

THE ROLE OF KNOWLEDGE MANAGEMENT IN THE TRANSITION FROM PROJECT MANAGEMENT TO SUSTAINABILITY MANAGEMENT

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ABSTRACT

When the cost of oil was substantially invariable and low, sustainability management was a voluntary decision and connected with particular projects or programs only. All environmental quality labels are still voluntary. The process of energy management during the construction phase of buildings (and after) was represented by well known fixed values project managers.

The increasing cost of oil and the new European directives on energy certification of buildings and the national laws on renewable energies are changing both the meaning of sustainable projects and sustainability management. Every new construction has to have an energy certification and soon each house (old and new) has to have a minimum energy efficiency quality. These situations involve a change of perspectives and a new role of the sustainability manager. A project of passive house or a house with renewable energy plants may have a negative impact on commitments, clients, designers and workers.

These kind of difficulties are considerably higher when the project concerns a renewable energy plan. This paper will take into consideration the new role of planners and project managers in a sustainable process of construction. We will analyze which aspects are connected with sustainability and what kind of tools project managers can use to cope with these new scenarios and the strategic role of knowledge management.

KEY WORDS

sustainability, knowledge, management, processes.

INTRODUCTION

Until 9/11 the world, economical and political geography appeared to follow a predefined and unavoidable path of slow evolution where institutional hierarchy would not be subjected to alterations.

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From the economical point of view, though, the attack on the Twin Towers, has accelerated the integration process of the Chinese economy in a worldwide context, changing all values of reference.

Almost immediately after the tragedy, China was admitted to WTO (World Trade Organization), speeding up the process of its economy becoming occidental. From 2005 on China is in all aspects an international accredited commercial operator and this has modified economical geopolitics.

The impetuous growth of China and its neighbour land India, together with the lack of some raw materials in these nations have confused local economies of all countries in the world (Weber Maria, 2003).

The first example of the effect of their presence is the increase of the price of iron for construction which has occurred from 2003 on.

In two years time the price has centipled, increasing the cost of all public and private constructions as a consequence.

For example, this situation forced the Italian Government to bring forward a law on extra cost clauses for contracts with private companies, building any kind of public or private construction (Ministerial Decretory 30 June 2005 called “expensive steel”)

But beyond any doubt, the most important consequence is the related increase of the price for oil and natural gas. Another important issue to define the frame of reference where to place this report in is the variation in natural gas supply from Russia.

Once more geopolitical modifications have caused , this time induced by the EU enlargement and its oriental relocation (to countries behind the former Iron Curtain), a subtle nerves war between Russia and Ukraine. As a matter of fact, Russia has reduced the supply of natural gas towards countries traditionally “western”.

These statements are a clear sign how unthinkable it is to continue being leaders in any field, included that of construction, without having a bright vision of the condition of the framework above (Beck, 2002), space travelling between countries far from our territorial reality.

Today’s decisions in Beijing, New Delhi or Caracas influence our lives and the costs of our enterprises directly and immediately, especially when we take into consideration the energy related costs.

China and India have decided to present themselves as one single customer in different international contexts of oil producing countries which means that they have more economical power of influence on energy markets, overtaking even the USA.

Europe is practically inexistent since their energy politics are delegated to single European Nations without having a united energy plans.

EUROPEAN DIRECTIVES 2002/91

In 2000 in Lisbon, the European Commission has signed an agreement following an economic strategic analysis on the future of the world production system.

At this treaty of Lisbon lines for the development of European countries were defined in order to address their efforts in investments along that lines that seemed to be valid in the new world production system being born.

In that occasion, a special taskforce was nominated who will concentrated on the assessment of the realization of what foreseen in the same treaty.

The fundamental of this agreement was that European economy would be rapidly transformed from a manufacturing production based economy into an immaterial production economy, services highly adding value due to knowledge management, and technology.

That the energy question would be strategic so much to European development was not perceived yet. There was an utopic sense of the need to provide more room for experiments with renewable energy sources and hydrogen.

