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Change of values and a change in the research perspectives for the 21st Century[*]

The important advance which has taken place during the last decade, in the process of the creation of a society with progress without precedent throughout history, has led to a quasi generalised economic and financial crisis that has ended by stirring up the very foundations of our life in society.

These achievements that have been attained have been the result of a whole conglomerate of effort carried out by the most diverse classes, with the common denominator of **freedom in stability**. The development of research in the different spheres of knowledge, in our opinion, constitutes one of the fundamental axes around which the progress attained has revolved. This progress can be seen today as menaced by the ghost of the crisis, which is hitting, particularly all the under privileged, so hard. How has this situation been arrived at and what are the paths that economic research can propose to shorten the time and depth of the consequences of the crisis are the aspects that concern actors in economy the most.

Nevertheless, we feel that the problem with has caused so much concern to so many families cannot be reduced solely to the economic-financial sphere but it must also be considered as a consequence of another far deeper and extensive problem: this is a **crisis of values**. In fact, historical evolution has accumulated a considerable **residue** of knowledge supported on certain principals that were believed unchangeable. A consensus established certain lines of conduct that nobody questioned: the limits to personal freedom did not collide with the freedom of others. What was instilled into people were values

[*] The paper is printed as submitted.

such as honesty and decency, work, sacrifice, effort … The scale of values, constituted the guideline for every good citizen. The explosion of the economic-financial crisis has brought to light the fragility of our social systems, in such a way that we are becoming aware of the disappearance of these values and, what is far more serious is the lack of any that substitute them. The result is **disorientation** in all walks of life in society: politics, economy, teaching, research, morals…this can even be found in our very model of coexistence.

The reality is that we now find ourselves with the fact that the ghost of the crisis is to be found in every corner of our planet, presenting itself disguised in the most varied clothes. But also from ghostly apparitions the light of an opportunity can arise, the opportunity of change that must be a **systemic change**. In fact, we have been living in a system with an American base, which in the immediate past represented an opportunity for progress in freedom and prosperity without precedent. This cloud of prosperity has given rise to the appearance of that phenomena, which precede the sinking of every structure with human roots, be this a country, a financial system, a business or a family: that is superficiality. Superficiality of the financial system has on this occasion resulted as dangerous as a field sited on quicksand. This has ended up by devouring all that functioned on it in an artificial manner. Thus what has occurred, in a slow but inexorable manner, is a rupture between the theoretical of society model and the real society. As a consequence of this the inevitable result has been the loss of confidence of citizens of all countries. To regain this confidence will require an important teaching effort and effort in dialogue. But this alone will not be sufficient. And this is so since what is in play is the design of a new **cultural model**. This cultural model must include from new values that are capable of substituting those that are outdated and today non-existent, right up to security and control of any possible excesses in the **exercise** of freedom. From here the importance of the setting up of a framework within which freedoms move. The drawing up of this **cultural model** must, also, respond effectively not only to the economic and financial consequences of globalisation but also take into account the process of shifting towards a society that is all the time becoming more complex and full of uncertainties[1].

[1] These comments were extracted from the paper by the autor given at the Solemn Academic Act of the Real Academia de Ciencias Econímicas y Financiaras of Spain, at Bilbao on the 5th of February 2009.

All of us, who are immersed in research tasks in the field of social sciences, cannot be oblivious of the study of the problems that arise in society. It is our duty to contribute at each interval in time, those solutions that are susceptible of resolving or mitigating the maladjustments that prevent the development of the capacities of all citizens within the framework of justice and freedom.

Why than is this disruption repeatedly manifest between theory and reality? Perhaps we can find the answer in the routine of economic research by copying the searching with which **physicists** observed the universe. They hope that with this they would find those signals by means of which social facts and phenomena could be represented. In this way, little by little, social sciences became impregnated with **the mechanism** that is typical of physics, the brilliant trajectory of which warranted the highest admiration, from the moment that Tales de Mileto (624 BC to 546 BC) raised his eyes to heaven and conceived the fundamental questions on the functioning of the cosmos.

