The Building of Human Capital: An Ontological Approach

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Abstract: This paper presents the synthetic results of the research and discovery of the ontological structure of knowledge and knowledge management and its application in the building of human capital considered as a complex system. The unicist approach to human capital uses knowledge management as the "catalyst" of the human capital building process.
Knowledge Management is the tool to avoid the loss of knowledge since it enables an institution to accumulate the "Know How" minimizing the entropy of the organization. This ontological approach made the development of a "Know Why" structure possible.
On the one hand, entrepreneurial models - in which the institutional entropy tends to be high - are less sensitive to manage human capital. On the other hand, the "Enterprising" model considers the human capital as a significant issue.
The results presented in this paper show the limits of a Human Capital Building process through the measurement of the return on investment, continuous improvement, personal benefits, individual confidence and synergy within the organization. Results also show which types of companies are inclined to use it and which ones reject it.

Keywords: human capital, knowledge management, unicist ontology

Introduction

Human capital implies structuring organizational synergy and efficacy and achieving an appropriate return of the investment of its building [1].
Knowledge has shown to work as a catalyst of this human capital building process. The more "learning oriented" an organization and its members are, the more human capital the organization has.

Institutions that Learn

The purpose of researching the world of knowledge has been to structure systems that allow institutions and the people in them (in that order) to learn.
What has been sought is the cause of institutional learning in order to apply it to the micro and macro fields. This work is based on the "Unicist Ontology of Learning" where the person's conceptual framework of learning has been developed [2].
Institutions learn from their people and structure learning as a system when they have a concept that goes beyond the financial situation. When that is not the case, the trend to knowledge entropy is at its highest.
When institutions are set up with a purpose in mind, with a clear procedure, whose knowledge is kept within it with a defined action plan that is in the hands of its political and strategic management, then we can talk of an institution organized to learn.
This brings up common names in the scientific field, such as Think Tanks, for the acquisition and structuring of conceptual knowledge, and operational groups for the structuring of working procedures´ knowledge.
There is no possibility of institutional learning for non-structured ventures or ad-hoc groups. It is a prior condition that there should be an institutional "life" that exceeds that of its members.
When institutions are created and managed in developed and emerging countries, institutional learning is relatively natural. When they are created and managed in underdeveloped or marginal countries, micro-cultures of knowledge are needed to operate. In any case it will be necessary to fight against knowledge entropy and its replacement with utopias whose responsibilities do not include the members of the institution. The more developed the culture, the greater the possibility of generating institutions that learn.

Methodology

This paper presents the research works and applications´ syntheses for the building of human capital as a complex system following unicist methodologies [3].
It seeks to present the results of the use of an ontological approach for the developing of human capital through knowledge management applications.
We define a complex system [4] as an open system, which determines the functionality of a unified field through the conjunction of objects and/or subsystems.

A complex system has the following characteristics:

1) It is an open system, meaning that the energy flows to and from the system itself.
2) The external limits of the unified field behave as the ones of a fuzzy conjoint.
3) Functionality is determined by the "conjunction" of elements that influence each other, generating "loops" of cause-effect relations.
4) The "disjunction" does not exist in a complex system.
5) The sum of the results of the subsystems is not equal to the result of the total complex system.
6) Relationships among subsystems are not linear; they respond to the double dialectics laws (purpose-antithesis / purpose-homeostasis).
7) Complex systems generate their own energy transformation using their own energy and the energy from the environment.
8) Complex systems are composed of subsystems, which are also composed of other subsystems, until reaching a descriptive level that is functional to their purposes [5].
9) Complex systems cannot be observed. The observer is part of the system.

Method

The unicist ontological approach of a complex problem requires the existence of two important elements:

- A "reflective" approach, fundamental for arriving to the ontology of a certain reality.
- A strict method for the building of hypotheses, their validation and "falsification".

