On intellectual capital: Exogenous and endogenous complexity

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Abstract
In a period of global transition a change in system of reference is now needed. This paper explores changes in 'systems of reference', with IC viewed as the capability to work across different systems of reference. After the industrial, electrical and nuclear revolutions – we are now living in a new Global Energy Revolution where boundaries are not limited in either time or space because its stage is the world stage where massive industrial age production units are being replaced by globally diffused smaller units. This fact changes business strategy and executives now have to learn how to cope with both endogenous complexity and exogenous complexity. While there is a large literature on endogenous complexity – which does not really involve any change in system of reference – the real challenge is to cope with exogenous complexity. Western and Eastern worldviews differ; while the former appear to be seeking new common shared rules the latter act with far fewer restrictions. Looking at the macro-scale, at the Global Energy Revolution in progress, Intellectual Capital is the understanding of the meaning of sustainable development, which has to be global or not, and at the micro-scale Intangible Capital is associated with the evolution of new work teams and groups. The macro and the micro scale have several degrees of complexity and the presence of several simultaneously acting actors creates two kinds of difficulties that we call endogenous and exogenous. In this sense Intellectual Capital is the connector of these two situations giving a closer vision to exogenous complexities and a wider vision to endogenous managing. Risk here entails crossing the boundaries and jumping into the dark to create new solutions.
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IC and the definition of borders

Since the end of the times of the “One Philosophical Thought” in culture supremacy - when the opposition between capitalism and communism occupied the entire scenery – new identities are coming on the stage (Cambi, 2001) and Multiculturalism takes off (Habermas and Taylor, 1988). Philosophy begins its “reductionism” period. The focus of many cultural debates is the respect for pluralism, for minority rights and for local cultures and traditions. All these questions, at the very end, belong to a covert question which relates to the definition of borders and how to cope with them.

In this context we can see that in different parts of the world the struggle against some Western brands has become a symbol of a more general struggle against the One Thought. This situation has changed the point of view of managers and has generated several different systems of reference which have different units of measure, parameters, norms and rules and that want to survive in and with their local differences. For example, it is so difficult to define the distinction between professions and disciplines, even in congresses or conferences such as this one, the call for papers is open to different disciplines, and the universities create new faculties every year. But we are still set in a common background which is our Western identity.

The fragmentation of identities creates a new form of complexity which is not just endogenous anymore. For this reason we need to learn this new form of complexity that we can call exogenous. This is represented by different systems of references (cultures) born from the fragmentation of the One Thought certainty. Fragmentation has created borders and people now have to learn how to manage differences.

Every border divides an internal and external space and the problem of their identification that is essential for both workers and products. Leaders know that evolution can be reached through a continuous adaptation to the new conditions of the borders and that they can not be completely defined by an inside action only as these borders are not static but in continuous movement. The reductionists have created many cultures each with a different identity that evolves following the same process that Piaget defined in his cognitive theory. This is the same situation of the learning curve of Piaget (1955) in which there is a moment when external inputs modify our self-certainties and a moment of reflection where we re-adapt this information to our personal identity and we create new knowledge.

In economy this fragmentation of identities corresponded to the beginning of a real Globalization where there is a re-distribution of manufacturing factories all over the world. Before that moment we could identify a company with its country but now it is impossible and each company has became a single system of reference. Problems of identity arise when we pass from company to its workers as we want to transform them in an intangible capital. We cannot say if this is the third or the fourth Industrial Revolution (Zamagni, 1999) but we can certainly affirm that we are in the middle of a new Industrial Revolution. During the first Industrial Revolution countries had plenty of natural resources and scarce labour craft while now they have scarce natural resources and plenty of labour craft (Heller, 2004); both these natural resources and workers are now concentrated far from Western countries and therefore the question of the intangible value of workers is unavoidable.

In fact we can speak of an actual industrial revolution in many of the third world countries while we have to define a new concept for our economies and maybe we are in a period of transformation which is not perceived as a good challenge by many people.
During the 1970s the assumption that the de-localization of industries did not represent an impoverishment of Western countries emerged, and while the head offices are still in these countries and all the patents belong to the original factories, the production units are located in function of local economic and financial advantages. We could imagine a new representation of the situation as described by the apologue of Menenius Agrippa and its analogy with the human body, the goal was that every part of society accept its place without discussion. This picture was true until the body was aggregated but it is not so clear when the body is distributed in several different places. But if the head is the only part of the body which we will be taken into consideration, we can consider Intellectual Capital as its only form of energy.