The lees of the **mechanist** culture, deposited over so many centuries in the formation of the scientific edifice, could not pass unseen in the construction of social sciences. The social phenomena were studied by considering the systems as „**large Meccanos**", thinking, like the physicists, the **differential** equations could show the **supposedly regular** behaviour of the agents acting within them. If the universe followed known laws, why then should social systems not do so? Physical models which function like a clock, therefore acceptance of social systems that function like a clock. **Mechanist** physical models, then acceptance of social **mechanist systems**.

Social sciences, then, is supported, from the outset, on the **mechanics of movement**, which describes processes of a **reversible** nature, where the **direction of time** plays no part whatsoever and in which there is no place for uncertainty.

It is true to say that **atemporality** constitutes a solid base on which to found the concept of **stability of equilibrium**, a fundamental element of economic science. But this does not exclude the initial difficulty of combining the realities of our convulsed society with „orthodox doctrine". An attempt to attain this came hand in hand with **Ilya Prigogine** (1917-2003) when he differentiated the **structures of equilibrium** and **dissipative structures**[2]. A structure

[2] Prigogine, I.: La fin des certitudes. Versión in Spanish Publ. Taurus, Buenos Aires 1997. pages 11-12.

of equilibrium does not require exterior flow for maintaining it, therefore it is prohibited from all activity generating **entropy**. A structure dissipative requires exterior flow given that without any external contributions which maintain dissipation it will disappear and the system attains a state of equilibrium. Therefore, only **when instability does not exist are mechanist laws totally complied with**.

It is curious to see how this original contribution of **Prigogine** draws us closer to the marvellous adventure, which commenced 150 years ago with the publication in 1859 of the **fundamental** work „**The Origin of species**". In fact **Darwin** combines two elements **fluctuation and irreversibility**, when he sustains that the **fluctuations** in biological species, thanks to the selection of the medium give rise to **irreversible** biological evolution. Of the association between **fluctuations** (which is similar to the idea of chance, we would say uncertainty) and **irreversibility** what takes place is an **auto-organisation** of systems with growing complexity.

In the social field **evolution** in social, institutions, broadly speaking, can be conceived as a **pseudo-genetic renovation**, which takes place in bodies of the **States and other public institutions** as well as in **businesses**. This pseudo-genetic renovation gives rise to successive **generations of social systems** and makes each one of them structurally unrepeatable. This then is a temporarily **irreversible process**, which **breaks the mechanist schemes** of classical and neoclassical studies that are overloaded with atemporality.

The use of **temporal reversibility** and **mechanics** in economy has given us as a result a **determinism** in which the notions of liberalism and freedom are works that have been divested of all meaning, when we have attempted to seek answers to the essential questions for social reasoning.

Paul Valéry states that „*the sense of the word determinism possesses the same degree of vagueness as that of freedom*"[3]. We should in this respect remember the reflection of Karl Popper[4] when he points out, on the one hand, „*every event is caused by an event, in such a way that all events could be foreseen or explained…*" But also, on the other hand he adds that „*common sense at-*

[3] Valery, P.: Cahiers, I. Bibliotheque de la Pléiade. Publ. Gallimand. Paris 1973. Pages 531-651.

[4] Popper, K.: L'univers irrésolu. Plaidoyer pour l'indéterminisme. Publ. Hermann Paris 1984 page XV.

tributes to healthy and adult people the capacity to choose freely between several paths…". This type of interior contradiction constitutes a major problem that William James[5] called the „dilemma of determinism" which on transferring it to economy we become aware that what is neither more nor less in play is **our relation with society**. In fact, has society been written or is it in permanent construction?

If for a large quantity of physicists, among whom is **Einstein**, the problem of **determinism** and also of **time** has been resolved, for philosophers it continues to be a question mark. Thus **Henri Bergson**[6] states that „time postpones or, better said, is a postponement". Therefore it must be elaboration. Will it not be then the vehicle for creation and election? Does the existence of time not prove then that there is indetermination in things? In this way, for **Bergson realism** and **indeterminism** walk hand in hand. Also **Karl Popper** considers that „the determinism of Laplace – confirmed as it appears to be by the determinism of physical theories and his brilliant success – is the most solid and serious obstacle in the way of an explanation and an apology of human freedom, creativity and responsibility"[7].