Reflection - Pilot Testing

Reflection tries to find the causative structures of reality, objective and/or subjective, to develop feasible action guides which also provide added value. Thus, the concepts "governing" a certain reality are sought after.
Unlike meditation, reflection aims at the fact of the individual being in peace both with himself and the environment. Reflection supports the environmentally adapted individual to exert influence on the environment while he is also influenced by it.
Reflection differs from the rational analysis as regards methodology and scope. The rational analysis allows finding all the rational measurement objective elements of a reality and developing action guides according to them.

In its first phase, group reflection includes the following stages:

1) Stating each person's point of view.
2) Disqualifying the other's point of view due to its being subjective and without any foundation.
3) Discussing each person's foundations in a subjective way.
4) Reflecting over the other's foundation and our own.
5) Making everyone's foundations relative.
6) Developing the hypothesis of the causative relationships which one seeks to influence.
7) Contrasting already discovered concepts.
8) Carrying out pilot tests in the real world.

Research

The concepts research requires conscious experience in the field being investigated into. It is only with this experience that the development of hypothesis becomes possible. The research methodological steps are:

1) Development of the hypothetical structure of the functional concept
2) Analysis of the concept and its division into sub-concepts (only if necessary and possible)
3) Decomposition of the concept parts in their observable facts
4) Development of application fields for using the concept to validate its behavior
5) Development of concept application experiences to forecast reality.
6) Development of at least five experiences in the concept application fields which are completely different to each other
7) Development of predictions of at least three periods with total accuracy
8) Restarting of the research process before any deviation

Knowledge Management as the catalyst

Knowledge management in organizations follows the same rules as individual knowledge management. Knowledge management aims to cover three aspects of the problem:
On the one hand, it seeks to gain knowledge on the basis of one's own experiences and that of others.
On the other, it seeks to prevent the knowledge that one has from being lost.
Finally, it seeks to structure knowledge so as to make it easily manageable, accessible and grounded.

General meaning of knowledge

Knowledge is generally considered a synonym of information. That is why in many cultures it is considered that an individual who has a lot of information knows a lot. This is how the saying "information is power" has arisen. This has the implicit affirmation that knowledge is independent of the reality in which an individual or an institution lives [6].
It is generally understood that there are two different kinds of knowledge:
Intellectual knowledge, which has to do with the knowledge of ideas.
Real knowledge, which has to do with the elements of the individual's external reality that he seeks to understand.

Particular meaning of knowledge

According to the unicist definition, knowledge is what enables an individual to use tools to make good use of the information he has available and to produce the added value result that he has been searching for.
Thus, with this perspective, a third kind of knowledge arises: conceptual knowledge, where external reality is the object of knowledge and the individual introjects [7] this in order to understand its causal structure, its concept (its ontology).
Useful data is information. Information, logically structured in pursuit of an added value, is knowledge.
In this definition, knowledge implies action and is measured in the result.

Frame of Knowledge

Knowing implies structuring information logically; consequently, it implies obtaining the concept of a reality [8].
Concepts belong, in their functional phase, to the world of philosophy, and at their operational phase, to the world of science. In operational terms, the unicist approach defines philosophies as ideologies, either absolute or relative. It describes ideologies as beliefs that use a technology to meet an interest. When we refer to philosophies as ideologies we are asserting that each culture adheres to the