I suppose that now this body has generated several different bodies (cultures and systems of reference) but while some are complete, others are still looking for their ancient parts. As an amputated man who can still feel his missing parts and suffers phantom pains.

In this sense the word “Intellectual” assumes a more philosophical meaning and maybe it is the correct word to deeply understand and govern the global configuration of the fragmented industries that has signalled the beginning of real Globalization but which seems and resembles more a new colonization.

As these post-colonial links do not depend only on state policy but also on advantages and disadvantages for multi-national enterprises, there is very little space for any ethical considerations on social rights or respect for the environment. The government of Globalization appears to depend on economic exchanges only (Augè, 2004). This financial point of view involves the necessity of evaluating everything in terms of money without other identities and so the intangible assets need to be understood in their morphology and need to be re-conducted to a rational and comprehensive scheme, which means inside known borders. The definition of identity of a single system of reference (culture) can be lead back to a question of endogenous complexity which belongs to intangible capital.

In order to reduce exogenous complexity there is a general debate on the role of Government on markets. Von Hayek (Clarico and Rizzello, 2000) affirmed that it is easier to understand a constructed order than a spontaneous order and more recently the affirmation of “rules rather than discretions” (Kydland, 1977) has caged all the nations of EU of the Maastricht Treaty. Nobody can be certain that these are the right preconditions to survive and to grow in this economic transition.

Following these thoughts, Globalization can be defined as a real re-distribution of richness all over the planet but also a fragmentation of the simple identity of the One Thought. If it has slowly started with some de-localizations of production units to emerging countries - the process is now going faster every day. And the question of the defining of borders is vital. We will concentrate our attention on the respect of environment because (with social responsibility) it is one of the most diverging questions which mark all these borders and which create horizontal links with other cultures. At the moment the cost of energy is one of the most important factors in economy development and Western and Eastern countries have different behaviours concerning the environment. This galloping growth is creating ecological disasters and if the air in Beijing cannot be breathed without masks it is also true that in China there is a Ministry for Renewable Energies and that many countries have subscribed to the Protocol of Kyoto on gas emissions.

The Role of Intelligent Energy

Every representation needs a stage and actors have to know it perfectly. Every physical experiment needs the definition of its own physical space and scientists spend a lot of time on its description. At the same time every trade exchange needs a contract and economists and lawyers prepare it carefully. This way a contract can be seen as the definition of exogenous complexity.

This is the logic of many international organizations that suppose they can drive complexities and differences among cultures creating common rules. This way of
thinking and acting was interesting until we were inside the border of a same culture. For example the EU has been created following this philosophical stream and someone still asks for more rules.

Things are going to change when two different systems of reference meet as it is impossible to declare a hierarchy of way of thinking. Stated this impossibility, the definition of a change of system or the definition of a hierarchy between different systems of references immediately appear as a philosophical problem which involves the deepest traditions of different cultures.

For this reason we can say that we have to use our intellectual capital to challenge the intercultural comprehension of each different system of reference.

This way we have defined what we mean when we refer to Intellectual Capital not to be confused with Intangible Capital which is the capability of driving endogenous complexity. In fact, there is another debate on the value of workers and of the surrounding part of productions which is internal to every firm. Then Intangibilities are a consequence of a higher philosophical perspective which belongs to the Intellectual Capital.

If we accept these differences than we can understand the incredible number of conferences kept by economists and philosophers together and the question of the economy of happiness and the “wellbeing manifesto”. But we can also comprehend why nowadays philosophical debates attract so many common people and why such people feel to be without a guide. And the distance between philosophical (and intellectual) leadership and the intangible leadership is one of the diseases of EU where technicians have taken the place of politicians.

With these premises we will examine the problem of the capability to work through the borders of different systems of reference (cultures) which comprehend also another interesting philosophical debate on the question of energy and the use of renewable (intelligent) energies. This question, with the one of social responsibility, is essential in the new relationship that links products and consumers and in the trust of the stakeholders in brands.