The fact that the **determinist** idea is present in western thought from pre-Socratic times is causing deeply felt tension when attempting to give an impulse to **objective knowledge** and, simultaneously, promote the **humanist ideal** of **freedom**. Science would fall into a contradiction if it were to opt for a **determinist** concept when we find ourselves involved in the task of developing a **free** society. One cannot identify **science** and **certitude** on the one hand, with **ignorance** and **possibility** on the other.

The new paths for knowledge of complex realities

This confirms to us that research activity is at a crossroads in which what is in play is the future of science. On the one hand what we will have is the **geometric conception** of knowledge, and on the other the **Darwinian conception**. On the one side, the sublime and well-known reiterative songs, which are re-

5 James, W.: „The Dilema of Determinism" in the Will to Believe. Publ. Dover. New York, 1956.

6 Bergson, H.: „Le Posible et le réel" in: Oeuvres. Presse Universitaires de France. Paris 1970, page 1333.

7 Popper, K.: „L'univers irrésolu. Plaidoyer pour l'indéterminisme. Publ. Hermann. Paris 1984, page 2.

newed in their forms. The dream of reducing the functioning of the world to the predictability of a Meccano. On the other hand, the emptiness of the unknown. The attraction of adventure. The invitation to jump forward only guided by the hope of opening up new horizons. The response to the calling of **Ludwig Boltzmann, Bertrand Russel, Lukasiewicz, Zadeh, Lorenz, Prigogine and Kaufmann**. The rejection of the yoke of pre-destination and the proclamation of the **freedom of decision.**

On our wanderings through the spheres of economic research we have dedicated an academic life to fighting **determinism** and **pre-destination**, aiding in the construction of theoretical and technical elements that are carriers of **freedom**. We have had the great fortune to receive the teachings of some of the great creators of innovating ideas. We recall in our youth the teachings of François Perroux, clamouring against the transfer to the social sphere of mechanist models. Later, in the mid 60's, it was Lotfi Zadeh who with the concept of fuzzy sets opened up the doors so that Arnold Kaufmann could develop and initially expand not only certain innovating techniques but a new way of channelling thought, which is **versatile, modular and qualifying**. Essential for transgressing the essences of economic determinism were the lessons received from Ilya Prigogine who in 1977 was awarded the Nobel Prize for Chemistry for his contributions to thermodynamic imbalance, particularly with the theory of irreversible processes.

On the occasion of the International SIGEF Congress in Buenos Aires[8], we attempted to set up the Epicurean position in the new coordinates arising from the findings of **Zadeh[9],** by enunciating the „principle of gradual simultaneity" (all propositions can be at one and the same time true and false, on the condition of assigning them a degree of truth and a degree of falseness). Before and afterwards, a good number of scientists have placed, stone on stone, the foundations of what can be a new building of knowledge. But still required is a large dose of imagination in order to break the links that tie us with the past, placing in their place „non linear" differential equations, that carry a large descriptive arsenal of **uncertain** situations.

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[8] Gil Aluja, J.: Lances y desventuras del nuevo paradigma de la teoría de la decisión. Proceedings of the III Congres of the International Society of Management and Fuzzy Economics. Buenos Aires, November 10-13 1996 (not numbered).

[9] Zadeh, L.: Fuzzy Sets. Information and Control. June 8, 1965, Pages 338-353.

Three fundamental axes make up the search for a new way of thought in economic science: **uncertainty** faced by **certainty**, **irregularities** faced by the **laws of nature**, and **complexity** before **linearity**.

Uncertainty, irregularity and complexity would appear then to be the principal challenges that the changeable realities of our day are placing before social and economic research. It is necessary to delve into the depth of each one of the levels of knowledge in order to attempt to find, in each one of them the keys that allow us to open the doors to an efficient treatment of **uncertainty**.

I would like to feel that my last words sounded like a song of hope. For this, we will resort to the words of Einstein when he says that „creativity is born from anguish just as the day is born from the night. It is in crisis when inventiveness, discoveries and great strategies are born. He who overcomes the crisis surpasses himself without being surpassed. He who attributes to the crisis his failures and penury, violates his own talent and has more respect for the problems than for their solutions". Science must play an important role in the rules that in the future govern international relations. We are very confident in future contributions made within the heart of the new fields that have opened in research activities. These contributions must be the ones to expand the light of science, and at the same time strengthen solidarity and well being of all citizens. Only this way will lead us to the desired **sustainable social progress**.

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