EDUCATE TO INNOVATE: INNOVATION AS CULTURE. YOUTH, PROACTIVITY, CREATIVITY, PARTICIPATION AND SHARED VISION ABOUT THE FUTURE

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ABSTRACT

Spain has a serious cultural deficit which affects our innovative capacity and, therefore, our productive capacity and the competitiveness of our human capital and our enterprises and institutions; and ultimately, our possibilities as a country too. The future of Spanish young people –in the present-day context– must necessarily include a deep structural reform based on the design of an educational system. And this educational system needs to be integrated into a national innovation system which can serve as a framework for decision-making in the short, medium, and long term.

This educational system must become the epicentre for the country's recovery and has to be completely focused on maximising the competitive potential of young people, generating an innovation culture –non-existent to date– which has its roots in the earliest ages and a complete development in higher education. An innovation culture which can instil a new system of values into youngsters underpinned by a work ethics based on effort, co-responsibility, proactivity, collaboration, creativity, empathetic capacity and active participation.

If it really seeks to generate a true innovation culture among young people, Spanish higher education should meet –at least– five conditions which are in turn interconnected: pragmatism (i.e. the curriculum design must be focused on the practical resolution of problems and not on an ideology); contextualisation (it needs to be based on the needs of the socio-economic environment and connected to it actively, and not only symbolically); sustainability (it has to be designed so that it can survive transitory political changes); an overall vision (it must pay attention and remain connected and integrated into international experiences and excellence centres) and a strategic vision (it needs to have clear and specific long-term aims, anchored in a shared vision about the future –on which the community has reached a consensus).

Some experiences can serve as a reference (the Finnish case is mentioned here): building an innovation culture may take one generation (15 years until the effects start to be seen) and must inevitably include achieving not only an integration between the educational system and the innovation system but also a strong support for that integration from civil society. However, that requires the development of mechanisms and participation spaces which make possible a better use of our human capital and the improvement of several skills both individually and on an organisational level, among which could be the 10 skills proposed in the present paper.

KEY WORDS
Innovation culture, Proactivity, Entrepreneurship, Youth, Creativity, Participatory Foresight, Open Innovation Ecosystems

1. SOCIAL ECOSYSTEM AND INNOVATION

To start with, it is worth highlighting that when people speak about 'Ecosystem', they very often fall into the simplification that represents assimilating this concept with that of 'environment.' The idea of Ecosystem as such must be approached from social sciences and goes beyond the concept coined from the field of ecology, which defines it as the natural system formed by all the living organisms and the physical milieu where they interact with one another. Thus, according to the Theory of the Social Ecosystem, an ecosystem would be made up of four elements, namely: environment; population; social organization; and technology (Hawley, 1991; Díez Nicolás, 2004). These four elements are not understood as a set of isolated elements but as components of a system which interact constantly, as a result of which the changes experienced in each one of them may end up affecting the whole group.

Therefore, it can be said taking as a reference the concept of Social Ecosystem that, unlike the rest of living creatures, human beings base their collective survival on the adaptation to the milieu through the generation and transmission of culture –a distinction can be drawn here between elements from non-material culture (systems of values, beliefs, etc.) and elements from material culture (technology, knowledge…) (Díez Nicolás, 2004). All living beings have the survival instinct by nature, but only human beings seem to be able to adapt the environment to our needs through the alteration of the resources available, the invention of new social organisation forms, the transmission of renewed systems of values, and so on and so forth.

Likewise, human beings also have as one of their peculiar characteristics the need to think about the future (Bas, 1999). Although other species show a certain interest in the future too, only man owns the capacity to assimilate and plan a wide range of future events (Makridakis, 1993). Such a necessity inherent to the human being may have a strong cultural root (Herbig & Dunphy, 1998) and its greater or lesser rootedness will largely depend on the system of values adopted by a group (Weber, 1998). It thus becomes absolutely necessary to analyse how the cultural factor (both material and non-material) influences the development of a shared vision about the future.