philosophy that is functional to its essence in order to accomplish its implicit objective. That is why Eastern philosophies do not integrate with Western philosophies, as they have different purposes.
Absolute ideologies are those that need a submission to them in order to subsist. Relative ideologies can coexist with other ideologies. In the world of absolute ideologies, each of them is incompatible with the other. Relative ideologies can coexist with the other because the other ideologies do not threaten their existence. Absolute ideologies see relative ones as absolute "with the opposite sign".
The concept is, however, a common element in all philosophies. Therefore, the discovery of its structure in terms of laws at a functional level allow for progress in the field of knowledge applied to ambiguous realities.
Nobody should lead a human group if he does not have the implicit concept in the mission, the procedure and the plan of action [9].
This leads to the conclusion that philosophical schools are to be considered as a response to society's needs at the time. The dominant schools are those that meet the needs of the collective unconscious, and those that disappear are the ones that meet the needs of few. Heraclitus had very little influence in the development of Western thought. Aristotle, some time later, gave sense to a way of seeing reality, providing a rigor that is still in force today.
The East combines philosophy with action, which, from a Western point of view, appears as bonded to religion. The East tends to value sages; the West, scholars. They are different conceptions for different problems. In the East, philosophy goes hand in hand with action; in the West, philosophy goes hand in hand with ideas.
The unicist approach to knowledge combines ideas with added value action, but modeling the elements that the East does not explain. It "degrades" the all-embracing knowledge of the East, as it analyses it, but integrates Western knowledge after conceptualizing it.
Those knowing conceptual developments relate this development with Eastern philosophy and in the West with Conceptualism influenced by Realism.

Preconceptions

Preconceptions are knowledge structured on the basis of the dominant ideologies and the accepted myths to avoid personal risks [10]. The operation based on common sense works on the basis of preconceptions. Common sense is materialized in preconceptions that work provided the reality does not change in operational terms. Preconceptions make knowledge rigid though mass-accessible. Only preconceptions can be handled massively. Concepts can be only handled by selected groups of individuals that have and intensify their capacity to apprehend and operate them.
Preconceptions change once one is aware of their dysfunctional behavior. They can only be changed by that individual who is capable of seeing the concept implied in the preconception.
Cultures and institutions need to develop the preconceptions with which the majority works. In countries laws represent modern myths and establish the preconceptions to be obeyed by everyone. In institutions, work procedures function as preconceptions.

The Concepts

Reality can be only grasped from some stable point from which to observe it. Preconceptions are a "fixed" starting point. They are an arbitrary point.
Concepts, on the contrary, are a stable starting point [11]. They are a "causal" point.
The concept is the most essential part of a reality and is what enables the apprehension of a reality in its deepest cause-effect relations. There are different levels of concepts depending on the function which it is being viewed from.
The concept is a mental map of an idea, fact, action or reality that guides human action. In a concept, conscious, unconscious, rational and emotional elements mix.
The concept is the representation of the essence of an idea, fact, action or reality, and is therefore invisible to the eyes. It is the conscious and non-conscious guide of human action in the individual, group and social field.
The concept is what enables energy to be focused. If an individual is dispersed in the action, it is because he does not have the concept. Only the concepts that can be managed are discovered.
Concepts, on pertaining to the field of ambiguity, to fussy sets, have their own particular language. Metaphors, parables, aphorisms, poems, stories, symbols, questions and riddles are languages which popular knowledge, mystics and wisdom use to attempt to communicate concepts.

Generic Structure of a Concept

A functional concept is a concept that describes the essential aspects of an idea, fact, action or reality. An operational concept is that which describes the procedures with which an idea, fact, action or reality is related to the environment.
A functional concept is determined by a functional structure that describes a procedure and an action guide for the accomplishment of a mission for which the object (idea, fact, action or reality) was created.