It is interesting to note that EU has called Intelligence Energy its program on energy as it considered it a philosophical problem more than a real problem. And the question of low consumptions is really a philosophical question as it concerns the lifestyle of men and women. 2004 Has been called the year of energy because of the huge price of oil and the huge increase of energy requests from emerging countries and so both the question of energy productions and of diffused production and of alternative sources and of renewable sources are focal points of most political debates that characterize this revolutionary period.

The Value of IC and the Meaning of Borders

There is a danger hidden behind the definition of the value of the Intellectual Capital seen from a single point of view only. In this Energy Revolution the flexibility of every assumption plays a strategic role. It seems that only people who have an holistic vision of the problem and a wide view may survive and emerge as winners. The example of the situation of the car market in the USA is clear enough.

Now we want to investigate the question of the value of intangible capital referring to workers and so on the definition of intellectual capital too. There are two situations: one inside a single safe system of reference and one outside, among differences. Economists are conscious that the personal attitude of a person could be exalted or denied in different contexts (Sattinger, 1993) but probably this affirmation has arrived to an excess and the value of a person may be completely different in function of the system of reference chosen. If we observe the problem only from a monetary point of view we can evaluate a person with the eyes of an Insurance Company. This way we can find different economic evaluations of a same person (Vittadini, 2004) depending on the local context: for example being an engineer in USA, in Europe or in China will give different calculus of value based on the local economic system. This context becomes a
referring system inside which there is the contraposition of individual self consideration and social expectations.

These differences make sense until we stay inside the borders that mark an isolated system of reference (just as it happens in Thermodynamics). If we enlarge the borders of this system of reference, for example bring a Chinese engineer to the USA or to Italy, his or her value will change in fact. For example in Italy we assist the phenomenon of East-European and African engineers who work as cleaning women or dancers, if they are lucky. For an Insurance Company their value is very low and does not really correspond to their intangible capital.

Now we are going to take into consideration another point of view. Since the system of reference changes its morphology we can choose a different unit of measurement. If we take as a measure the intangible production, which depends on their Intangible Capital, and if we think of a small competition, such as the preparation of this kind of essay for this conference, we will have the same unit of measurement (the one established by the convenors). In this case there is both homogeneity in system of reference and in unit of measure and the three engineers above could have a very different value with respect to the Insurance Company.

But going into a wider range, into a borderless area, we can imagine other points of view. If we focus our attention on different systems of reference the results will change again. There are situations where the value of a person depends not only on the quality of his or her works but also on their efficacy (Gori, 1999). It may happen that although the works are of the same quality, one of them contributes or generates a process of growth while another one passes to history with indifference. See the thousands of inventions that could have changed the world but were not in the right place at the right time.

Therefore the question of systems of reference and their borders is unavoidable and the difference of Intangible and Intellectual Capital which define endogenous and exogenous complexity as well.

Until a few years ago, in the One Thought era, this problem was marginal; there was no need to know all the reference systems that were adopted all over the world, but Globalization has changed the cards on the table. The boundaries between the different systems are now more permeable and indefinite and it is impossible to remain inside the same system of reference for a long time. One practical example of this situation is that Indian and Chinese firms are growing and now they are buying Western firms, and IBM is only the most famous example of this phenomenon. Property changes owner, the rules and the values of Intangible Capital have suddenly changed and it is impossible that a head-worker has the same value before and after that moment and suddenly we need a new way to evaluate him or her or to capitalize him or her.

Believing in the communicative power of literature, the famous ‘The Persian Letter’ by Montesquieu (1721) can be read to understand the kind of interactions between different systems of reference. In this case the tale is ironic but it could become tragic if it were connected to the survival of social and individual economic systems.

For these multiple connections we can say that the structure of intangible assets cannot be defined in a simple way and it is composed by a mixture of technical, managerial social and philosophical aspects which are difficult to recognize. And these social and philosophical assets can be defined as the Intellectual Capital. Static considerations on the value of Intellectual Capital – through space and not through time - depend on the desire to maintain and to improve a positive self-image or identity- and could have social implications (Johansson-Stenman & Martinsson, 2003) on the growth of complexity. Exactly the same situation of the man with his amputation who still perceives his whole body.