However, the shared vision about the future as we understand it –collectively generated, consensus-based and implemented– has never played the prominent role that the current context requires, that civil society demands, and that (public and private) organisations seem to need badly in order to survive within an ever-changing reality characterised by: interconnection; the collective generation of knowledge and information; and hyper-communication. It is a reality that demands from every Social Ecosystem (and every community): an optimised utilisation of the human capital that they own; an updated knowledge of the environment (and the opportunities and contingent dangers which may be generated in it); and an accurate understanding of their own weaknesses and potentials that make possible a consistent decision-making based on strategic vision. A reality which requires a change within organisations (from more hierarchical/vertical and élite-controlled to more participatory/horizontal and integrating) so that they can continuously reinvent themselves –by means of innovation– and thus have real options to survive.

It is no easy task to find a single social system in the history of mankind where a specific collective or social group has not been –explicitly or implicitly– subjugated by another. The use of information and knowledge (through religion, ideology, economy or technology) has repeatedly acted as a weapon to implement a situation

characterised by the domination of some over others. And that continues to be the case: one only has to read the national and international press.

The aforementioned use of information concerns both the past (it has always been said that history is written by the victors) and the present (the control exerted by the media and its materialisation in social control through the influence on public opinion) and, of course, the future: the management of individual and collective expectations –whether it is by means of advertising or through the election manifesto, among many other options– is an infallible weapon to lead a community's fate.

With the exception of certain historical episodes and very few specific experiments (perhaps the assembly-like and communal movements supported by the libertarians and their sequels –the hippy movement, May '68, etc.) there are few moments in History when knowledge, creativity and innovation (which is not the exclusive property of technology –as some want to make us believe– but covers every aspect of social life: rethinking the operation of a National Parliament, or of Universities, generating a new action model which is innovation too) have been postulated or claimed as contexts open to the participation of any community member.

The maxim "Innovation for the people, but without the people" –which paraphrases the one coined by the Enlightened Despotism– seems to have prevailed in design and strategic planning (in all fields: from politics to economics, and including security as well) to the present day. It is a maxim which apparently became useless after the advent of a new social reality characterised by a change towards more open and participatory paradigms, which has ultimately assigned a central role to the individual (user, beneficiary, citizen…) as the main character of every Social Ecosystem. Hence the stream of thought linked to Human Centred Design and the other approaches which reclaim a prominence for the individual that the latter has lacked for centuries.

A context like the present-day one, a liquid world characterised by globalisation, interconnectivity and flexibility, is leading to the establishment of a new approach to Innovation that is more horizontal and open; more open and strategic; more integrating and participatory. Therefore, it becomes practically unfeasible to make proposals with possibilities of success in any sphere of social life or any organisation without the active involvement (endorsement or submissiveness do not suffice any more) as well as the sustained involvement (participation at specific moments is no longer enough) of individuals (citizens, consumers, employees…).

It consequently seems that having a vision about the future (imposed/suggested/anticipated by preachers, political leaders, visionaries, executives, technologists or experts) does not suffice for a Social Ecosystem (regardless of whether we are referring to an enterprise or a State) –for the community by which it is formed– to survive in the future; instead, that vision about the future needs to be shared. In other words, it must be generated by the actual community (according to its needs and expectations), approved on the basis of consensus by the individuals belonging to it (as a 'lowest common denominator' in its heterogeneity) and implemented in a coordinated manner by the institutions around which it is structured.

Therefore, the only way for any innovation (the implementation of a creative idea which can help to reach higher levels of economic development and/or social welfare) to result in greater welfare and socio-economic development –nowadays– is to be generated from individual contribution and widespread consensus in a

community, within the framework of the Social Ecosystem where that community lives.

2. FINLAND AS A PARADIGM

The systems of values –as part of the non-material culture which is transmitted within a society– are of paramount importance when it comes to adapting to the Ecosystem and, therefore, the transmission and strengthening of that system must become a priority on an educational level. One cannot fail to mention the Finnish example at this point, insofar as it can be regarded as the paradigm of a developed society which has reached high welfare levels on the basis of a productive model underpinned by knowledge management and wealth redistribution.