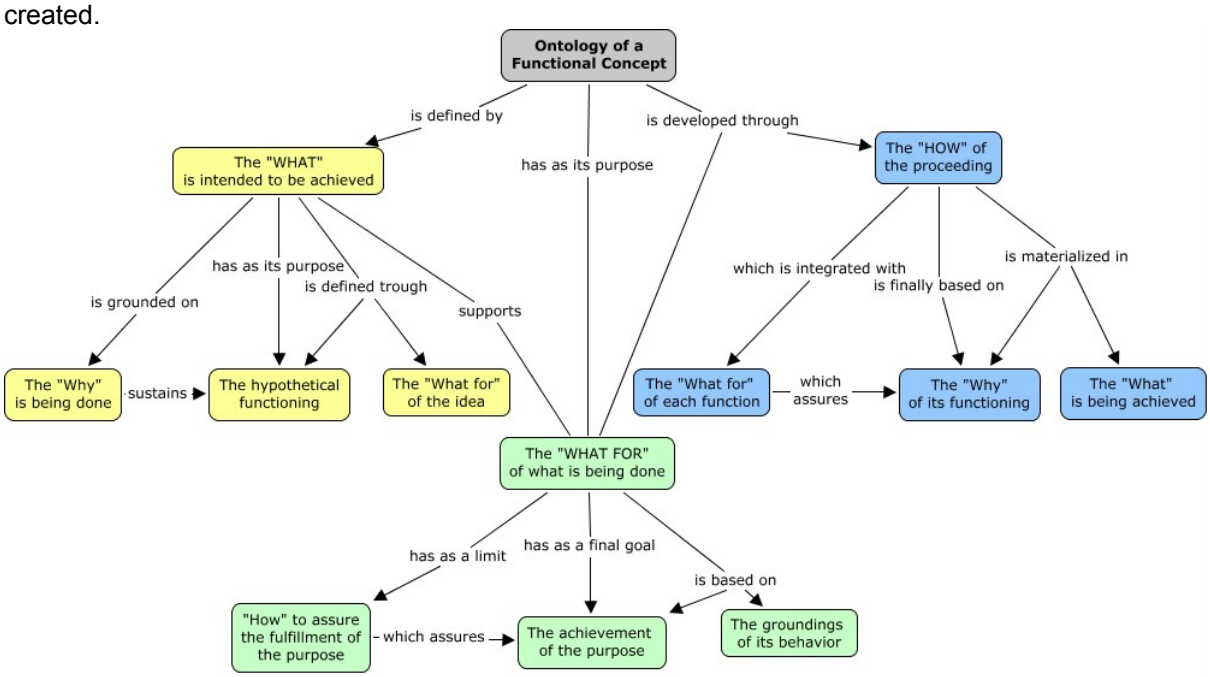

Figure1: The generic structure of a concept defined through the “Ontology of a functional concept”.

By knowing its structure it is possible to find the operational concept. To arrive at the operational concept it is necessary at least to intuitively guess the functional one.
The functional concept is the basic element to develop strategies. Without a functional concept (the essential concept) we cannot provide a strategy even if we can develop tactics.
The way to approach a functional concept when it cannot be perceived spontaneously will be described as follows. The taxonomy (steps) to find the elements of a concept is based on the structure of the concept, which is made of a central value, an antithetic value and a homeostatic value. The way to “apprehend” them in the real world depends on how perceptible they are.
This taxonomy starts from the antithetic value that represents a utopia. As a utopia, it is difficult to perceive, but due to the weakness of the central value it appears as the most evident. The utopia is a proposal made as a result of the weakness of a situation.
We will then look for the homeostatic value, representing the myths (short cuts) facing a situation. Myths are more difficult to observe because if the observer is a member of the culture, he has the same myths as the observed object. Hence they become invisible to him. The attitude of a third party is needed to observe the myths of a situation.
Finally, we search for the central value (taboo). The central value is the most difficult to perceive and once observed is the one most difficult to accept as existent. The central value contains all the wishes, drives and emotions of a person, all conjugated with rational aspects. That is why it is so difficult to perceive and accept it. It touches the deepest values of man.
The guideline that describes the functionality of the concept and gives it sense is included in its central value.
The knowledge of logical relations that form part of information and transform it into concepts is given by the structure of the concept that underlies the studied reality.
Only with concepts can one arrive at genuine knowledge, which can be therefore used again. When one does not arrive at the concept, the possibilities of knowledge are limited by the probability that the relations among effects will repeat (preconceptions).

Knowledge as an "Object"

(In terms of "Object-oriented Design")

Knowledge is an object serving the community and the individual. If we look at knowledge from this point of view, we will see that it is essential that it should have a clear identity so that it can be used when necessary. In order to categorize it as an object, we need to be certain about the "class" or "object" of superior order to which it belongs and which are the relations established among the different types of knowledge [12].