From a survey into the distribution of the consumption of energy performed by both EU (EU Green Paper, 2005) and national researches centres (e.g. ENEA in Italy) resulted that after the oil crises of the 70s the reduction of waste of energy was met in some departments while in others it was not at all.

Especially housing came out as the top energyvore. In homes built in Europe energy efficiency is inconsistent. This factor together with two other aspects rends the situation particularly weak from an ecological and economical point of view.

The first factor is the variation the climate is submitted to which implies hotter summers and colder winters and, as a consequence, more energy is needed for heating and cooling.

The second factor is the transformation of economy in a service economy which results in the closure of big manufacturing plants and the opening of many offices, located just in those buildings with low energetic efficiency described before.

In 2002 EU brought forwards the directives number 91 which should have taken to a range of national laws introducing the concept of energy certification as a reference for local taxes. Later we will also describe some financial instruments which have been identified – especially in Italy, but also in the rest of EU – to give this transformation of economies the incentive towards better energy efficiency.

This directive, in practice, put houses in three different categories (Class A, Class B and Class C) and a extra one for passive buildings.

The energy certificate must be renewed every 5 years and, in fact, any time major changes are made to the house.

This will be a compulsory issue for new buildings while slow adaptation to the standards is foreseen for existing real estate. The total renewal is the obligation to produce energy (at least hot water from solar thermal panels) for all new buildings.

In the building sector this law associated with the context of variable in increment of the cost of energy is changing the point of view of local politicians, of the people and, therefore, of entrepreneurs.

Up to a few months ago only the region of Barcelona (Spain) had brought forward its own building standards which were similar to the ones of the European directive (Dall'O', Morimondi, 2003).

In 2004 Lazio Region in Italy brought forward a law which imposed the obligation of solar panels on all new buildings but this kind of examples can be counted on one hand.

ECOLOGICAL CERTIFICATION FOR HOUSING

New markets were already being individualized in order to meet the necessity of introducing concepts linked to energy saving and energy-efficiency in housing.

They are the markets of housing quality aiming at certificates or at the value of a brand to characterize constructions.

Before the introduction of a compulsory certificates for housing the only norms of reference were those of EMAS or ISO 14000 (Guido, Moriani, 2003). They are still a voluntary certification independent from analysis and economical financial valuation.

The idea of EMAS is exclusively linked to respect for the environment and has not achieved the activation of a new market of reference characterized by ecology.

On the other hand, no marketing expert would consider the EMAS logo having those holistic qualities of real individualization to influence decisions of the final users.

From a survey on the kind of consumers that have pursued an EMAS certificate we learn that they are mainly institutions or enterprises which depend on environmental issues, as it is the case for dairy and food industries (De Leo et al. 2003).

From commissioned polls directly from the US Environmental Protection Agency and Department of Energy, the logo Energy Star has its own logic and companies do not follow it for economic purpose only but for marketing reason as well. ENERGY STAR, introduced in 1992, is the U.S. national symbol for environmental protection through energy efficiency, and it is recognized by more than 60% of all U.S. households.

The case of the brand "Energy Star" represents a trade mark jointed to another trade mark.

In the field of construction other experiments have been performed over the last years.

For example in UK houses are being built with trade mark WWF on it, this too used with the logic of brand accessory. The houses belong to a govern program but they are made through a PPP (Private Public Partnership) and follow the trade rules.

In both cases the ecological brand marks have the function to linking the ecologically known trade mark to the original trade mark of the company itself.

Other trade marks are being born under the umbrella of European finance in sustainability sectors. For example, thanks to finances in the Area of the V Framework Programme, a

group of Italian cooperatives associated with Danish, German and Swedish, realized a programme called SHE (Sustainable Housing Europe).

Those performances have results in a leadership for the association of construction cooperatives in this market and in experimenting with an own trademark as well. Thanks to this programme the construction cooperatives have also become favourite liaisons for the Italian Ministry for the Environment in the field of bioarchitecture and energy efficiency.

TOWARDS A SUSTAINABLE CITY

For the moment we have described the present framework – even if recent – where planners and project managers of construction companies and, more generally speaking all who are in some way connected with territorial transformation operate.

