behavior at top management level can lead to two polar extremes, fragmentation and group think. Both situations are shown to be inefficient, thus reinforcing the idea that collective behavior may be an element of competence or incompetence.

Similarly, the "know-how" axis is also a composite dimension. It clearly relates to skills, individual and collective processual capabilities, as as technologies. As discussed abovewell , technologies are at least in part understood and modelled. They are more than just empirical techniques. They thus lean in part towards the knowledge dimension, while techniques lean the other way.

Now turning to the knowledge axis, it should be noted that the "know-what / know-why / know-how" distinction put forward by Sanchez (1996) is dealt with only in part by the referential presented since only the know-how appears as one of the 3 generic axes. The know-what / know-why turn out to be two different variants or subcategories of knowledge. Know-what is in a sense hinting in the direction of know-how, through a flavor of intuition, without the cognitive explanation which the "know-why" has to offer.

The "know-why" is actually twofold. On one hand it stands for the expertise of the knowledgeable who can explain to a skilled worker why his/her "know-how" works and how to modify and improve the corresponding skill.

On the other hand, the "know-why" also includes a strategic understanding of why it is relevant to choose whatever strategic path which the "know-what" suggests. The strategic dimension of the second type of know-why is far reaching.

We thus suggest that the "know why" clearly relates to strategy and strategic vision and constitutes a very important aspect of the competence of the organization.

♦ Managerial levers and the competence base

The three basic dimensions of our referential of competence together with the sub-dimensions which we just added help understand key aspects of the competence base.

Yet, one should recognize that management is not necessarily capable of acting upon these dimensions.

Standard managerial levers are of a different nature:

- **Strategizing** (strategic thinking leading to a strategic vision, a strategic logic thus relating to the "know why", strategy deployment and strategic decision making). This relates to the knowledge (know-what and know why) dimension.
- **Organizing** (the organizational structure as well as management processes). This relates more to the "know how" dimension.
- **Motivating** (i.e. setting up incentives but also coaching, encouraging positive thinking and behavior, promoting dedication and will). This thus relates to the "attitudes" dimension.

Figure 9 illustrates the respective positioning of each of these three main managerial levers for action.