When knowledge has been made an object, one has the possibility of using it when necessary. Categorizing knowledge as an object is to detach it from personal subjective aspects that have nothing to do with the functionality for which it was developed.

It is only possible to manage knowledge once it has become an object. When the purpose of knowledge is satisfying the need of the one possessing it, then it loses its objective and consequently its concept, hence ceasing to exist as such.

Knowledge objects imply the recognition of their identity and intellectual property so that their use is legitimate.

Acquisition of Knowledge

There are two ways of acquiring knowledge in an extreme form: Acquisition through experience and acquisition through study. Besides, there are integrated systems that seek both. The question is which comes first.

In unicist terms, only the dysfunction of knowledge opens the mind of an individual to take other knowledge in its place. Therefore, and based on Piaget's works [13], it can be asserted that action unadjusted to the environment is what determines the formation of a guiding principle to acquire knowledge.

The feedback of action results is what allows knowledge to be acquired. Without such feedback there is no possibility of ongoing improvement. Experience and study are the two sides of the same coin.

Avoiding the loss of Knowledge

In the cultures or institutions where knowledge is necessary and valuable, the culture's trend is to keep it. In underdeveloped or marginal cultures the trend is to lose knowledge and the struggle is to avoid its entropy.

When cultures lose knowledge, they become dysfunctional. But that is not dysfunctional in the marginal role. The marginal has a secondary benefit when things do not work, because that validates its role.

Only if a developing or emerging culture is generated it is possible to avoid fighting against the loss of knowledge, for which it is necessary, among other things, to structure that knowledge.

Structuring Knowledge

To structure knowledge in organizations means developing a system that can guarantee the flow of data and information with a logical structure.

Consequently, what make the structuring of knowledge easier are the transparency and the system of benefits offered or available in the culture. Systems increasing their transparency need knowledge not to get trapped in their previous preconceptions.

Providing for transparency is the first step for knowledge structuring. At a personal level, it means making the individual perform all his actions in public, making it clear what he can and cannot do. Under this conception, what the individual knows is just an underlying element to what he does and is that person's sovereignty.

The second step is to assure a system of benefits that encourages the development and use of knowledge.

The benefits systems in developed cultures are based on the incentives provided by those ahead and the marginalization of those left behind, which become absorbed in a subsistence system to avoid social costs.

The benefits systems of emerging cultures are the same as those of the developed, but they do not have an absorption system for the drop outs that are left behind.
The benefits systems of marginal cultures are based on the encouragement of those at the end and the marginalization of those who are ahead who are expelled from the environment.

Implementations

Operational Knowledge Management ("Know How")

When Knowledge Management deals with the "Know How", the added value is given by the continuous process improvement supported by the accumulated knowledge. It is basically oriented to improve internal processes whether they are developed within the institution or in the environment. Knowledge Management implies a strategic approach to process improvement and it requires a high level of reliability.

Unicist Knowledge Management ("Know Why" – Ontological approach)

The UKM, using neural networks and conceptual analysis, develops the knowledge to improve industrial or operational processes.
Another use of UKM is for the development of market knowledge. This enables a more objective analysis of markets because of the double checked knowledge: on the one hand, neural networks synthesize facts and on the other hand, conceptual analysis describes the functionality of markets. For example, using the ontological approach in Knowledge Management, marketing costs are reduced significantly. It helps to accumulate knowledge without making a new market analysis in each case.
The use of Operational Knowledge Management ("Know How") adds information about the operation of the conceptual knowledge base. This helps the organization to develop the continuous improvement of marketing processes.
In the field of economic scenario building, conceptual models enable a more accurate approach to the environment. The cause-effect relations established by conceptual analysis and the validation with neural networks processed facts permit the development of reliable future scenarios.

