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Individual Knowledge as a Bridge between Human and Customer Capital [1]

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Abstract: This paper will study the influence of three components of human capital focusing on operative personnel under a dynamic perspective. It considers learning flows and the knowledge stocks that the employees of the organization generate because of the relationships that they maintain with their clients. The influence of individual knowledge in these learning flows will be examined. These being components such as: learning capacities; automatic and conscious knowledge, on the flows of the relational learning process including transfer, transformation and harvesting phases of knowledge. In order to study the relative importance of the individual knowledge components in each phase of the relational process, the scale established by [Kohli and Jaworski 1990] will be used in this research. The paper is structured in four parts. In the first, a theoretical reference on individual knowledge on the relational learning process will be established. In the second part, some hypothesis and the necessary methodology will be proposed. In the third part the results will be shown and finally, in the conclusions some interesting aspects on the role of individual knowledge in the process described will be shown. Conclusions are based on a study of eighty-four organizations. This investigation establishes important conclusions on the role of individual knowledge in the generation of the customer capital. Concretely, the explicit knowledge of the employees is the most meaningful in the relational learning process, although it is also true that the tacit knowledge and individual learning capacities have a special importance in the harvesting phase of knowledge.

Keywords: individual knowledge, explicit and collective, customer capital, intuition processes, interpretation, integration
Categories: J.4, J.5

1 Introduction

This article identifies the relationships among human components of customer capital and the flows of the relational learning process. For this aim, it has been considered that context will be different depending on the analysed post. In this sense, because the operative personnel are the key element that insure that the transfer of the knowledge provided by customers at an individual level in the relational learning process takes place, the present investigation focuses on operative personnel who are

[1] A short version of this article was presented at I-Know '03, (Graz, Austria, July 2-4, 2003).

in touch with end customers such as sales representatives, sales people and people in contact with customers, but not on administrative and executive personnel.

The individual learning within the organizational context, is a topic which has been studied mainly within a framework of strict psychology and has not received due attention from the strategic organizational literature. Thus, [Kim 1993] defines the individual learning: "as increasing one's to take effective action" (p. 38). Other authors such as [Swieringa and Wierdsma 1992] understand it as the behavioural change in order to reach a form of conduct that is better suited to the goals of those who are going to learn. These two selected quotes are illustrative of the absence of concern for the individual level in the strategic organizational literature.

However, the individual level has been frequently used as an illustrative metaphor of some problems that are identifiable in organizational learning. For example, concerning the classic differentiation between the exposed action theory and the action theory in use [Argyris and Schön 1978], [Argyris, 1994], or as far as it refers to the classic hierarchy of learning at different levels according to the depth of the behaviour and or cognitive changes involved (single loop learning or adaptive rational system where individuals basically learn from experience; double loop learning or generative learning occurs when individual mental models become incorporated into the organization through a shared mental model; as well as triple loop learning or Deutero learning that is the acquisition of these learning capabilities) [Swieringa and Wierdsma 1992], [Argyris 1994].

Therefore, [Kim 1993] offers a relatively exhaustive structured explanation about the dynamics of the individual learning level in the strategic organizational context. In the model proposed by Kim the core of the individual learning is constituted by the cycle OADI (observe-assess-design-implement). This cycle interacts with the individual mental models[2], constituted at the same time by two components: frameworks and routines. According to this model, assess (reflect on observations) and design (form abstract concepts) integrate conceptual learning or know-why, that is to say, 'the ability to articulate a conceptual comprehension of an experience'. On the other hand, implement (test concepts) and observe (concrete experience) form as named by [Kim 1993] operational learning or know-how, that is to say, "the physical ability of producing some action" (p. 38).

According to [Kim 1993], operational learning represents that stage of learning at the habitual procedure level, where one learns the steps in order to complete a particular task. This know-how is captured as routines. On the other hand, conceptual learning has to do with thinking about why things are done in the first place, sometimes challenging the very nature or existence of prevailing conditions, procedures, or conceptions and leading to a new framework in the mental model. Thus, the reference frameworks are the cognitive component of mental models, while the routines constitute the operative part.

The individual learning is a process through which the individual generates knowledge such as the interpretation, assimilation and implementation of tacit and explicit information. Taking the following definition of individual learning, provided

[2] According to [Kim 1993]: "Mental models represent a person's view of the world including explicit and implicit understandings, mental model provide the context in which to view and interpret new material, and they determine how stored information is relevant to a given situation" (p. 39).

by [Murga 1984]: "assimilation and elaboration of new conscience contents, of life knowledge and of experience, as well as of individual behaviour patterns" (p. 23), we can say that: individual learning can be understood as a personal phenomenon in which cognitive aspects, such as behaviour and experience acquire a highly relevant role in generating routines and frame works. This definition associates learning with the generation of individual knowledge and serves as a starting point for the model that we present in the following paragraph.

2 Classification of Individual Knowledge

Despite all that has been said in the previous paragraph, organizations have not given time to evaluate which part of the relational learning process has improved more by using individual knowledge. For this aim, the previous consideration is to establish a classification of this individual knowledge, which forms the human capital of the company (i.e. the set of skills which an employee acquires on the job, through training and experience, and which increase that employee's value in the marketplace). To classify the individual knowledge, this research will take into consideration the classification proposed by [Spender 1996]. According to Spender knowledge can be classified according to its explicit or tacit character, as well as its individual or social character. In this sense, Spender distinguishes individual knowledge as automatic or conscious according to the possible combinations between its tacit and explicit characteristics. A short explanation of each one of these types would be the following:

1) Automatic knowledge is the individual and tacit knowledge that includes abilities acquired by experience. Automatic knowledge takes into account the attitudes and behaviours that individuals maintain within their organization and includes aspects which are closely related to their emotional reactions and motivations, which are relevant to how people integrate within the company.
2) Conscious knowledge is that which is individual and explicit and that therefore can be articulated or codified, and consequently it is susceptible to being shared by the rest of the organization. Conscious knowledge includes the aptitudes and abilities that human resources possess, and refers to the external capacities of the individuals that are put to the service of the organization.