Finland is a country which has been assuming a firm and decisive commitment to an economic and social development supported on an exemplary educational system and a correct utilisation of the (material, human…) resources available ever since the late twentieth century. It is a commitment based on a shared vision about the future (originally generated from below, from civil society), designed from: self-knowledge (weaknesses and strengths); the proper understanding of the context, participatory foresight (a consensus-based strategic planning: the Parliament's *Committee for the Future* –where all the political parties in parliament have a representation– is the living proof of this way to understand the construction of the future); and pragmatism when the time comes to make decisions.

The aforesaid commitment has lifted Finland to the first positions in the PISA report rankings, thanks to which it has been the world's leader in educational matters for over a decade and has become a model to follow for many countries around the world. Another of the key factors in the development of the knowledge economy in Finland was its bet on Innovation, something that is clearly revealed by the fact that it belongs to the group of countries that make a greater investment in R&D (3.7% of the GDP in 2008). And this orientation towards innovation processes is not only reflected in macro-economic indicators at a national level; there are cases of recognised prestige in the business field (such as, for instance, NOKIA, the world's second-best enterprise in terms of R&D investment and one of the organisations which have shown more interest in innovation –and not only the technological one– during the last ten years). These examples allow us to infer that the bet on innovation is being made both from the public and from the private sector.

Nevertheless, although the previous data become essential to understand 'the Finnish miracle,' the fact that we are in front of a society –the Finnish one– which shows a clear 'orientation towards the future' becomes equally or even more important (Heinonen and Wilenius, 2008). That 'orientation towards the future' materialises in the existence of a social organisation specific to this country, which could be referred to as the 'Finnish Foresight System' –directly connected to the successful and internationally acknowledged Finnish National Innovation System– where different social actors have a role to play, namely: civil society (represented by the FSFS-*Finnish Society for Futures Studies*); the scientific research framework (represented by the FFRC-*Finland Futures Research Centre*); the political sphere (represented by the aforementioned CF-*Committee for the Future* of Finland's Parliament); and the academic context (represented by the FFA-*Finland Futures Academy*). The integration of all these actors around a well-articulated system guarantees that the long-term strategies will be developed on the basis of a vision about the future which is shared by the Finnish population as a whole. And this shared vision about the future in turn ensures the achievement of social welfare

levels which are not only consistent with the entire society's vision but also sustainable in the medium and long term.

The case of the *Aalto University* probably symbolises –better than any other initiative– that particular way to understand the innovation culture anchored on a vision about the future that they have developed in Finland. Created in 2010 through the formal integration of three very different pre-existing universities (technology, economics and arts), it constitutes a creative and proactive response to a financial problem: a 2004 study carried out by the Ministry of Finance had informed about the need for structural reforms in order to optimise an oversized Higher Education system. By transforming a problem into an opportunity, a proposal is put forward –from the actual university context– to create a new centre of an interdisciplinary nature that could go well beyond the mere formal integration (the organic umbrella) and make an attempt to create a synergic space, an ecosystem focused on the encouragement of innovative thinking and its application to the practical resolution of problems found in the socio-economic environment.

Private financing for the project (donations, projects, etc.) is promoted from the public sphere –with the State providing two additional euros for each euro obtained from the private sector– with a view to ensure the integration of *Aalto University* into its immediate context as well as the reinforcement of its connections with the productive fabric. Furthermore, the design of an Innovation Ecosystem (Design Factory, Start-up Sauna) with an international, flexible, creative and participatory approach which boosts an open, multidisciplinary innovation oriented to the resolution of specific problems posed by enterprises and organisations. An Ecosystem where students (who are supposed to find solutions to the problems identified by enterprises and organisations in their projects) assume a starring role; it equally guarantees the integration of the training process into the research work, as well as a total orientation towards the transfer of knowledge to enterprises and organisations. The outcome?: graduates with an excellence level that increases their competitive capacity within the global labour market; an entrepreneurship level (regarding both the quantity and quality of initiatives) which –after only three years– has made Aalto become a worldwide referent and called the attention of Silicon Valley (18 million euros were invested by Microsoft –in an agreement with Nokia– in the AppCampus during 2012); and, finally, a constant revitalisation and reinvention of the productive fabric, which is completely integrated into the activities and orientation of the university itself.