**Ethics and Intellectual Capital**

In many works Intellectual Capital is confused with Intangible Capital and this is due to an innate Western necessity to rationalize situations and to put the different entries inside a predefined mesh or array. The Energy Revolution (also considered as a
part of ethics revolution) in progress is transforming this mesh and brings us to a change of system of reference. In a dynamic evolution and with the aim of exogenous complexity the value of the Intellectual Capital is factually immaterial and it is represented by the capacity to be at the frontline and to run firms, and place countries' economies in a more general context, during this period of transformation.

A few years ago stock exchange markets were shocked by several cracks and by the policy of the managers of the companies involved. They had huge personal incomes while their firms were sinking in a sea of debts. Suddenly the public and the press started to talk about ethics and we can certainly affirm that nowadays ethic and values are the most used words among people. It is interesting to note that both represent intangible values that are now considered as a form of capital also for firms. Many Public Administrations and companies are drawing up sustainable budgets.

Arrow (2003) in his work on social behaviour and democracy wrote that in a context of economy of welfare, the most relevant order to reach the “maximum social” is the one based on values. This affirmation is every day more true and it is the anchors of Western countries against the commercial troubled seas of emerging countries like China. In this situation the most common error is confounding commonplaces with values. Commonplaces do not transmit any significant or meaningful information and it is impossible to learn or to teach them. In Italy we define them as “metropolitan legends”. It has no sense to discuss their relevance or to contest them (especially in social and environmental matters) and it is only possible to copy, imitate and follow them as they are structured as intangible commands. Intelligence Capital is the capability of working in different contexts of values.

Philosophically speaking, based on the considerations above, there is a parallelism between tangible and intangible with rational and un-rational (Walzer, 2001), where the prefix un- includes several different aspects which are not the irrational ones only, but comprehend emotions, sensations and more in general things which are not touchable. Many scholars, such as Goleman (1999) or Damasio (1995), who investigate in fields between psychiatry and social behaviour, have brilliantly explained this situation inside single individuals and inside a community context.

The same dualism can be found inside every society where there are people who are morally correct and people who do not follow the straight line individualized by laws and social rules. Once more this is a problem of system of reference. If we do not consider any moral questions we can easily understand the structure of a society as it has been represented by libertarian philosopher Block (1976) and which could comprise some East-Asian behaviours, for example.

The border line between these two systems is flexible and depends both on the time situation- historical context and on the location: the Chinese system is very different from the Western one and they are both completely different from the Arabic one, for example. Sociologists as Anzaldua (1987), who examined the intercultural communication, describes a small space called bordelands, where different cultures meet and understand each other and this space overlaps values.

The capability to work across different systems of reference and the intercultural communication tools create a low sense of risks that could avoid many cultural shocks (Grinswold, 1997).

**Intangible risks and Happiness**

Cultural shocks, high perception of risks, loss of emotions are creating a general sense of uneasiness that often evolve in depression. In many Western countries this situation has arrived to a high threshold of alert and economists are investigating the essence of happiness. Once more, we find a philosophical question behind a tangible situation. If it is easy to understand what a broader view is - also because our daily encounter of different cultures has become more frequent - it is not as easy to realize the meaning of the word “risk”. This concept has had a Darwinian-type evolution from the time of Dante’s Ulysses (in the *Hell*) where he went through the Columns of Hercules.
Now it represents the negation of the evolution – in the sense of dynamic change - in an absolutely static vision of life.

What has brought us to this point? The answer should be searched in the incapacity to cope with exogenous complexity and accept pain and in a different perception of peril and risk. Being in the happy condition to rely on science and understand all events leading back to few prefixed or prefixable schemes, many people have been induced to suppose that it is possible to quantify and to weigh life and to reduce exogenous complexity to the endogenous one.

An unconditioned trust in science in a Positivistic vision of evolution (connected to the One Thought) has brought a scientific ethos around all circumstances and has created a predictable scheme of behaviour. This presumed certainty, that could be called “norm system”, has arrived to the excess of many politically correct affirmations where the distance between reality and Utopia is insurmountable and has arrived with incredible aberrations.