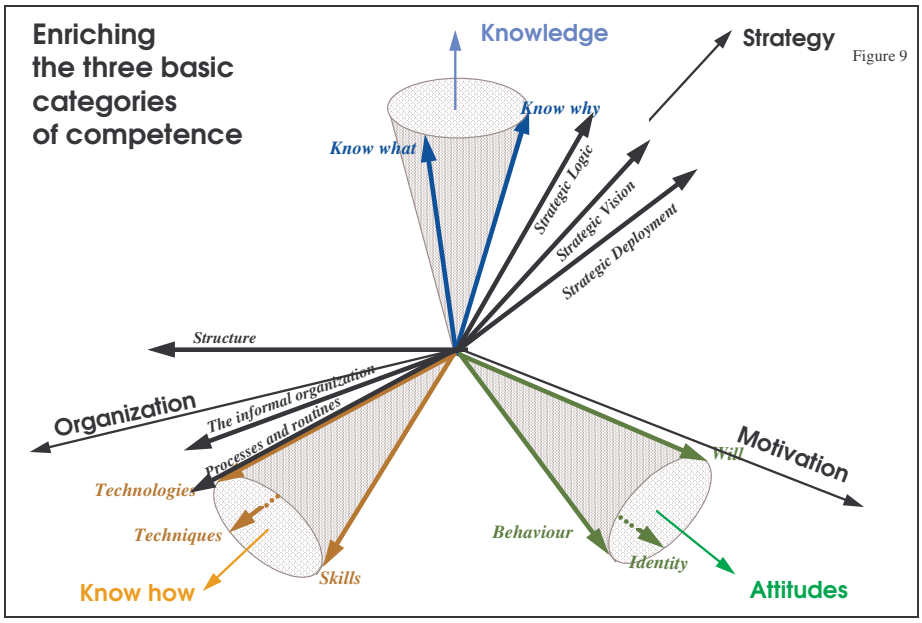


Figure 9

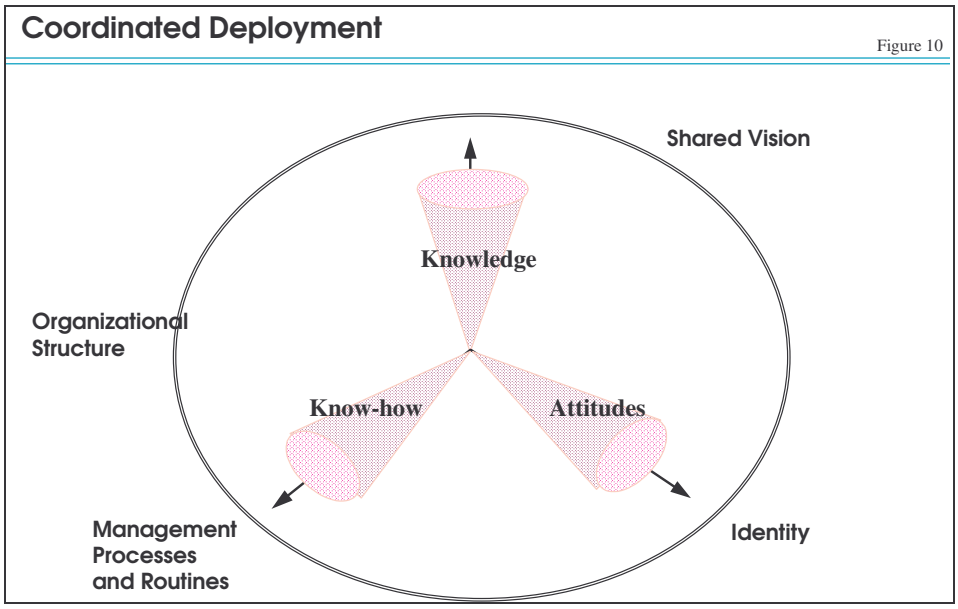


Figure 10

Parallel learning processes and stages

Figure 11

Knowledge	Know-how	Attitudes
Data	Action	Interaction
Information	Skills and capabilities	Behavior, culture, will
Knowledge	Know-how	Attitudes
Expertise	Expertise	Expertise

The strategic vision includes the idea of a goal set up for the whole organization and sharable if not shared, thus leaning slightly towards the attitudes, will and commitment dimensions. This is even more so for strategic deployment which clearly means deploying the strategic vision for each subpart and every member of the organization.

Motivation fits in between these strategic dimensions and the attitudes. Motivation clearly combines an intent, a far reaching goal and a positive, proactive attitude made up of will, determination and commitment. More than ever, motivation should be regarded as a key element of competence. Human resource managers are obviously well aware of this and line managers as well. And so are sport coaches. This is indeed a key element of team building and managing. How come then most of the literature on competence based theory simply ignores this key aspect? Do management researchers forget what management is all about?

The organization with its two basics dimensions, the organizational structure and the management processes are also shown on Figure 9. One may also add to this the informal organization. The organizational structure falls more on the articulated side of the referential while the informal organization and most of the processes are closer to the know-how axis. Management processes relate to the collective capabilities of the firm, thus including the technologies. Note that processes may be regarded as two fold. On one hand stand the organizational processes set up and explicitly monitored by the management. On the other hand are the routines which were generated historically by the organization, possibly from a distorted appropriation of some management processes, long ago forgotten. Routines in that sense may be regarded as informal processes. They thus tend to be more deeply rooted and embedded in the organization. In that sense, the informal organization and the routines also relate to the behavioral and cultural dimensions of attitudes, thus leaning towards this axis.

This specific positioning of the standard managerial levers (strateging, organizing and motivating) with respect to the proposed key dimensions of competence in our model thus raises the issue of the interaction between managerial tasks and competence building and leveraging. The links are obviously not so direct but nevertheless exist. How could management operate on the same wavelength (according to the same dimensions) as the competence base in order to better build and leverage competence? This issue is essential and should be paid more attention in future research.

♦ Enlarging the content of coordinated deployment

This in turn leads to the idea that the heart of the concept of competence, the "organizational alchemy" as we call it, which has to do with the coordinated deployment of resources and assets, should be enlarged beyond management processes. Indeed, while Sanchez, Heene and Thomas (1996) actually associate their coordinated deployment function to the management processes only, we argue that this idea should be significantly extended to the cultural identity, the strategic vision and the organizational structure. We argue that the identity (the shared values, rites, taboos and beliefs) operate as a cement holding the organizational pieces together at least as efficiently as any other coordinating and integrating mechanism.

We further argue that a shared vision also contributes to the coordinated deployment of strategy, channeling people's energy, motivation and commitment. Finally, we suggest that the organizational structure is also a key element of the same coordinated deployment of assets and capabilities.