It can be said at this stage that the levels of development shown by this country at present are the result of a national strategy agreed by consensus and adopted a few decades ago (more precisely, in the early 1990s) with the aim of boosting the economy of a country which used to have economic and social development levels typical of underdeveloped countries during the 1950s. What is more, trying to relate the different elements which form a Social Ecosystem, such a strategy can be said to stem from the willingness of a society (the Finnish population) that, trying to reach an agreed future ideal (social organisation), implements a series of initiatives oriented to make use of the technical, material and human resources (technology) required to be able to reach a high degree of social welfare in a country where –until the 1950s– the crudeness of winters (the physical environment) could ultimately compromise the actual survival of the population (Castells & Himanen, 2002).

Therefore, the Finnish case –if compared to the reality of other countries which have similar figures regarding resources, technological development, etc.– provides a clear example of the fact that the availability of cumulative knowledge or technology does not guarantee that the adaptation to the ecosystem and the changes occurred inside it will take place in suitable conditions. They do not form

part of a direct causal relationship: having the ingredients available, if we are allowed the metaphor, does not ensure the preparation of a dish; the first thing is a necessary condition, but not sufficient, for the second. Therefore, the adaptation process will not be effective unless attention is paid not only to the elements belonging to the material culture (technological development) but also to those included in the non-material culture (shared prospective vision and proactive attitude). Only in that way will it be possible to guarantee success when facing the challenge of designing innovations (products, services, processes) that can prove useful to society; or, differently expressed, that make it possible to manage the changes experienced within an ecosystem by anticipating those changes –which will result in lower opportunity costs for that society.

3. THE ('DOWN') CASE OF SPAIN

The absence of an innovation culture in Spain is not new at all… it is something that has been repeatedly denounced by the scientific and intellectual community throughout recent history, either implicitly (in the idea of an invertebrate society developed by Ortega y Gasset) or explicitly (–and ironically– by Valle Inclán with his "let them invent!"). It is an endemic evil with a structural nature and a cultural root which has always determined our future as a country and which has recently proved to be a heavy burden that prevents us from reaching the desired welfare and development levels.

The study "*La cultura de la innovación de los jóvenes españoles en el marco europeo* [The innovation culture of Spanish young people within the European framework]" (Perez-Diaz & Rodriguez, 2010) bore witness to it, showing that Spaniards –by their cardinal virtues (sic)– are situated in the lower third within a distribution of countries that includes the ensemble of Nordic, Central-European, Anglo-Saxon and Euro-Mediterranean Europe. This study has proved that the cultural inferiority of Spaniards is similar to that of other Mediterranean peoples (also known by the awful acronym PIGS) such as the Portuguese, the Italians and the Greeks. These are all countries which share a simple productive structure, less innovation, difficulties to solve common problems, late literacy, political clientelism, widespread corruption and a weak civil society… all of which has placed them in a delicate situation before the crisis.

I would even venture to add other lacks to those mentioned above, at least in a first impression; among them, the non-existence of an industrial revolution (with the dimension and development of other Northern European countries); the lack of a solid business culture with an international orientation (with very few exceptions); the absence of a labour ethics (here hedonism and paternalism defeat asceticism and the capacity to undertake and assume risks) that could prove suitable to survive within a worldwide capitalist system; the lack of an advanced democratic political culture (we continue to think in terms of left/right, and not in terms of management, in Spain), and a complete and total disregard –both socially and institutionally–- for knowledge and education as essential values to articulate social and economic life. That is why the educational systems of these countries can be described, for lack of a better adjective, as loss-making and ineffective.

The whole of Finland's national innovation system (and, consequently, its innovative power to generate wealth and welfare) revolves around an educational system which, apart from being excellent, is perfectly intertwined with both the productive fabric and the political system (which includes civil society, as mentioned above). Drawing a straightforward and concise parallelism, one could go as far as to say that, in the case of Spain, the educational system is just the opposite; so much so that it has become a real Achilles' heel which largely hinders

our present reaction capacity within the knowledge society and compromises the country's future –'castrating' it at its root.