This classification of individual knowledge can be improved introducing the concept (present / future) as a new evaluation. This perspective allows us to distinguish the value of the individual knowledge components at a given time and its potential for future development. This new perspective considers inherent capacity as the ability for a resources group to accomplish some task or activity.

The tangible and intangible resources nourish the company's capacities and these capacities are the principal sources that provide the company with its competitive advantages. In this sense, the automatic and conscious knowledge represent a set of human resources in the present. The individual learning capacities (conceptual and operational learning) represent those abilities that make it possible to move from a given situation to another desired situation of individual knowledge. But the capacities will not be limited solely to organizing and co-ordinating a set of present resources. The individual capacities incorporate complex interactions between individuals to other individuals and the resources that belong to the company. Here we have the concept of organizational routines in the sense given by [Nelson 1991] or

[Nelson and Winter 1982]. [Grant 1991] suggests that a capacity is in essence a routine, or a number of routines that interact with each other (p. 122).

Bearing in mind previous considerations, table 1 establishes a classification of the individual knowledge components. The array of aspects that could be included is very wide, therefore the proposal outlined in table 1 is to show those human resources which are more relevant. We have considered that these resources with the exception of academic development and professional formation are non-defendable due to the difficulty of codifying and systematising the concept of individual knowledge. We understand that training can be substantiated because it can be understood and analysed with greater clarity. With respect to the protection criterion of the knowledge, [Fernández et al. 1998] assert that it is accurate to clarify that though the training is not actually defensible in the sense in which this criterion has previously been defined it is nonetheless included as such under the supposition of the fact that it can be defended in employment contracts (p. 169-170).

	Present		**Future**
	Automatic knowledge	**Conscious knowledge**	**Automatic and conscious capacities**
Not defensible	Intuition Motivation Attitude Loyalty Cognitive map Leadership	Language Conversation and dialogue Team work Polyvalence Social relationships	Learning capabilities
Defensible		Academic formation	Future internal or external training

Table 1: Classification of human capital components

2.1 Automatic Knowledge

In Spender's classification, automatic knowledge refers to an individual's implicit (i.e., tacit subconscious skills, e.g., riding a bicycle). Automatic knowledge represents that knowledge which is difficult to express in words. This is the kind of knowledge that individuals perceive, but cannot describe in words. Automatic knowledge allows expert sellers not to have to think consciously about their actions with customers. Having been in the same, or similar, situations and recognising the pattern, the expert knows, almost spontaneously, what to do. Expressed simply automatic knowledge can be thought of as an unconscious recollection of experiences. This helps explain why automatic knowledge is so hard to transfer from one person to another.

However, although difficult to put into words, experiences, images and metaphors can be used to describe some sensations, intuitions, motivations and attitudes. Individuals use metaphors to he1p explain their automatic knowledge to themselves and to share it with others. As [Tsoukas 1991] suggests, “metaphors involve the transfer of information from a relatively familiar domain to a new and relatively unknown domain” (p. 568). According to [Crossan et al. 1999], metaphors constitute an economical way of relaying primarily experiential information in a vivid manner, and they can be used as variety reduction mechanism in situations where experience cannot be segmented and imparted through literal language.

Even the most sceptical person would have to admit that the feeling denoting emotional experience has objective correlations such as psycho physiological responses, expressive gestures, and overt motor actions. For example, when in fear, a person is likely to exhibit increased heart rate, to show specific facial grimaces, and to try hard to get away from the situation. However, this set of facts can be interpreted in different ways. An example of automatic knowledge is that which is carried out through processes such as the observation and imitation of clients. We find in expert sellers, that they are capable of interpreting given corporal and facial (i.e. eyes, mouth) expressions of the clients, thanks to the fact that they are expressions or images that the clients have previously used to transmit an idea. These sensations have developed into a way of sharing personal knowledge and they create a common place without needing to use a codified language.

To illustrate the transformation from sensations or intuitions to images or metaphors, [Bowers 1984] invoked the contrasting approaches of a hard-nosed experimental psychologist and an optometrist in deciding the eye-sight of a person in need of glasses. Certainly, above-chance forced-choice discrimination between Os and Ws or Qs and Ds would provide evidence that the potential lens-bearer would be able to discriminate much smaller letters on the eye chart than revealed when the optometrist merely asks what the subject sees. Nevertheless, the phenomenological based criterion is much more appropriate for the patient's need (i.e. lenses that make the world seeable rather than discriminable).

2.2 Conscious Knowledge

Once automatic knowledge is named, in experiences, images or metaphors, then individuals can make more explicit connections among them. In Spender's classification, conscious knowledge refers to an individual's explicit knowledge (i.e. knowing the spelling of words or syntax of a computer programming language). In the context of this work, we have considered conscious knowledge in a wide sense, that is to say including all the knowledge that the individual can codify, such as: language; conversation and dialogue; team work; polyvalence; and social relationships.

According to [Tolman 1948] a cognitive map is a global representation of the environment, it is a personal mind map or a mapping of the thoughts an individual has about a particular situation or problem of interest. The cognitive map represents an interpretative framework of the world (automatic knowledge), which, it is argued, exists in the human mind and affects actions and decisions as well as knowledge structures. The cognitive map is not only influenced by the domain or environment but also guides what is interpreted from that domain. Language plays a pivotal role in the development of these maps, since it enables individuals to name and begin to explain what were once simply feelings, hunches, or sensations.