In other words, we suggest to review and enlarge the content of the coordinated deployment concept in order to encompass four elements: the management processes, the identity, the

strategic vision and the structure. This is shown on Figure 10. In so doing, we clearly relate to Strategor's (1988) *tetrahedron* of strategic management.

♦ The dynamics of competence building

This framework can also be enriched with the theme of competence building. In a way, competence is a stock accumulated as a result of an ongoing flux of learnings, reinforcing and enlarging the competence base of the organization.

The "data ➔ information ➔ knowledge ➔ expertise" sequence described earlier can now be extended and adapted to the two other axes of the referential, i.e. the two other generic forms of competence, as shown on Figure 11.

This illustrates the parallelism which prevails in the way learning mechanisms operate for each dimensions of the referential. Know-how is built through action which shapes skills and techniques. Similarly attitudes are shaped through interaction when individuals conform to group or organizational behavior, adopt the same cultural values and share the same basic commitments.

Expertise requires one step further. As discussed, expertise needs some form of quantic jump in competence together with a merger of the three generic dimensions of competence. Figure 12 illustrates this idea graphically, detailing the learning processes at hand.

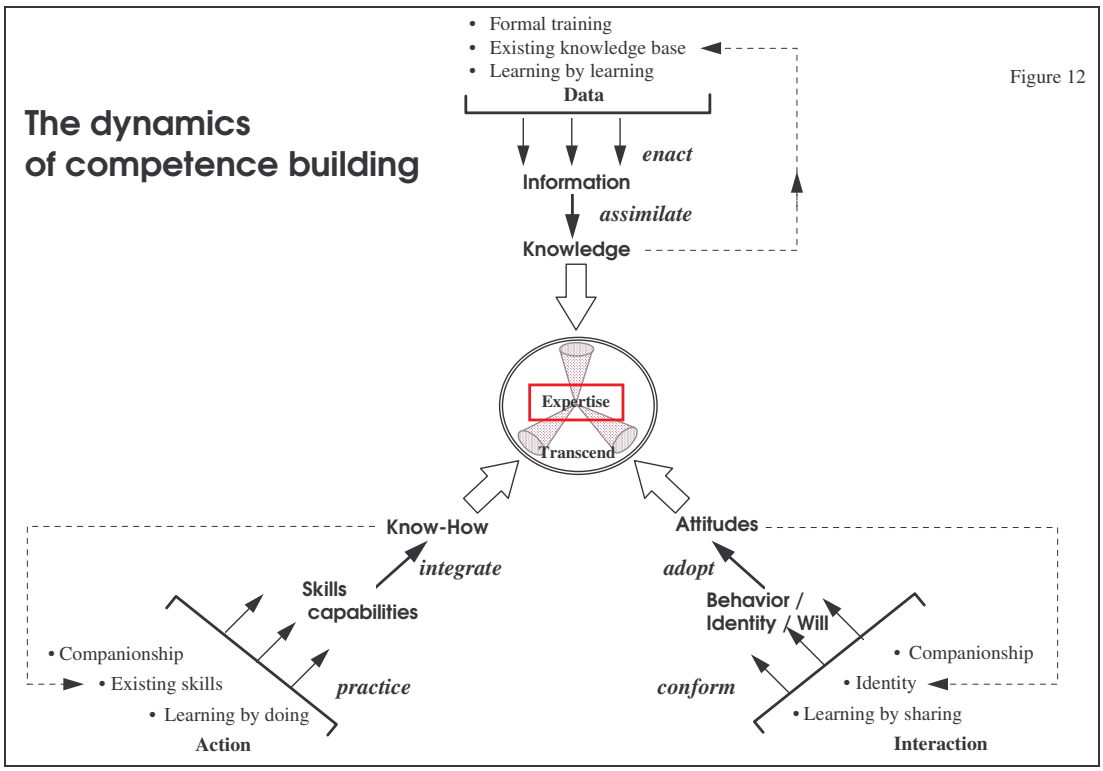


Figure 12

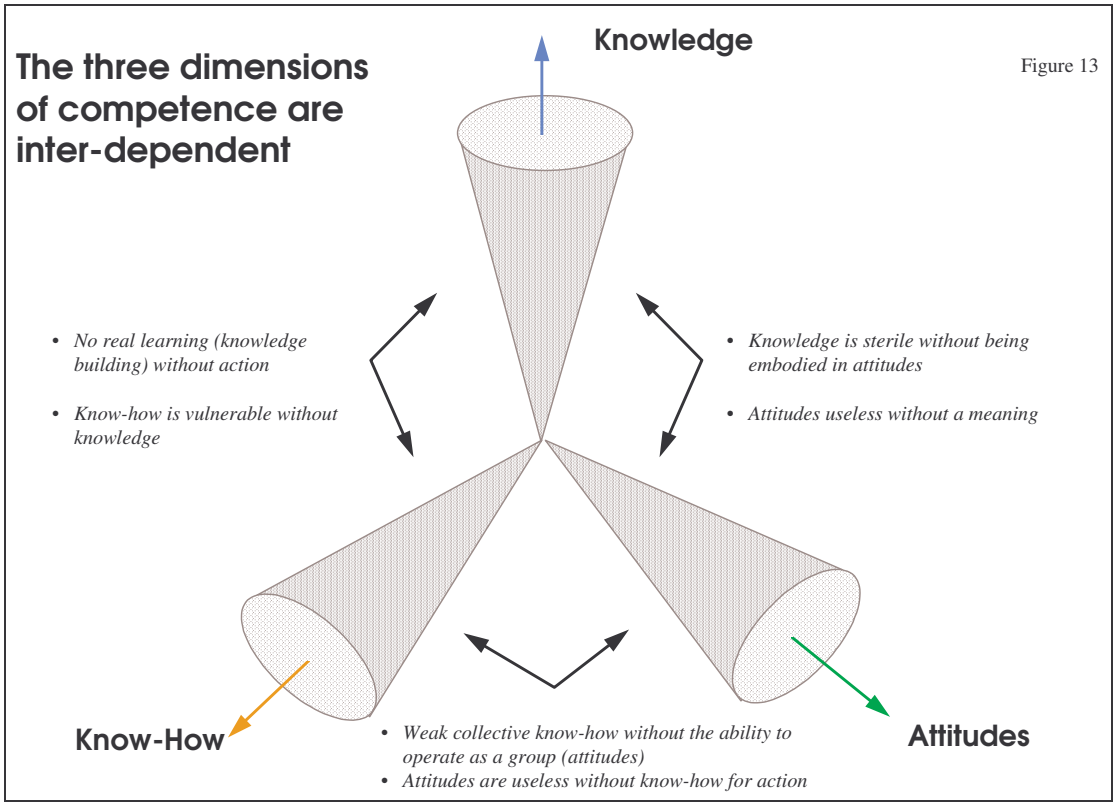


Figure 13

Four interesting comments may be made on this matter:

- The pre-existing stock of competence (the existing skills, knowledge base and identity) significantly affects the learning capabilities. It may operate as a booster to build up competence fast. It may also transform itself into a source of biais and inertia, hindering any real new learning. As discussed earlier, history indeed matters. The "installed base" counts. This is shown graphically on Figure 12. For each axis, the dotted arrows loop back on the pre-existing competence base which in turn influences new learnings. The result of learning is not just a function of the learning process. It also depends upon the pre-existing base of competence.