Whoever has a complete perception of this framework is able to understand the present and to move about in this complexity. This knowledge enables managers to perform short-term tasks and to conduct economic operation with short-term revenue, to manage the construction of a product but not the management of the entire job from the project to authorizations to the completion and even its management. Substantially, this knowledge does not make him a leader with his own view of future evolution. Let us try to focus on the possible evolution of the framework of reference described above.

Seen the quintuplication of oil and gas prices in three years, it is easy to understand how this weighs ever more on family balances. If we do not want to reduce family expenses on energy and communication (ISTAT) we have to operate in a way that houses are efficient energy users (A Class or passive) and also we have to start thinking of compounds that is energy isles.

With reference to ENEA data again, but referable to any context, a 30 % of all energy produced is lost in its way from the site of production to the place of consumption. Big production plants are production efficient on the one hand, but on the other hand they waste much which is more evident when we relate it to the cost of raw materials (oil or gas).

Renewable energy is extremely easily found (sun, wind, biomass, fides) and still low efficient in production. In practice it still suffers of absence of transformation process engineering. Its main use proves, therefore, to be a contiguity of production units and final users.

This representation is called “energy island” to explain the ideal cycles of production and use. It is clear that this peculiarity renders renewable energy interesting, especially where by geographical and geo-morphological difficulty the final consumer is almost unreachable (Dierna, Orlandi, 2005).

We have some examples related to islands (Chan, 2002) as that of Iceland economy of which is being converted into one totally depending on hydrogen and where the production of hydrogen cells is becoming one of the world’s biggest (Maack and Skulason, 2006).

There are simpler examples such as those in hundreds of Greek isles which geographic position facilitated a massive application of solar energy. There are also examples for the

future as Madeira in Portugal and Ventotene Island in Italy where a program taking to Zero Emission has started recently.

Amplifying this prospect to the urban sector of building we understand that the next step will be planning and realization of “urban energy island”, sustainable quarters.

Such a quarter can be compared to a self-producing energy centre, comprising the sale of this energy outside the quarter and in all ways optimized energy efficiency of its buildings.

EU equals energy efficiency to a sort of renewable energy. It is not just a case that its Agency for financing this matter was called IEEA – Intelligent Executive Energy Agency.

The first examples of urban realization are already “working” in the Netherlands one of the leader countries in this sector, in Germany, Austria and UK. We can quote the case of the Zero Emission quarter BedZED, in London (Schibel, Zamboni, 2005).

What makes these energy islands interesting is not only their planning or their urban and installation realization but also the managing organization of relationship among single users and of local utilities and with skilled territorial administrations in many aspects.

The strategic organization of agreement between the different partners who have different goals, is not a comprehensible task for a classical project manager who is concentrated on the technical realization of the project.

This task needs a view of the whole of the island and of its links with the context of reference.

This is a holistic view and at the same time a Dialogic Thought that means the capability to maintain the duality inside the whole (Morin, 1993).

THE EVOLUTION OF THE DIRECTIVE

The future renewal of norms – as emerged from the statement above – will go in the direction of realizing sustainable quarters. In order to be one of the main characters of new processes of construction, that will be outlined, the leadership must have this before their eyes and be able to catch the signs of the change.

We will try to see what these signs are, with reference to EU politics. Analyzing the DG TREN (Directione Generale Transport Energie) website we can understand that DG have acquired a series of management and communication instruments to keep up with this transition process.

Until today the VI Framework was aimed at laying down the foundations for a fragmented dissemination of knowledge in the territory. The VII Framework is being born with the goal to unify all experiences in distribution to favour the creation of one sole system capable of delivering a new sector of industries and enterprises. It is interesting to perceive how the words diffusion and management cannot be dissolved anymore.

As a matter of fact, in the area of energy efficiency and the implementation of renewable energies it is not possible to divide the times of communication and the one of projection.

The two phases are tightly interconnected: the management and the organization of all new characters involved in managing of (energy) islands need strong participation that can be obtained only by means of correct management of knowledge.