The Knowledge Center

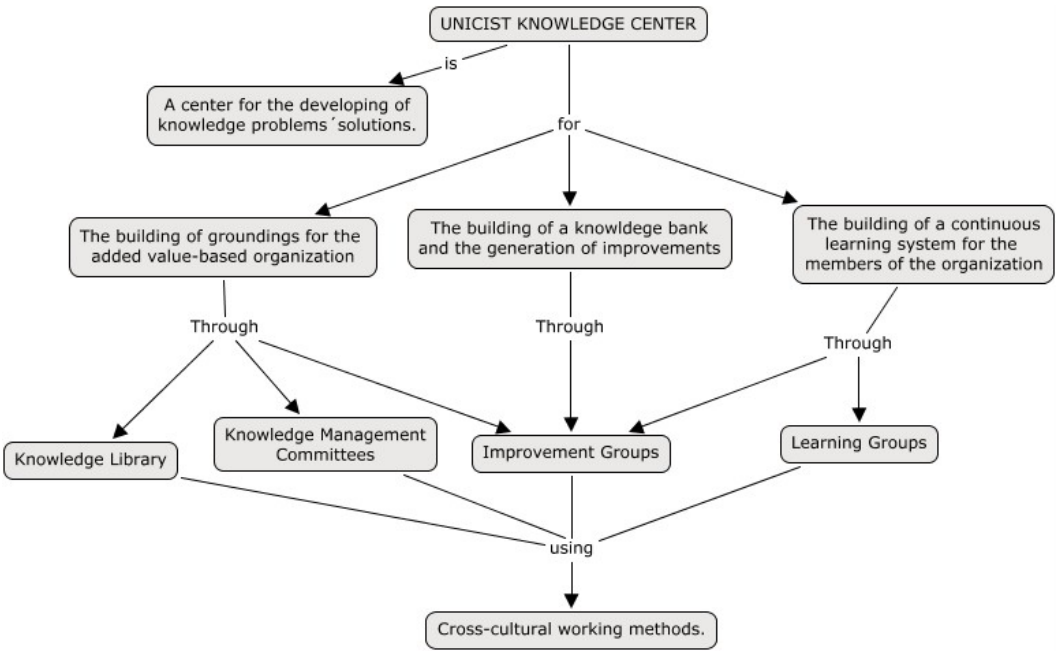

Figure2: The building of a Knowledge Center using Ontological-based Technologies and Methods.

A Knowledge Center is the place where knowledge is distributed within the organization and to chosen external members. The main goal of a Knowledge Center is to ensure the reuse of knowledge.
The participation of selected clients and providers in certain programs helps for the development of quality and productivity.

The Laboratory

An UKM laboratory is a research unit to structure knowledge, and test its validity, and a place for doing pilot programs of its use. Its IT structure includes the use of Artificial Intelligence and Neural Networks.

The Incentive and Benefit System

Unicist Knowledge Management is sustained in its implementation by a consistent incentive and benefit system. It is required to reward those who develop, use and reuse knowledge within the organization.

The bottleneck of knowledge

The main problem of knowledge is not its development or discovery but its reuse.
The "Incentive & Benefit" system basically rewards those who structure or reuse knowledge. The "I&B" system is the support and equilibrator of the Unicist Knowledge Management system. Its main goal is to incentive the structuring of reusable knowledge. It also promotes the reuse of knowledge.

Results

The ontological approach to human capital building was implemented in several companies. A selection of ten cases illustrates the results obtained. In all these cases human capital building was only a part of a major project.
These ten companies are: Diners Club, ABB, Citibank, BASF, Bayer, Monsanto, Massey Ferguson, Renault, Emzo and Shell.
Human capital building is a complex problem; therefore it should be regarded as a complex system and measured as such. In the following table, results have been classified according to the unicist ontological structure of human capital (using human capital drivers and their measured results).