- If knowledge building stems from exposure to external data enacted as information and integrated into frameworks, know-how is built through action and companionship while attitudes are shaped through interaction in companionship.

- It is action (taking place in the form of the various learning mechanisms described here) which transforms the potential competence, not yet demonstrated, into reality. Through the dynamics of competence building and learning, what one could possibly do becomes what one can actually do.

- As discussed earlier, the expertise combines the three generic forms of competence identified (knowledge, know-how and attitudes) into an integrated higher level competence. Experts understand, can explain and even can do better than others, with state-of-the-art ability. Expertise is beyond assimilation and digestion. It tends to transcend competence and merge its key generic dimensions.

♦ The three generic dimensions of competence are interdependent

Two different aspects of interdependence may be formulated here. They are illustrated on Figure 13.

First, building upon Piaget's work, we recognize with Senge (1990) that there is little real learning and knowledge building without action. Knowledge and know-how are in fact built simultaneously as learning needs action.

This idea can be extrapolated and extended. We argue that learning actually takes place in organizations simultaneously for the three generic dimensions of our referential. This happens, in parallel but in an interrelated mode, through exposure to external data, action and interaction.

Secondly, we suggest to look at the case of workers highly vulnerable to technical change as they built their competence around purely empirical know-how with little or no knowledge of other technologies. When the technological process, e.g. the equipment is changed, they lose most of their competence. Without knowledge they are not in a position to adapt to the change. Know-how without knowledge is thus very vulnerable.