The organization of the process does not stop at the completion of the construction of a plant anymore but it continues with its management. The process of building is stretched naturally, including both the production of the building and the production of energy. As a consequence, the phase of engineering weighs as much as the one of energy engineering.

The system changes dramatically the role of the project-manager who used to think that her or his work was complete at the opening of the work she or he had helped realizing.

On the other hand, as from the stage of projection, not only the management of construction but also the role and the organization of the aggregate of people who will manage it need to be considered (Young et al. 2005).

The project manager should stay by the side of the future managers in the organization of their own production unit (for example a building in a sustainable quarter can be compared with a production unit). At the same time she or he has to grow to become a weak strategic consultant, such as defined by several scholars (De Maio, 1994).

ECOLOGICAL FOOTPRINT, LCA, CO-GENERATION AND TRI-GENERATION

In the title of this paragraph we want to communicate the natural way from philosophical aspects of choices - aspects which are linked to the respect for the environment – towards aspects connected to the technical realization of these choices.

These double aspects represent also a different perception of the problem by different nations depending on their democratical evolution. The problem of the conversion of energy production towards forms of renewable and efficient energy (or the intelligent use of energy) is perceived in a different way in the West and in the East, in the USA and in China (Bettiol, 2005). Pragmatism and idealism.

To be true the more pragmatic approach is met in oriental countries and in California. Their pragmatism is due as well to the awareness that real industry linked to renewable energy sources has still to be born. For this reason no industry is in a supermizing or monopolizing position. The first industries to empower themselves of the first position will be able to benefit by this position. On the contrary, of what we could have supposed if in Western countries we are linked more to philosophical questions, in oriental countries they have a practical vision linked to pragmatism. While in western countries we speak of ecological indexes, specific ministries for renewable energy are created in oriental countries: real task forces.

The ecological footprint is an index created by William Rees e Mathis Wackernagel in 1990 and updated continuously by them. This index is used to connect lifestyle and consumption of a population with the quantity of nature needed to keep them up for ever. This quantity of nature express in hectares of territory per person comprises both natural resources necessary to maintain that type of life and consumption (e.g. fields to produce wheat, trees for paper, space for construction of buildings, etc..) and environmental spaces needed to degrade waste

(e.g. hectares of forests to absorb CO₂ produced by cars). In practice the index represents the weight (expressed in hectares) that a population has on the environment (Chambers et al., 2002).

It is interesting to compare the index with “productivity per person” or “bio-capacity” of the territory occupied by the population under survey. From the point of view of ecological balance when the index is inferior to bio-capacity it is all right but if it is higher we have to start worrying because this means that the population under survey consumes resources from territories beyond their borders.

Welfare does not correspond necessarily to the fix value of the population: an American, Dutch or an Italian have reached a comparable level of welfare but gain different indexes anyway. This makes us think that we can work on reducing the index of a population without decreasing their grade of welfare.

Let us imagine that we plan a new more equal society: in this case we can start from a known average value (compatible with demographic growth) of circa 1,8 hectares per person. There are many systems and technologies to respect environmental balance: from energy saving to car sharing, to car pooling, from the consumption of local produces to the production of adjustable manufactures, without a cost of “use and throw”.

The ecological imprint as main index for its politics of sustainability has recently been adopted by Wales.

Other than the ecological imprint, there are new concepts or ways to plan that can be taken into consideration. This can be done both to gain environmental sustainability and economical questions connected to the cost of energy.

The first aspect is LCA (Life Cycle Analysis) which comprises computing energy inside the entire life cycle of a product, from its creation until its delivery back to nature as waste.

On the other hand we must take into consideration products aggregated to various form of energy as the thermal and the electrical one.

In this case we refer to Co-generation and to Tri-generation. In both cases the vision of the total building and managing a plant goes beyond traditional borders and arrives to an optimum solution that involves subjects which are foreign to the project.

We can take as an example the connection between a plant of industrial energy generation to the tele-heating in a residential quarter.

As we can see the project manager is asked to have a vision which is not bordered by space and time with his client and his project but goes across borders into the territory.