Human Capital Drivers and Results

Human Capital Drivers	Average Obtained Results	Comments on results
Individual benefits - Incentives - Personal career - Personal recognition	100% (individuals)	Measured in individuals involved in specific working processes.
Return on Investment - Productivity increase - Cost reduction - Quality improvement	100% (investment)	Measured in money return for the institution as a result of the investment.
Continuous Improvement - Process improvement - Productivity improvement - Quality improvement	20% (processes)	Measured on the continuous improvement in processes achieved in: -Technological Cultures: 100% -Artisan Cultures: 0%

Human Capital Drivers	Average Obtained Results	Comments on results
Individual confidence - Increase of self-esteem - Increase of self-sufficiency - Increase of responsibility	100% (individuals)	Results obtained in the increase of responsibility, self-esteem and/or self-sufficiency in the individual's working environment.
Synergy - Increase of team spirit - Increase of competitiveness - Increase of cooperation	40% (among individuals and working groups)	Synergy measured among individuals doing a shared working process (Operational Synergy) or the interacting of individuals and the institution (Cultural Synergy). Operational Synergy: 80% Cultural Synergy: 20%

Although specific goals were different in each company, critical goals were shared and measured in all cases.
The results showed the limits of a Human Capital Building process. The average obtained results are irrelevant compared to the specific relative results. In this sense, the best results in "continuous improvement" were achieved when this methodology was applied to technological cultures instead of artisan cultures, where process, productivity and quality improvements were not a threat but an every-day's challenge.
On the other hand, 100% of all cases, in both artisan and technological organizations, not only recovered the return on investment, but also obtained individual benefits and increased individual confidence within the institution.
Finally, when analyzing the results in learning processes, we must take into account the different levels achieved by the members involved. In 100% of all cases, learning at an operational level has been achieved, while analytical learning has been accomplished in 60% of the cases and conceptual learning has been reached only by a selected group of individuals (40%).
Synergy was measured through the increase of team spirit, competitiveness and cooperation within the members of the organization. In this case, 80% showed improvements in operational synergy and 20% in institutional synergy, showing how difficult it is to introduce cultural changes within the organization.

Conclusions

The ontological approach to human capital building gives a new starting point in the definition of knowledge and its sharing.
We could say that the human capital administration intends to improve efficacy, synergy and the return of investment to a point where the strategic goals, the mission and the vision of a company are achieved or fulfilled.
The unicist approach to human capital uses knowledge as the catalyst of the human capital building process.
Knowledge development and its reuse require incentives and a long-term approach. Although results are immediate, they are only solid within a long-term knowledge policy.
On the one hand, Artisan-oriented Entrepreneurs base their success on the personal ability of their staff, rather than on the efficiency of their "systems". Paradoxically, entrepreneurship driven companies, where the institutional entropy tends to be high, are less sensitive to manage human capital.
On the other hand, Technology-based Enterprisers are more bent to introduce Human Capital as an issue than Entrepreneurs. Companies based on an enterprising model tend to consider the human capital as a significant issue.
Nobody should lead a human group if he does not have the implicit concept in the mission, the procedure and the plan of action. The Unicist Ontological approach to Knowledge Management opens new gates to the use and reuse of knowledge within the members of the organization.

Using conceptual knowledge as the basement of efficacy, synergy and adequate investments, the human capital demonstrates its capability to produce effective returns.
Fostering Human capital building implies taking into account the fact that it behaves as a complex system. Therefore, it implies not forcing “universal recipes” but understanding universal archetypes. In this sense, applying it implies promoting a technological culture within the organization and not forcing it in artisan ones.

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Glossary

Falsification
It is a process that seeks to prove that a hypothesis is false. When something cannot be proven to be false it is considered not-false. In common language it is called to be true.

Unicist
It is an operational, scientific and philosophic approach to reality. It considers reality as a concept driven unified field.

Unicist Ontology
It describes the concept (nature) of a given reality considering its functional unique structure. Although the ontology of a given reality is unique the perceptions within the structure might be multiple. These multiple perceptions define the credibility zone of the concept.

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