Just as language plays a pivotal role in enabling individuals to develop their cognitive maps, it is also pivotal in enabling individuals to develop a sense of shared understanding through conversation and dialogue. These methods can be used not only to convey established meaning but also to evolve new meaning. In this sense, teamwork is a social activity that creates and refines conversation and dialogue creating common language, clarifies images, and creates shared meaning and understanding. As [Isaacs 1993] explains some of the most powerful forms of co-

ordination may come through participation in different tasks (p. 25). Polyvalence allows individuals to unfold meaning, which might even be perceived differently by different people.

2.3 Automatic and Conscious Learning Capacities

There is a large difference between the human mind and the ape mind. Our conjecture is that besides the larger brain, there is one qualitative difference of our consciousness of our learning capacity. The evolutionary step consisted of making more of the brain state itself OADI (observe-assess-design-implement) than was possible for our ape-like ancestors. The consequence was that we could learn procedures that take into account the state of the brain (automatic and conscious knowledge), e.g. previous observations, knowledge or lack of it, etc.

Individual's capacities have much in common with conceptual learning [Kim 1993]. Automatic and conscious knowledge represent a person's view of the world, including explicit and implicit understanding. This knowledge provides the context in which individuals view and interpret new material and decide what information is relevant in a given situation. Through the individual's learning capacities people understand and apply automatic and conscious knowledge and individuals develop cognitive maps (routines, diagnostic systems, rules and procedures) about the various domains in which they operate and use automatic and conscious knowledge [Huff, 1990]. Therefore, individual's learning capacities are essential to understanding work. Without a clear understanding of automatic and conscious knowledge and the role they play, the practice itself cannot be well understood, engendered (through training) or enhanced (through innovation).

As a result of individual capacities, individuals will interpret the same stimulus differently, based on their established attitudes, improvement learning capabilities or improvement in competence. The same stimulus can evoke a different or equivocal meaning for different people [Hambrick and Mason 1984]. Individual learning capacities have do with thinking about why things are done in the first place, sometimes challenging the very nature or existence of prevailing automatic and conscious knowledge and leading to new knowledge. This new knowledge in turn, can open up opportunities for connected steps of improvement by reframing a problem in radically different ways. For this reason, in the following epigraph, a relational learning model will be presented, in which every level of learning (individual, group, and organizational) will be studied, information exchange and beginning with explicit customer knowledge, distributed and used to create customer capital (i.e. the value of the knowledge created because of the relationship that an organization maintains with its customers).

3 Relational Learning Process

From the relational learning point of view, the human factor is the key, and the organizational learning from these customers quite simply the fact of exchanging information with them [García et al. 1999], and it is precisely sales representatives who have direct contact with customers. However, the information given by the customer is one thing and the knowledge used by the company is another. On the

other hand, and since much of the individuals knowledge is of a tacit nature, it is necessary to impulse its conversion to explicit knowledge thus increasing its formality. In consequence the individual knowledge is converted into an organizational knowledge and certain mechanisms on knowledge service are needed that help to create, combine, group and integrate the knowledge that comes from the various individuals that interact on a daily basis in the organization, and conversely, the combination and knowledge transformation throughout the net.

Bearing in mind these considerations, the relational learning process represents the mechanism by which the organization transforms the tacit and explicit knowledge of the client into customer capital. Such as is presented in figure 1, it is understood as a process which is structured in four phases (customer selection, transfer, transformation and harvesting of the knowledge). This division is more pedagogic than structural. That is to say, the variables are neither independent nor autonomous, but interacting permanently. For example, a specific perception of an individual on a topic, influences on the degree of motivation that he has for a related learning.

According to [Crossan et al. 1999] relational learning is a "dynamic process" (p. 532). Not only does learning occur over time and across levels, but it also creates a tension between assimilating new learning (feed forward) and exploiting or using what has already been learned (feedback). Through feed forward processes, new ideas and actions flow from the individual to the group to the organization levels. At the same time, what has already been learned feeds back from the organization to group and individual levels, affecting how people act and think. The concurrent nature of the feed forward and feedback processes creates a tension, which can be understood by arraying the transfer, transformation and harvesting phases against one another, as shown in figure 1.

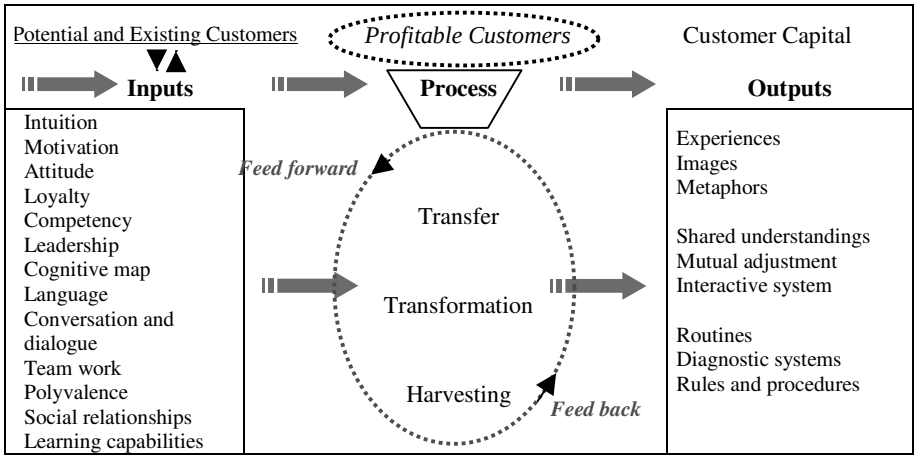

Figure 1: Relational Learning Process

Moving from transfer to transformation and harvesting phases (feed forward) requires a shift from individual learning to learning among individuals or groups. It entails taking personally constructed cognitive maps and integrating them in a way that develops a shared understanding among the group members. On the other hand,

moving from harvesting to transformation and transfer phases (feedback). Harvesting of knowledge can easily drive transfer and transformation phases. The tension between acquiring new learning (feed forward) and using what has already been learned (feedback) arises because the organizational memory (what has already been learned) impedes the assimilation of new learning. Especially, because individuals and groups learn within organizations using theirs organizational memory, in this sense, companies with a high degree of routines learning requires what [Schumpeter 1949] refers to as “creative destruction" destroying, or at least setting aside, the institutional order to enact variations that allow intuitive insights and actions to surface and be pursued. There are many factors that could facilitate and inhibit these phases of the relational learning process, some of which are part of the organizational memory or institutionalised learning itself (e.g. reward systems, information systems, resource allocation systems, strategic planning systems, and structure), and others are consequence of human components (i.e. individual capacities, automatic and conscious knowledge). In order to understand better the roll of individual knowledge on the relational learning process, these phases and some hypotheses are shown below.