GREEN ECONOMY

We will not analyze economic aspects linked to the different way to conceive environmental transformation or construction engineering we have described above. We cannot understand the concept of “lack of richness” until we reflect on the branch of economic studies that are in action to define goods that are not directly economic but that represent a condition of

welfare. This branch of economics has the name of “Economy of happiness” which is subject to discussion inside adaptation to a system of welfare properly the way from welfare to wellbeing.

For example the payment of retirement (exclusively economic richness) does not guarantee the wellbeing of people anymore and Nations have to ask themselves how to improve the quality of life of its inhabitants (Grozinger, Panther, 2003).

The concept of lack of richness can be divided from the attempt to define and maybe modify conditions of wellbeing that are an alternative to economic richness. It is not a case that the Theorem of Coase is the basis of a cultural revolution in environmental and juridical fields.

In the environmental field the research for an alternative battle against pollution in an exclusively repressive way by the police has taken us to the definition and the approval of the Kyoto Protocol. The protocol is a voluntary agreement but it is based on the property of air quality.

Juridically speaking, the economic analysis of rights has started trying to find a balance between Common Law and Roman Law. The development and the adhesion of forms of alternative dispute resolutions, called also Negotiation, started from the Theorem of Coase.

Following negotiation, rights can be structured as to remove impediments of private agreements that could reach the optimum on their own.

But it is research (voluntary, in this case as well) of alternative creative solutions that is the enormous cultural treasure of negotiation that can take us to the condition of lack of richness. It might be better to name this the annihilation of economic misbalance.

The revolution started with the Theorem of Coase is still going on and is conducting a cultural revolution in environmental sectors that is known as “from Environmental Law to Environmental Justice” (Suchman, 2005). This means that if demagogically the laws have sometimes been written imagining perfect situations where ecological systems are created that became unnatural in their statics but their application may happen by following steps agreed on through ongoing negotiations.

In other words: when mankind with his laws substitutes the creator and dreams of being able to construct micro ecological systems apart from the global context wherein he performs his considerations and his environmental measurements, he describes rather an utopia than a real practical way. In philosophical terms we could say that the laws should mirror public ethics

(Viano, 2002), these ethics represents a target that is difficult to meet. It is then that we can make the idea that we can arrive to a perfect solution (utopia) for a step by step improvement without being accused of non fulfilment.

Without this opening provided by the possibility to consider the lack of richness, the sole possible situation would be total paralysis. For example, when the clearance of a polluted site is expensive, no society is apt to pay and they will prefer to incur the risk of penalties and hide the pollution and wait.

The alternative is that the community pays the cost of clearance or to introduce an agreement of retribution on pollution clearance that does not have the aim to eliminate the problem but to border its negative effects. This is the basis of the Kyoto Protocol, to give an economic value to the quality of the air.

There is another consideration we have to keep into account in a global context overcoming the former limitation introduced by the definition of a system of reference. The solution of toxic waste has often been that of sending it to third world countries. In a global world we can refer to share ethics and laws that are not the same everywhere.

We could say that globalization represents a connection from a unique n-dimension system to the presence of different n-dimension systems that can find meeting points only adapting to each other.

As a prove of the above, we can remember that the Kyoto Protocol was signed when the number of nations (referring to some geographical and economical characteristics of subscribing nations) reached a predefined quota and not when single States adhered. Only in this case we can refer to the condition of lack of richness.

We believe that at present all western economy is quantifying the lack of richness with all its strength.

GREEN FINANCE

A framework of norms that provide with reinvestment as well as the promotion of the transformation of Theorem of Coase in environmental sustainable constructions has been created. Green Trade was born after an exact framework of norms where players can move in (Sen, 2002).

Politicians have a strategic role in development planning. Without these plans markets would not be convinced to invest in solutions without a short time revenue.

The laws of Green Trade want to increment and relocate in time (towards sustainability) The economic convenience of some entrepreneurs choices.

The mechanism of White Certificates, financial shares that have been introduced in Italy and that are under observation of EU, seems to be very interesting. It is a mechanism of reimbursement linked to the world of construction and specifically to the improvement of energy efficiency of present real estate.