Two logical steps of extraordinary effect have been realized: the first one from the concept of pain to the one of risk and the second one has diminished the sense of the word “opportunity”. The static vision corresponds to an old context which lives in a plus minus welfare condition while emerging countries are young and live in a dynamic condition where there is no time to create rules and cages. This difference can also be found in a linguistic analysis of the kind of communication that occurs between these two contexts: the old one is concentrated on a norm vision while the young one is concentrated on the object: the evolution to a welfare state. Members of the first one now believe that the structure of syntax is a reality and sometimes cannot distinguish anymore between the shadow and the object, as in the myth of the cave of Plato. The shadowy environment of the cave symbolizes the physical world of appearances for Plato, that now we can also call the “norm world”. The people who belong to the second one are outside the cave which symbolizes, in the real world, full and perfect being, the world of Forms, which is the proper subject of knowledge and they are concentrating only on real specified subjects. We can call this a “social world” and they use language to do a “social construction of reality”.

These two situations are so different that if we go to a book-shop we can find books of scholars who write that Globalization is a “devil” and scholars who write that it is a “saint” just because they look at reality from different points of view. Generally static philosophers mainly believe that this situation will create trouble and unfairness, while static economists try to evaluate the risks of every change.

The Insurance Companies represent the norm-context, the ambition to comprehend everything inside an array. They try to reach “zero risks” which is a static dimension. In this Energy Revolution the Insurance Companies are in trouble because they failed most of their calculus on ecological consequences of human actions. It is impossible to understand the entire exogenous complexity which links the world unaccountably.

In this situation most people lost the capability of orientating and feel a general uneasiness.

The tendency to rationalize everything has led to the cognitive theory that labelled risk as ‘the product of probability and of consequences (dimensions and gravity) in the event of certain adverse circumstances (of a peril)’ to establish the probability and the necessity to consult a wide array of specialists – such as engineers, statisticians and mathematicians and during epidemic diseases, psychologists, economists were needed.

These presumed irreproachable data, and some scientific outcomes, have given room to always more lively activities from the outside by detective-solicitors. They try to understand the gap between probable data and statistic ones, and claim someone to be responsible for it. By these actions the place of individual personal responsibility has changed and considering interdependency of a plurality of different factors was avoided in this way. It is clear that there is no more space for happiness.

Individuals, and especially those with a higher education, have been induced to thinking that they are in the condition to plan their entire existence basing it on prefixed
schedules. Solicitors made us believe that life could be explained as a straight line where all the risks could be calculated and therefore eliminated.

The most disturbing factor of these fascinating theories is their impact on communicating through media. The message they transmit is characterized by the dichotomy good/bad (Boudon, 2004) and generate a significant support from, for example, the cinema industry and contribute to the creation of metropolitan myths and legends.

**Exogenous and Endogenous Complexity**

We are going to try to explain why intellectual Capital plays a key role in dealing with exogenous complexity and why intangible capital plays a key role in dealing with endogenous complexity. What exactly is the exogenous complexity and how is it related to the *Energy Revolution*? Before the Enron and Parmalat cracks and before 2001 the answer would be the managing of very large companies, of a great number of employees, of the competition with other companies and of the definition of shared rules inside a same community. After these deadlines the answer is completely different and involves state policy and energy supplying and the definition of shared rules among different communities. In brief: the definition of a shared system of reference.

The establishment of a new common basis for the development in global growth cannot be postponed because Western people feel themselves as poorer and a feeling of fear of emerging countries is being born, with the creation of intangible barriers and borders. For many years, people of Western countries have been surrounded by a sense of guilt because of all the bad situations of the world, versus ecological disaster, racial discrimination, poverty of the third world, and so on. The Politically Correct Movements represent this situation well. But now there are several situations in which this sense of guilt evolves in proud. The dichotomy between bad/good is leaving space to individual sins and not to general guilt (Boudon, 2004). The simplification of complexity into bad/good which derived from the Conspiracy Theory, denies the value and the importance of individual choice and evaluates only the pressure of social constrictions and situations.

The differences between economic and social scientists can be reconduced exactly to tangible and intangible matter if we only think of the first ones as individual matters and of the second ones as collective and foggy matter. In Western countries we are supposed to be single persons – each with personal characteristics – while we refer to emerging countries’ people as to an indistinctive mass. And also when the Politically Correct Movements try to go over this situation it does not search for equilibrium or harmony but only scapegoats of the present.