3.1 Customer Selection

The first phase, ‘customer selection’ represents a first step to apply the process itself and it is due to a company strategy process, whereby after differing, identifying and classifying all the customers, it is possible to establish which of the customers are interesting to the company. To establish an indiscriminate relationship with every customer is not profitable. Those organizations that have tried to be all things to all people have ended up being nothing for anyone [Day 2000], [Kaplan and Norton 2000]. For these reasons, the first phase in a learning process must be to choose those initial customers to learn from. In this aim, many academic studies conducted in demonstrating the importance of focusing on profitability with individual customers, they have offered arguments, heuristics, and methodologies for determining segment profitability [Reicliheld 1996]. A very simple classification of the clients is the one proposed by [Sherden 1994], starting of with the fact that 20% of the better clients produce 80% of the earnings, while 30% of the worse clients are being subsidized and reduce the earnings to half.

According to Sherden´s contributions, the top left of figure 1would represent the universe of clients. That is to say potential and existing clients. From a relational learning consideration we should classify them according to the necessary effort to reach them. Or put another way potential clients would be located in a distant circle and considerable effort would be required to learn from them. Closer to the organization would be those clients with whom it would be less difficult to form a business relationship and who are in addition of value to the organization, [Sherden 1994] asserted that these last were not representing more than a 10% of the total customers. The next step is identified in terms of profitability existing and potential customers. For existing customers the accounting approach of activities based on costing (ABC) is useful, in many cases the allocation of service costs to customers is the best way. On the other hand, the organizations have to understand, to record, and to store the costs associated with each customer in their customer files [Zeithaml et al. 1999].

Once they classified the clients and considering that all relationship can be improved, the degree of learning will be increased from within to outside. That is to say, beginning by the interior circle, and starting with the existing clients who are providing a greater profitability to the organization. The following step would be to learn to convert, or loose the rest of the current clients, and to capture new allies, widening the circle in the measure and to the speed that the resources of the organization permit. It is convenient to have a realistic vision of what the organization can encompass in each moment maintaining the quality of the learning and thus the transfer of knowledge starts.

3.2 Transfer of Knowledge

The second phase, 'transfer' represents the individual learning level. It is this level which is the key to acquiring knowledge, the sales representatives in touch with the clients starting off with an information exchange, and beginning by a literal harvesting of the explicit knowledge of the client. All this 'know how' is internalized by the individual who materializes it in the form of experiences and mental models. Furthermore, this knowledge which is internalised by the individual in the form of tacit and explicit knowledge will represent an important part of the human capital of the organization.

Information from customers may be acquired by workers from direct experience with customers, the experiences of other agents (e.g. customers, banks, suppliers, competitors, employees, shareholders, etc.) or organizational memory. Learning from others is called by [March 1991] "exploration". This process encompasses common practices, such as benchmarking, forming joint ventures, networking, and making strategic alliances. Learning from others also includes providing continuing education or training. The knowledge transfer provided by other agents of the organization and the organizational memory, will be studied in the transformation and harvesting phases respectively.

In this paragraph we focus on knowledge acquired by the direct experience of sellers working with profitable customers, who both recognize strength before the rest of the market and are motivated to find solutions to those needs [Webster 1994]. This process shows the clearest illustration of acquiring knowledge from internally focused experience and the effect of cumulative hours and user experience on sellers in relationships with customers, this learning process, is called "exploitation" by [March 1991]. Organizations encourage information sharing with customers by creating external communities of practice, where customers and employees interacting and interdependent working together for the achievement of a particular objective. These communities, not only stimulate real-time information sharing, but they also generally increase the quality of the information gathered, for example, to drive new products concept to launch more rapidly and with fewer mistakes.

In all these methods to acquire knowledge from customers, it is necessary that the organization promote an organizational context shared between the clients and the senders (the shared organizational context is referred to joint elements related to the environment provided by the organization, so that the desired vision exchanges and opinions that facilitate the individual learning can take place). However, we must consider that the knowledge assimilation in the individual learning implies internal processes to the persons such as reflection, intuition, or interpretation. This is

something, which makes the previous satisfaction existence or human components of the individual indispensable, since an organization will find it difficult to achieve client satisfaction if previously employee satisfaction has not been achieved [Fornell 2000]. Therefore, in this part of the learning process, the automatic and conscious knowledge are critical to understanding of how people come to discern and comprehend something new, for which there was no prior explanation. Therefore, at this phase those variables that have been studied for their influence on the individual learning (i.e. perceptions, attitudes, values, abilities, motivation, and conduct) will have to be presented. These considerations lead us to frame the first hypothesis of the work.

H_1: The automatic and conscious knowledge has a significant affect on the transfer of knowledge.

[Nonaka and Takeuchi 1995] suggest that individual knowledge may guide the actions of the individual to acquire knowledge, but automatic knowledge is difficult to share with others. However the outputs of transfer phase, imagery sometimes called 'visions' or 'metaphors' aid the individual in his or her interpretation of the insight and in communicating it to others. Therefore, the organization will need all this individual knowledge to be shared between all the members of the organization and thus the third phase of our model starts.