These White Certificates represent a novelty also internationally. For 2005-2009 major distributors of electrical energy and natural gas (of 100.000 users or more) have to respect fix yearly quotas of saving energy. In total they should reach 2,9 MMBOE /year (Million Barrels of Oil Equivalent).

The Italian Energy Authority started to recognize legally new kinds of companies for energy services, called ESCO - Energy Saving or Services COmpany- that may develop saving projects. After this realization they will obtain the White Certificates that they can sell to the great distribution companies directly or in the Green Stock Market.

From 1 January 2005, the AEEG (Authority for Electric Energy and Gas) has started the exchange of this shares called White Certificates or TEE (Title of Energy Efficiency).

On the other hand, the Green Certificates are yearly shares connected to the production of energy from renewable sources in plants working or empowered as from 1 April 1999, following law 239/04. In this case too there is a law which forced to produce fix quotas of green energy.

For what concerns the effect of the Kyoto Protocol and European Directives on the “Emission Trading”, Blue Certificates have been born. Substantially there is another law which fixes a threshold of emission. If the emission of a country is lower than this threshold, the country will have a Blue Certificate. If not it has to buy the equivalent Credit from others in a specific share exchange.

For instance, if a German industry is able to improve its efficiency it can have Blue Certificates and it can sell them.

To complete the framework, Yellow Certificates are being born. They refer to the no-food agriculture, seeded for energy purposes to produce bio-fuel.

FROM PROJECT MANAGEMENT TO SUSTAINABILITY MANAGEMENT

In all definitions of sustainability, from the Bruntland’s Report on (1987), there is reference to negotiation and balance between three different aspects that a transformation process is composed of: the economic, social and environmental ones.

To help project managers to be a star in this sustainability production process we need to illustrate obsolescence of the supremacy of homo economicus of Smith which has happened in many western countries. It is difficult to understand this prospect in fast growing countries (like India o China) that are emerging from poverty, but it is especially in China that this is discussed because of its development which is resulting in immense environmental disasters. In many Chinese cities the air is irrespirable to a point that people have to walk with a mask on their noses.

The conjunction of economy and environment is therefore a reality in all governments discussion in all countries of the world (Ortolano et al, 2000).

In eastern counties the question of social sustainability is delayed and is analyzed in USA and Europe. Arriving to extreme situations as in the case of World Commission on Dams which is evaluating the social consequences of the dams. This after many years of their construction. To illustrate the principles of social sustainability, we can quote the evolution of the concept of sustainability in European administration system, quoting the case of Environmental Evaluation.

With the European Directive 2001/42/CE the evaluation of Environmental Impact has become the Strategic Evaluation. This means that for every project several possible future scenarios and their comparison and the choice of a final project solution have to overpass parameters that are not parameters linked to physical measurable indexes must be taken into consideration for every project.

To apply this new directive we need to be able to manage a common process of consensus creation within local communities. The capability to foresee social transformation within local communities, the capability to negotiate with the territory.

The speakers of an environmental transformation become a great number and everyone has her or his own language values and believes. Problems of multiculturalism among different players of the process are born. For these reasons a manager has to be a good communicator and a good manager of task forces firstly.

At present many public projects are stopped in Italy by the manifestation of local communities (for instance the rail corridor 5 from Lisbon and Kiev). Many engineers were forced to learn about sociological problems, above all with the NIMBY syndrome - Not In My Back Yard - (Bettioli, 2005).

With this acronyms we describe phenomenon of collective protests that spark against the realization of big projects in the neighbourhood of one's own city or one's own country because of the fright of heavy damage to the environment or to personal health.

The only way to prevent this syndrome is to promote communication and the participation of the communities in the choice of projects. As a matter of facts NIMBY syndrome is often caused by suspicions and ignorance.

Therefore, we can face the NIMBY syndrome but the managers' attention should not focus on the project only but on the relationship it will establish with the local community (both during the construction and the managing of the final work) as well.

This is always more linked to the enterprising world the more the work is being financed by a PPP – a public private partnership.

A process of transformation outlined this way is a part of the management of a complex system and should be faced with a new mentality and the knowledge of new instruments able to support all professionals of the compound and the management of its dynamics.