We can describe the paradoxical situation of construction companies: apart from the very big companies which work practically in every part of the world, the medium and small enterprises work typically inside a local market with a predefined range of interaction and does not suffer from ‘outdoor’ competition. During 2003 the budgets and the structure of works of these companies changed and were modified by the costs of steel and oil. The price of these resources suddenly duplicate their values – and sometimes ‘four-hundred-plicated’ – because of the great request from China and for its policy. For many years, in construction matter in Europe we have adopted certified steel to be safe also during earthquakes and our structures are certified. The Chinese tried to sell steel of low quality and without guarantees and they are the new helmsmen of the market.

At the same time many Western technicians who go to construct in emerging countries escape from them because they find themselves in a situation without their known rules. They are not able to cope with a change of system of reference.

With a pervading sense of rational power, during the last years, Western culture has created a system of fixed rules which find no place in this new enlarged system of reference. We have planned such a rigid mesh of behaviours that we cannot imagine life
beyond that scheme now. What appears as complexity is only a natural fight for survival in a larger context and not a new Berlin wall.

The process of breaking up and fragmentation of social identities represents the protection of immanency, of small dreams. They are both sides of the same coin. The historical moment’s paradox — after Ulrich Beck — is that this is a reality for national states as well, although on a bigger scale. On the macro scale, we attend the problem of an identity crisis. It is only through a process of de-nationalisation and trans-nationalisation that we can regain our collective national identity.

Following the sociologist Peter Berger (1999), the ultimate human fear is not of evil but of chaos and this is the difficulty in imagining new systems of reference and to work across different borders. During the 60s and 70s people considered their parents’ traditions absurd and obsolete and enthusiastically changed their behaviours and habits. Sociology and Management engineering are studying this theme which represents an intersection between human and technical sciences. In human science it is very difficult to define it but at the same time — because of its technical relevance on work production — managers want to define it clearly.

This situation could be pointed out as a real match between two completely opposite philosophical schools. On one hand, there are people who suppose that intellectual power-ship is in the centre of the universe — and that mankind is the winner. They believe that they can measure everything and can control and normalize reality. On the other hand there are people who suppose that mankind is just a part of a more complex system and that — although its actions are dangerous for nature and for other species — he or she has to build up reality in a social way.

The word complexity goes together with the word inter-action but very few people understand this. For Example: a perfect technician, who knows how to work in Western countries, has profound education and has the right relationships, is often not able to work all over the world. As we mentioned before, it happens that Western engineers who go to third world countries escape from them during emergency situations because they lose their normal points of reference, such as norms and procedures, and are not able to construct new flexible rules to be shared with the local workers.

In this situation — if a quality manager has to evaluate these technicians in their Western work-places — he or she could judge them with the highest marks. But when the points of references change, this judgement does not correspond to reality anymore. In this way it is hard to measure the value of Intellectual Capital and we can define the Intangible one only.

**Conclusion: can we evaluate Intellectual Capital?**

As we have already shown this is not the right question as it depends on the system of reference that we take into consideration. Maybe the right question is how to continue to create intangible values on products, made in emerging countries, and to maintain our intangible economy.

This question can be understood more easily thinking of patents, for example, software licences. If we consider the value of them inside our system of reference maybe their value corresponds to the sum of the incomes of all the sales and there are heavy fines for pirates. When these firms arrive on the Chinese market the number of the hackers are so big and the patent rules so unclear that they change their policy. In this circumstances there is a need for a change of a system of reference. Intellectual Capital helped to create new strategies and now much software has become an open source and managers have changed their strategies.

This debate happens at different levels in all Western countries and we assist to a division inside traditional political parties who try to preserve their identity with new barriers or to uncritical believe that we can have a very fixed system of rules while others cannot. For this reason it is not the time to concentrate our attention on the endogenous complexity but to find new strategies for the exogenous complexity.

Maybe we all have to read Himanen, Torvalds and Castells (2001) *The Hacker Ethic and the Spirit of the Information Age* to understand how far can be two different
systems of reference and what ‘creation of new product’ means. Only this way we can have a real confrontation in and with representatives of other systems of reference. This is the real challenge for Intellectual capital: more process revolution and less product revolution. While for Intangible Capital the main challenge is to create product revolution.

References

Becker, G., S., (1964), Human capital: a theoretical and empirical analysis with special reference
to education, New York: NBER.
Plato. Republic. Paperback