3.3 Transformation of Knowledge

The group and organizational learning levels represent the third phase, 'transformation of knowledge' which constitutes the process through which; tacit knowledge is converted into explicit knowledge. In our learning process, we take for granted that in the process of creation of knowledge, individual knowledge is generated and expanded as a consequence of the interaction between tacit and explicit knowledge. It should be borne in mind that this conversion is due to a social process between groups and individuals. The result of these externalisation and combination processes will be the structural capital, in the form of shared explicit knowledge. This could be seen in its broader context by all organizational players who might use or be affected by it and who are able to feedback questions, amplifications or modifications that provide new insights to the senders.

This phase of the relational learning process is enhanced by the development of conscious knowledge (i.e. language, conversation and dialogue, teamwork, polyvalence, and social relationships). This encourages open sharing of information and removes constraints on information and communication flows [Woodman et al. 1993]. It is through the continuing conversation among members of the community or group and through shared practice [Brown and Duguid 1998] that shared understanding or collective mind [Weick and Roberts 1993] develops and mutual adjustment and negotiated action take place [Simons 1991].

Therefore, to ensure that all information is considered, organizations must provide forums for information exchange and discussion. This communication may occur through liaison positions, integrator roles, face to face contact in meetings and on task forces, or utilization of information technology to create organizational bulletin boards on topics such as competitive activity or technology development. In all these circumstances, the evolution of conscious knowledge extends the process of interpreting to interactions among individuals. In other words, language developed

through conversation and dialogue allows the evolution of shared meaning for the group. However, when organizations remove the functional barriers that impede the flow of information from development to manufacturing to sales and marketing, they improve the organization's ability to make rapid decisions and execute them effectively. Under these circumstances, organizations must support tasks, such as: decision-making, solution of conflicts, leadership, motivation and attitude that is to say that the automatic knowledge is influencing in the transformation process too. These aspects also are studied in our investigation in the second hypothesis of the work:

> *H_2: The automatic and conscious knowledge has a significant affect on the transformation of knowledge.*

However, organizations are more than simply a collection of individuals; organizational learning is different from the simple sum of the learning of its members. Although individuals may come and go, what they have learned as individuals or in groups does not necessarily leave with them, thus starts the fourth phase of our model.

3.4 Harvesting of Knowledge

The fourth phase will internalise and use the knowledge acquired in the previous phases. The result of such a process will be that tacit and explicit knowledge on the clients are stored in a shared organizational memory and then used by the members of the organization. If it were not for organizational memory, learning would have a relatively short half-life because or 'employees' turnover and the passage of time [Levitt and March 1988]. Organizational memory is particularly important in this era of restructuring and reliance on temporary or contract workers. It is essential that important knowledge be recodified or recorded in information systems, operating procedures, white papers, routines, diagnostic systems, rules, mission statements and procedures.

Organizational memory will be used by the members of the organization: beginning a new learning cycle and facilitating the one which in the transfer and transformation 'phases' new learning is also acquired. This new knowledge is included in the learning process as 'customer capital' [March 1991]. Therefore, harvesting phase is a means for organizations to convey the learning of the individual and group members in transfer and transformation phases to customer capital. In this sense, structures, systems, and procedures provide a context for interactions.

Over time, spontaneous individual and group learning become less prevalent, as, the prior learning becomes embedded in the organization and begins to guide the actions and learning of organizational members. Organizations outgrow their ability to exclusively use spontaneous interactions to interpret, integrate, and take coherent action. In this aim, relationships become formalized and coherent action is achieved with the he1p of plans, training programs and other formal systems. If these formal systems produce favourable outcomes, then the actions deemed to be consistent with the plan become routines, this is the role for what [Simons 1991], [Simons 1994] calls "diagnostic systems". In other words, if individuals are capable of taking advantage of these routines then, they will influence in the harvesting phase of the knowledge.

However these memories may contain outdated information or even encourage ineffective learning if they focus the organization inappropriately. In other words,

new procedures or capabilities may be more effective than old ones; it runs the risk of becoming irrelevant and may even obstruct feed forward learning flows. Because learning that has become institutionalised at the organization level is often difficult to change, the organization must promote active unlearning and motivate its employees to take risk [Schein 1992]. But, changes in systems, structures, and routines occur relatively infrequently in organizations; as a result, equivocal situations are often resolved through a group interpretive process [Weick and Van Orden 1990]. According to [Daft and Weick 1984], mistakes are reduced through interpreting by "shared observations and discussion until a common language and course of action can be agreed upon" (p. 291). Under this framework the hypothesis that we propose are:

H_3: The automatic and conscious knowledge has a significant affect on the harvesting of knowledge.

H_4: Automatic and conscious capacities have a significant affect on the harvesting of knowledge.

4 Methodology and Results

Once the importance of individual knowledge in every phase of the relational learning has been justified this work is going to develop the methodology to test the hypothesis. In this aim, the population of the most important companies of the optician and optometrist sector from Spain were considered. In this sense, attending to the criterion of the European Union from 1996, the research considered as population the small and medium companies with more than three employees; the information-collecting period lasted about a month, from early March to April 2002.

The information collected was done through an electronic letter sent by e-mail to the manager or general director of the SMEs who had to indicate the position of their companies with respect to their competitors on a scale Likert of seven points (1= strong down and 7= strong up). In order to contrast the five hypotheses, a unique measure is necessary to show us a reference point about individual knowledge, for this aim, we used Intelect model developed by [Bueno 1998]. This decision is found to be justified due to the success and usefulness of this model among Spanish companies. In table 2 are shown the 9 articles used to measure the individual knowledge: 1-3 automatic, 4-6 conscious and 7-9 capabilities. On the other hand, such as it is presented in table 2, to measure relational learning process articles proposed by [Kohli and Jaworski 1990], [Jaworski and Kohli 1993] were used: 10-12 transfer, 13-15 transformation, and 16-18 harvesting.