Again, we suggest here to extend this idea to the interactions among the three generic dimensions of our referential.

What would be a collective know-how without appropriate group attitudes, i.e. without the capability to behave as a group? Similarly, attitudes without know-how may prove useless, as much as attitudes may be meaningless without knowledge and thus understanding of the stakes and challenges at hand. Pure knowledge without relevant know-how is sterile and knowledge without attitudes may even prove counter-productive.

In other words, exposure to data, action and interaction are three parallel and interrelated modes of learning, building up competence simultaneously. Conversely an unbalanced

competence base, leaning more towards one of the three generic dimensions of our referential, may prove inappropriate.

In this sense, the three generic dimensions of competence in our referential are interdependent.

V. Conclusion

We have first pointed out the lack of attention paid to clear and workable definitions and concept specifications in the literature devoted to the resources / competence-based view of the firm.

We have then summarized the key distinctions encountered describing the dimensions of competence (tacit / articulated, individual / collective, cognitive / behavioral, positive / negative, tangible / intangible, intended / contingent, demonstrated / potential, assets and resources / coordinated deployment function). We have also presented and compared two examples of competence classifications, thus relating the concepts to real managerial categories. We have clearly distinguished resources and assets from what we called "organizational alchemy" or the coordinated deployment of assets and resources, offering to keep the word competence for the latter category.

We have further discussed different forms of learning as well as the idea of a sequence in knowledge development, before referring to the competence building / leveraging continuum.

Using these ingredients as building blocks, we then presented a revised model of competence around three generic forms (knowledge, know-how and attitudes). We stressed the importance of the latter which is too-often neglected in the literature on competence / resource based theory. We could relate the know-how / know-what / know-why decomposition to the framework presented and introduced Strategy and Vision as well as the Organizational

Structure and Processes in the model. This led to the idea of enlarging the content of the coordinated deployment of assets and resources, to include not only management processes but also the identity, the shared vision and organizational structure. These, we argue, are the four elements of the essence of competence.

We have also shown how managerial levers (strategizing, organizing, motivating) relate to the three generic dimensions of our referential for the competence base.

We then introduced the dynamics of competence building into the model, discussing the unique status of expertise and the importance of the pre-existing competence base influencing the flow of learning. We finally suggested that the three generic dimensions of competence in our model are interdependent, reinforcing each other as learning takes place simultaneously in all directions.

Altogether the model which we presented here should make it possible to address and possibly enrich most of the questions which theory building on competence related topics has to deal with. It is intended as a framework designed to permit further theoretical development as well as simpler presentation and diffusion of the concepts towards practitioners.

References

Amit R. and P.J. Schoemaker (1993), "Strategic Assets and Organizational Rent", Strategic Management Journal, n°1, pp. 33-46

Arrow K. J. (1962), "The Economic Implications of Learning by Doing", Review of Economic Studies, 29, pp. 155-173

Atkinson A.B. and J.E. Stiglitz (1969), "A New View of Technological Change", Economic Journal, 76, pp. 573-578

Barnes J. (1984), "Cognitive Biases and their Impact on Strategic Planning", Strategic Management Journal, 5, pp. 129-137

Barney J. B. (1986), "Strategic Factor Markets: Expectations, Luck and Business Strategy", Management Science, 32, pp. 1231-1241

Bettis A. R. and C.K.Prahalad (1995), "The Dominant Logic: Retrospective and Extension", Strategic Management Journal, 16, pp. 5-14

Carlson (1995), personal communication

Collis J. (1991), "A Resource-Based Analysis of Global Competition: the Case of the Bearing Industry", Strategic Management Journal, 12, pp. 49-68

Conner K. C and C.K. Prahalad (1996), "A Resource-Based Theory of the Firm: Knowledge Versus Opportunism", Organization Science vol. 7, n°5, Sept-Oct. 1996

Dosi G., D. Teece and S. Winter (1991), "Toward a Theory of Corporate Coherence", edited by Dosi G., R. Gianetti and P. A. Toninelli*, Technology and the Enterprise in a Historical Perspective*, Oxford University Press

Durand Thomas (1992), "The Dynamics of Cognitive Technological Maps", in *Strategic Processes, e*dited by P. Lorange, J. Roos, B. Chakravarty and A. Van de Ven, Blackwell Business, April 92