THE ROLE OF KNOWLEDGE MANAGEMENT IN PROCESS MANAGEMENT

After von Neuman postulates on the homo economicus and after the theory of cost of transition, the organization is seen as a network of transitions between people and groups of people. Its goal is that of adopting a internal structure that allows the lowering of costs of exchange.

The same existence, the size and the capacity of the enterprise will be justified in relation to the minimizing of cost of transition.

The economy of transition costs represents a static and is overall based on the analysis of transition of tangible goods, avoiding the dynamic behaviour of searching for profits coming from internal resources and specific knowledge of the enterprise.

This way, the attention of the manager is concentrated on economic aspects this is the cost of the final product and on transition costs. He works in a socially homogeneous environment composed of people with economic aims. But the idea of enterprising has evolved.

Already in 1959 Penrose stated that, when the enterprise develops unique capabilities or resources, this is a consequence of its activity. His theory, the *resource-based view*, sees the enterprise as a collection of resources distributed heterogeneously among enterprises. This way we can understand the human resources of enterprises as the basis of its competitiveness and a main factor to base the income on.

From this point of view, the role of the strategic resource of the enterprise becomes clear even if indirectly, as its knowledge for its special characteristics. The approach to dynamic capabilities developed by Teece, Pisano and Shuen (1997) provides us with a theoretical framework able to integrate different contribution for analysis and action.

The approach to dynamic capabilities states that the competitive advantage depends on the continuous development of knowledge and on the re-configuration of resources and special capabilities of the enterprises. Overtaking the norm management of human resources we arrive at the role of a strategic manager.

But the basis of the new theory belongs to Grant (2002). He describes the new economic environment characterized by the important role of knowledge as a factor of production. The focus on intangible goods (services and brands, patents and reputation), the network, the virtualization and the acceleration of rhythm and the speed of innovation

From what we have stated it is clear that enterprises are not only focalized on products but on some dynamic processes that happen in a network of relationship. A project manager has become a network manager who, in the field of civil engineering of big jobs, becomes a sustainability manager.

This transformation is associated with a cultural transformation in new holistic process.

CONCLUSION

To conclude this essay on the evolution of the project manager we may have to touch the theories on the Creativity. Creativity is placed along a borderline which separates chaos and paralysis, in the complexity any manager has to face.

In this case, chaos is represented by energyvore buildings, cy the loss of competition of entire industrial compounds and high pollution. Paralysis is represented by an attitude of excessive fright of changes and a high level of perception of risks, reason why there is hesitancy about introducing some modifications of today's management systems.

Creativity is at the centre of new vision of enterprise culture which should refer to the process but to the product as well.

At the point we appear to go against the flow current theories (Csikszentmihalyi, 2003) on management engineering that see in organization of process a way of optimising the manufacturing production, increment the vale of its personnel and management of knowledge, at the same time.

However, increase of systems for the production of renewable energy or the construction of houses with big energy efficiency implies the realization of neo prototypes too, and therefore it deals with the management of a new process and of a new product at the same time.

For this reason the thought of sociologist Edgar Morin on the complexity results to be ever more interesting. His essay was commissioned by UNESCO and depicts how complexity may be dealt with by a conjunction of technical and humanistic cultures, as accompaniment of process or reorganization of management and processes of reconstruction of technological identity.

We must add that the cultural shocks associated with any kind of change is a natural factor (Griswold, 1997) also when the change is an actual concretisation of the present.

The definition of risk is limited to a subjective perception of a future possibility which always contains a margin of uncertainty.

Some big processes on environmental responsibility have had the paradoxal result of creating a system of the individual held responsible. The single person does not succeed at achieving his own decisional system but within a extremely small context. The space of subjectivity shrinks in favour of the space of collective impositions.

Ant it even more shrinks the capability of a long term vision. For this reason the evolution from project management to sustainability management is becoming a necessity. To recuperate this vision of aggregation that allows us to guide transition processes such as that of traditional homes to highly energy efficient houses placed in compound quarters of green energy.

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