In contrasting each hypothesis only those cases that had answered all the relevant questions were considered. Finally, on a sample of 108 companies, the total of surveys that were carried out was of 84 companies which gives a response rate of the 77.77% of the total, with a factor of error of 5.1% for p=q=50% and a level of reliability of the 95.5%. According to [Hair et al. 1999] the size of the sample was considered sufficient, since it is greater than ten times the number of predictors from the indicators on the most complex formative construct or antecedent construct leading to a endogenous construct.

Constructs indicate the degree of agreement or disagreement (1= strong disagreement and 7= strong agreement)	**Value**	**T-value**	**λ_i+2 ε**	**SCR**
Automatic component with respect to his employees.				0.841
1. Satisfaction and motivation of the personnel	0.71	7.09	0.89	
2. Knowledge and abilities of the persons	0.82	8.71	0.96	
3. Loyalty and commitment of employees	0.85	9.02	0.97	
Conscious component with respect to his employees.				0.693
4. Composition and characteristic of the team (age, type of contract)	0.66	5.75	0.90	
5. They are capable of accomplishing different activities within groups	0.73	6.39	0.97	
6. Work in group	0.58	4.98	0.84	
Capacities component with respect to his employees.				0.837
7. Innovation capacity of the persons and work equipment	0.64	6.30	0.84	
8. Habitually accomplish research and development processes	0.81	8.51	0.94	
9. Have mechanisms to capture information and useful experiences for your company	0.88	10.07	0.98	
Transfer of knowledge with respect to his organization.				0.642
10. In this business unit, we meet with customers at least once a year to find out what products or services they will need in the future	0.75	6.84	0.97	
11. We poll end users at least once a year to assess the quality of our product and services	0.72	6.49	0.94	
12. We periodically review the likely effect of changes in our business environment (e.g., regulation) on customers	0.34	2.81	0.58	
Transformation of knowledge with respect to his organization.				0.647
13. When something important happens to a customer or market, the whole business unit knows about it in a short period	0.75	6.75	0.97	
14. Data on customers satisfaction are disseminated at all levels in this business unit on a regular basis	0.52	4.37	0.76	
15. When one department finds out something important about competitors, it is fast to alert other departments	0.54	4.52	0.78	
Harvesting of knowledge with respect to his organization.				0.710
16. Customer complaints fall on deaf ears in this business unit	0.49	4.12	0.75	
17. If we came up with a great marketing plan, we would not be able to implement it in a timely fashion	0.58	4.97	0.84	
18. When we find that customers would like us to modify a product or service, the department involved makes concerted efforts to do so	0.72	6.27	0.96	

Table 2: Construct summary, confirmatory factor analysis and scale reliability

The evaluation of psychometric properties in each of the measurement scales used for different constructs is based on methodological suggestions developed by [Churchill 1979] and was validated for convergence and discrimination [Anderson and Gerbing 1988], [Lehmann et al. 1999]. Results of the confirmatory factor analysis and reliability of the scale are shown in table 2. The standard coefficient regression between the set of explanatory variables of scales and their corresponding variables of saturation are significant, confirming the existence of three inherent dimensions to measure each of the proposed variables. In all cases the coefficients of reliability exceed the minimal level of 0.6 recommended by [Bagozzi and Yi 1988] confirming the reliability of each construct. The standardized parameters (>0.5) indicate that there

is convergent validity and that they are significant at the level of reliability of 99%. Discriminate validity is guaranteed between each pair of dimensions because the interval of reliability in their correlations does not include unity [Anderson and Gerbing 1988].

The confirmation statistics of the hypothesis have been accomplished using the statistical technique of regression analysis. This decision is considered to be justified, due to the quantitative nature of the dependent and independent variables. Within this technique we opted for the hierarchic method, which permits the introduction of the independent variables in different blocks. Through these equations, the degree of explanation of the variance in the dependent variables is studied. For this, we designed some standardized coefficients of the independent variables. Table 3 shows the path coefficients we got using this technique.

In model first, the effect of the learning capabilities, automatic and conscious knowledge in the transfer phase was studied. Table 3 shows that though three variables incorporated in the model had a positive influence, the automatic and conscious components had a greater and significant influence with beta coefficients of 0.333 ($p<0.05$) for the automatic, and 0.356 ($p<0.01$) for the conscious component. Among the three variables ($R^2=17.7\%$) of the variable 'transfer of knowledge' was explained. Considering these results, we can assert that learning capabilities, automatic and conscious knowledge have a positive influence on the transfer of the knowledge.

The second model analysed how the independent variables, individual capacities, automatic and conscious knowledge were influencing the dependent variable transformation of knowledge. Though all the three variables incorporated in the model had a positive influence, only automatic knowledge with a beta coefficient of 0.291 a level of ($p<0.1$) and the conscious knowledge with a beta coefficient of 0.308 and a level of ($p<0.05$) resulted significant. The independent variables included in this model explained ($R^2=12.8\%$) of the 'transformation of knowledge'. Because of this, we can assert that the automatic and conscious components of the individual knowledge are good predictors of transformation of the knowledge.

Finally, the third model analysed how the independent variables individual capacities, automatic and conscious knowledge were influencing the dependent variable harvesting of the knowledge. It is important to emphasize that the three indepeese ndent variables had a positive and significant influence on the harvesting phase of the knowledge. However, the automatic and conscious components had a greater influence with beta coefficients of 0.332 for the automatic, and 0.525 for the conscious component, and levels of ($p<0.01$). Nevertheless, the individual capacities also were significant 0.300 ($p<0.01$). Among the three variables ($R^2=36.1\%$) of the variable 'harvesting of knowledge' was explained. Considering thresults, we can assert that learning capabilities, automatic and conscious knowledge have a positive influence on the harvesting phase of the knowledge.