Durand Thomas (1996), "Strategizing Innovation: Competence Analysis in Assessing Strategic Change", in Competence-Based Strategic Management, A. Heene & R. Sanchez editors, John Wiley (forthcoming)

Durand Th., E. Mounoud and B. Ramanantsoa (1996), "Uncovering Strategic Assumptions: Understanding Managers' Ability to Build Representations", European Management Journal, vol. 14, n°4, pp. 389-398

Grant R. M. (1996), "Prospering in Dynamically-competitive Environments: Organizational Capability as Knowledge Integration", Organization Science, vol. 7, n°4, July-August 1996

Hamel G. and A. Heene, editors (1994), *Competence-Based Competition*, John Wiley, Chichester, UK

Hambrick D. (1989), "Putting Top Managers Back into the Strategy Picture", Strategic Management Journal, Summer Special Issue, 10, pp. 5-15

Hedlund and Nonaka (1992), "The Dynamics of Knowledge", in *Strategic Processes*, in P. Lorange and al. Editors, Wiley

Heene A. and R. Sanchez (1997), in *Competence-Based Strategic Management*, A. Heene & R. Sanchez editors, John Wiley & Sons, 1997

Kogut B. & U. Zander (1996), "What Firms Do ? Coordination, Identity and Learning", Organization Science, vol. 7, n°5, Sept-Oct. 96

Lundvall B.A. (1988), "Innovation as an Interactive Process: from User-Producer Interaction to the National System of Innovation"

Marino K.E. (1996), "Developing Consensus on Firm Competencies and Capabilities", Academy of Management Executive, vol.10, 3, pp.40-51

Mc Gee J. (1995), communication at the Third International Workshop on Competence-Based Competition, Ghent, November 1995

Moscovici S. (1988), "Notes Towards a Description of Social Representations", European Journal of Social Psychology n°18, pp. 211-250

Penrose E. (1959), "the Theory of the Growth of the Firm", Oxford, Blackwell

Prahalad C. K. and G. Hamel (1990), "The Core Competence of the Corporation", Harvard Business Review, pp. 79-91

Prahalad C. and X (199?)

Rosenberg N. (1972), *Technology and American Economic Growth*, edited by Armouk, New York

Rumelt R.P. (1984), "Towards a Strategic Theory of the Firm", in *Competitive Strategic Management*, R. Lamb ediror, Prentice-Hall, Englewood Cliffs, pp. 556-570

Sanchez R. (1996), "Managing Articulated Knowledge in Competence-Based Competition", in *Dynamics of Competence-Based Competition*, R. Sanchez, A. Heene & H. Thomas editors, Elsevier, London (forthcoming)

Sanchez R. and A. Heene (1997), "A Systems View of the Firm in Competence-Based Competition", in *Dynamics of Competence-Based Competition*, R. Sanchez, A. Heene & H. Thomas editors, Elsevier, London (forthcoming)

Sanchez R., A. Heene and Thomas H. (1996), "Towards the Theory and Practice of Competence-Based Competition", in *Dynamics of Competence-Based Competition*, R. Sanchez, A. Heene & H. Thomas editors, Elsevier, London (forthcoming)

Senge (1990), "The Fifth Discipline"

Strategor (1988, 1993), "Stratégie, Structure, Décision, Identité - Politique Générale d'Entreprises", ouvrage collectif, InterEditions

Schneider S. and R. Angelmar (1993), "Cognition in Organizational Analysis: Who's Minding the Store?", Organization Studies, n°14, pp.347-374

Schwenk C. (1984), "Cognitive Simplification Processes in Strategic Decision-making", Strategic Management Review, n°5, pp. 111-128

Schwenk C. (1988), "The Cognitive Perspective on Strategic Decision-making", Journal of Management studies, n°25, pp. 41-55

Stubbart C. (1989), "Cognitive Science: a Missing Link in Strategic Management Research", Journal of Management Review, 10, pp. 724-736

Teece D.J. and G.Pisano (1994), "The Dynamic Capabilities of Firms: An Introduction", International Institute for Applied Systems Analysis, Laxenburg, Austria

Von Hippel E. (1976*), "The Dominant Role of Users in the Scientific Instrument Innovation Process*", Research Policy, 5

Wernerfelt B. (1984), "A Resource-Based View of the Firm", Strategic Management Journal, 5, pp. 171-180

Wernerfelt B. (1995), "The Resource-Based View of the Firm: Ten Years After", Strategic Management Journal, vol. 16, 1995