Independent Variable / *Dependent Variable*	**Automatic component**	**Conscious component**	**Capacities component**	**R^2 for model**
Mod. (1). Transfer of knowledge	0.333**	0.356***	0.046	17.7%
Mod. (2). Transformation of knowledge	0.291*	0.308**	0.096	12.8%
Mod. (3). Harvesting of knowledge	0.332***	0.525***	0.300***	36.1%

p<0.10*; p<0.05**; p<0.01***.

Table 3: Result for Correlation Path coefficients

5 Conclusions

The present investigation presents a starting point for the discussion on the relative importance of each one of the components of the individual knowledge in each phase of the relational learning processes (transfer, transformation and harvesting of the knowledge). This work has demonstrated that the relational learning process is influenced by the sum of all these human assets (knowledge and capacities). Using data of the optical sector from Spain, the contributions of [Bueno 1998] and the scale of market orientation proposed by [Kohli and Jaworski 1990] and [Jaworski and Kohli 1993], the objectives have been: a) to classify by order of importance the different components that compose the individual knowledge in the relational learning process; and b) to justified that individual knowledge which is not present in tangible data is indeed a source of competitive advantage for the organizations.

Among all individual knowledge, automatic and conscious knowledge have been elected as of primary importance, while the individual learning capacity has been in second place. With respect to the influence of these components in the relational learning process, it is observed that in spite of the fact that it is the conscious component which is the area with more influences in the relational learning processes; the automatic knowledge has a decisive roll in the transfer and transformation phases of the knowledge, while, in the harvesting phase of the knowledge the individual learning capacity is fundamental. The results support all hypothesis, this implies, a positive influence between individual knowledge (learning capacities, automatic and conscious knowledge) and the relational learning process.

These findings are significant, since they call into question the traditional focus of organizational learning research and management practice on learning at the individual level. Specifically, the current results indicate that automatic and conscious knowledge are more closely related than individual learning capacity to transfer and transformation phases. This suggests that companies may be in these phases over investing in the development of individual learning capabilities, and under investing in mechanisms to facilitate the automatic and conscious knowledge. However, harvesting phase of the learning process is influenced by the individual learning capacity, this suggests that companies may be in the harvesting phase under investing in mechanisms to develop individual learning capabilities

We are conscious of the limitations that to accomplish this type of analysis for one sector located in a geographical zone can have; in fact, some of the results reached are influenced directly by characteristics of the companies of our population. Mainly the

fact that all companies are Small and Medium Size enterprises (SMEs) and the types of products and services that they sell. A more limiting factor regarding the generalizing this research deals with national cultural issues For instance, the nature of organizational learning may be different in different cultures. One other limitation of our approach in this paper needs to be acknowledged. We have tried to define our constructs, as precisely as possible by drawing on relevant literature, to articulate clearly our conceptual framework, and to then closely link our measures to these theoretical underpinnings through a careful process of item generation and refinement. Nonetheless, the measurement items that we use here can realistically be thought of as only proxies for an underlying, latent phenomenon that is itself not fully measurable. Finally, taking into account the limitations of the current study, in future this research study will take place across other sectors and with others items, in order to generalize results.

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References

[Anderson and Gerbing 1988] Anderson, J.C and Gerging D.W. "An updated paradigm for scale development incorporating unidimensionality and its assessment", *Journal of Marketing Research*, vol.25, May, pp 186-192, 1988.

[Argyris 1994] Argyris, C. "Good communication that blocks Learning", *Harvard Business Review*, vol 72, nº 4, pp 77-85, 1994.

[Argyris and Schön 1978] Argyris, C and Schön, D. *Organizational Learning: A Theory of Action Perspective*, Addison-Wesley, Reading, Massachusetts, 1978.

[Bagozzi and Yi 1988] Bagozzi, R.P and Yi, Y. "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, vol 16,nº 1, pp 74 94, 1988.

[Bowers 1984] Bowers, K. S. *On being unconsciously influenced and informed*. In K. S. Bowers & D. Meichelbaum (Eds.) The unconscious reconsidered (pp 227-272), New York Wiley, 1984.

[Brown and Duguid 1998] Brown, J. and Duguid, P. "Organizing knowledge", *California Management Review*, vol 40, nº 3, pp 90-111, 1998.

[Bueno 1998] Bueno, E. *Medición del capital intelectual: modelo Intelect*, Instituto Universitario Euroforum Escorial, Madrid, 1998.

[Churchill 1979] Churchill, G.A. "A paradigm for developing better measures for marketing constructs", *Journal of Marketing Research*, vol 16, nº 1, pp 64-73, 1979.

[Crossan et al. 1999] Crossan, M. M; Lane, H. W; and White, R. E. "An organizational Learning framework: from intuition to institution", *Academy of Management Review*, vol 24, nº 3, pp 522-537, 1999.

[Daft and Weick 1984] Daft, R.L and Weick K.E. "Toward a model of organizations as integration system", *Academy of Management Review*, nº 9, pp 284-295, 1984.

[Day 2000] Day, George. S. *Comprender, captar y fidelizar los mejores clientes*, Gestión 2000, Barcelona, 2000.

[Fernández et al. 1998] Fernández, E; Montes, J.M; and Vázquez, C.J. "Tipología e Implicaciones Estratégicas de los Recursos Intangibles. Un Enfoque basado en la Teoría de Recursos", *Revista Asturiana de Economía*, nº 11, pp 159-183, 1998.

[Fornell 2000] Fornell, C. Customer asset management, capital efficiency, and shareholder value: performance measurement, past, present and future, Conference in Cambridge University, England, 20 July 2000.

[García et al. 1999] García, V.; Rodríguez, P. and Salmador, M.P. "Investigaciones sobre Gestión del Conocimiento, Aprendizaje y Capital Intelectual", *Club Intelect*, nº 3, July, pp 14-22, 1999.

[Grant 1991] Grant, R. "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation", *California Management Review*, vol 33, nº 34, pp 114-135, 1991.

[Hair et al. 1999] Hair, Jr; Anderson, R; Tatham, R; and Black, W. *Análisis multivariante*, 5 ed, Prentince Hall Iberia, Madrid, 1999.

[Hambrick and Manson 1984] Hambrick, D and Manson, P.A. Upper echelons: the organization as a reflection of its top managers, *Academy of Management Review*, vol 9, pp 193-206, 1984.

[Huff 1990] Huff, A.S. *Mapping strategic thought*, New York Wiley, 1990.

[Isaacs 1993] Isaacs, W.H. "Dialogue, collective thinking, and organizational learning", *Organization Dynamics*, vol 22, nº2, pp 24-39, 1993.

[Jaworski and Kohli 1993] Jaworski, B and Kohli, A.K. "Market orientation: Antecedents and consequences", *Journal of Marketing*, vol 57, nº 3, pp 53-70, 1993.

[Kaplan and Norton 2000] Kaplan, R.S and Norton, D. *Cómo utilizar el Cuadro de mando integral para implantar y gestionar su estrategia,* Gestión 2000, Barcelona, 2000.

[Kim 1993] Kim, D. H. "The link between individual and organizational learning", *Sloan Management Review*, vol 35, nº 1, pp 37-50, 1993.

[Kohli and Jaworski 1990] Kohli, A and Bernard J. Jaworski. "Market Orientation: The Construct, Research Propositions, and Managerial Implications", *Journal of Marketing*, 54 (April), pp 1-18, 1990.

[Lehmann et al. 1999] Lehmann, D.R; Gupta, S; and Steckel, J.H. *Marketing Research*, Addison & Wesley, New York, 1999.

[Levitt and March 1988] Levitt, B and March, J.G. Organizational Learning, *Annual Review of Sociology*, vol 14, pp 319-340, 1988.

[March 1991] March, J.G. "Exploration and exploitation in organizational learning", *Organization Science*, vol 2, nº 1, pp 71-87, 1991.

[Murga 1984] Murga. Diccionario Rioduero de psicología (2ª edición), Rioduero, Madrid, 1984.

[Nelson 1991] Nelson, R.R. "Why do firms differ and how does it matter?", *Strategic Management Journal*, vol 12, pp 61-74, 1991.

[Nelson and Winter 1982] Nelson, R.R and Winter, S.G. *An Evolutionary Theory of Economic Change*, Belknap Press, Cambridge, 1982.

[Nonaka and Takeuchi 1995] Nonaka, I and Takeuchi, H. *The knowledge-creating company. How Japanese companies create the dynamics of innovation*, Oxford University Press, New York, 1995.

[Reichheld 1996] Reichheld, F.F. "The loyalty effect: the hidden force behind growth, profits, and lasting value", *Harvard Business School Press*, vol 323, pp 24- 95, 1996.

[Schein 1992] Schein, Edgar. *Organizational Culture and Leadership*, Second Edition, San Francisco: Jossey-Bass, 1992.

[Schumpeter 1949] Schumpeter, J. "Economic Theory and Entrepreneurial History", *Change and the Entrepreneur*, pp 63-84, reprinted in Schumpeter, J. (1989) *Essays on Entrepreneurs, Innovations, Business Cycles and the Evolution of Capitalism*, edited by Richard V Clemence, New Brunswick, N.J, Transaction Publishers, pp 253- 231, 1949.

[Sherden 1994] Sherden, W. A. Market ownership: The art & science of becoming nº 1, *American Management Association*, New York, 1994.

[Simons 1991] Simons, R. "Strategic orientation and top management attention to control system", *Strategic Management Journal*, vol 12, pp 49-62, 1991.

[Simons 1994] Simons, R. "How new top managers use control systems as levers of strategic strategic renewal", *Strategic Management Journal*, vol 15, pp 169-189, 1994.

[Spender 1996] Spender, J. "Making knowledge the basis of a dynamic theory of the firm", *Strategic Management Journal*, vol 17, Winter Special Issue, pp 45-62, 1996.

[Swieringa and Wierdsma 1992] Swieringa, J. and Wierdsma, A. *Becoming a Learning Organization*, Addison-Wesley. Reading, MA, 1992.

[Tolman 1948] Tolman, E.C. "Cognitive Map in Man and Animals", *Psychol*, Rev. 55, pp 189-208, 1948.

[Tsoukas 1991] Tsoukas, H. "The Missing Link: A Transformational View of Metaphors in Organizational Science", *Academy of Management Review*, vol 16, nº 3, pp 566-585, 1991.

[Webster 1994] Webster, F.E. "Executing the New Marketing Concept", *Marketing Management*, vol 3, nº 1, pp 9-16, 1994.

[Weick and Roberts 1993] Weick, K and Roberts, K. Collective mind and organizational reliability: the case of flight operations in an aircraft carrier carrier deck, *Administrative Science Quarterly*, vol 38, pp 357-381, 1993.

[Weick and Van Orden 1999] Weick, K and Van Orden, P.W. "Organizing on a global scale: A research and teaching agenda, Human Resource Management, nº 29, pp 49-61, 1999.

[Woodman et al. 1993] Woodman, Richard; Sawyer, John; and Griffin, Ricky. "Toward a Theory of Organizational Creativity", *The Academy of Management Review*, vol 18, Issue 2, pp 293-310, 1993.

[Zeitharril et al. 1999] Zeitharril, Valarie A; Roland T. Rust; and Kay Lemon. Make Customer Profitability the Basis for Service, Working Paper. University of North Carolina at Chapel Hill, 1999.