And what are the flaws in the Spanish educational system? At least the following ones should be mentioned: the absence of a politically agreed strategic vision which should stem from a shared vision about the future (plans change depending on which party is ruling the country and, if some measure is implemented following an imposition of the European Commission, this is done without resources, lacking expert knowledge and on a partial basis, in the best of cases); total lack of coordination between the different educational system levels which results in academic failure and difficulties to make the most of our potential human capital (which exists, indeed!) giving a clear direction to the training process; a complete disconnection –perhaps not formal (there are *OTRIs* [Spanish initials for Research Results Transfer Office(s)]) but definitely *de facto*– between the training level (teaching) and that of innovation (research) and application (transfer) which – added to a painful lack of communication and synergy with the productive fabric– materialises in a serious inability to meet the needs of the socio-economic environment; absence of flexibility in the areas of programme design and human capital management, which reveals a total lack of international perspective and results in a considerable loss of competitiveness –not in all of them, but actually in many areas– for graduates trying to access a globalised labour market.

In short… Spain has suffered from the lack of a general strategic vision, which results from one of our worst blights as a country: the absence of a vision about the future, of a proactive culture, and of innovation. With few exceptions (the Basque Country and Catalonia, perhaps because of their industrial, commercial and international tradition, have actually developed prospective thinking to a greater extent and have implemented initiatives aimed at improving the competitive capacity of individuals and organisations in a global market), Spain is a 'moor' regarding these issues. The prevalence of a reactive culture which lacks any anticipation and is absolutely installed in the *modus vivendi* of citizens, enterprises and institutions has ultimately become a structural problem.

And that is due to the lack of a vision about the future… and of an international perspective: most of our political leaders –who are actually the decision-makers– have very little or no vital and professional experience outside Spain and lack the references –to start with, foreign languages are a recurrent problem– needed to place themselves, to contextualise and adopt informed decisions within a global environment. Furthermore, these two factors –vision about the future and international perspective– are inextricably linked: it becomes essential to travel and explore other forms of management, work, taxation, organisation and learning in order to assess benchmarking activities, for instance (basically, getting to know success cases in order to learn from them –not copy them–); and also to be able to realise the extent to which there is a need –for survival purposes– to develop an innovation culture (and, consequently, a shared vision about the future) in the country. Other countries - Other cultures.

An aspect which clearly shows the absence of an innovation culture derived from combining the lack of a strategic vision and the lack of an international perspective is the design and implementation of spaces and systems meant to promote Innovation within the scope of action and/or the sphere of influence of public (i.e. state-run) universities; whereas foreign Innovation Ecosystems work successfully, Spanish Scientific/Technological Parks are highly unproductive and uncompetitive.

Most of the Scientific/Technological Parks created from public universities are conceived as Incubators; in other words, they host exogenous projects (generated away from the Park) and are compartmentalised spaces with a common coverage

(which share expenses, resources and infrastructures, but not information or work).They are places where Innovation Management is carried out in the best of cases, but where Innovation Culture is not cultivated. Places which are not too different from a Hotel, or a block of apartments where tenants –who live, each one of them in their cubicles, and have hardly any relationship with one another beyond mere convention– share the use of the lift (or the spin-dryer) and the common expenses derived from the shared utilisation of infrastructures.

Instead, Ecosystems linked to universities, as is the case of *Silicon Valley (Stanford University)*, Mondragón (University of Mondragón/University of Deusto/Innobasque) or *Aalto Campus (Aalto University)*, are designed as shared-interest communities: open, sustainable communities focused on individuals and their creative capacity and devoted to the analysis of problems posed by the environment (in the market and/or in public administration). Integrated and well-articulated communities where universities, enterprises and students go hand in hand, and where the latter really act as the main characters of the innovations generated within that Ecosystem (which develop its activity providing support for endogenously generated ideas). As mentioned above, these are shared-interest communities which, far from simply occupying a common compartmentalised space and working isolated from one another, work in the same direction, openly sharing information, spaces, resources and even leisure activities.

At least five conditions –which are in turn interconnected– should be met in order to promote a true innovation culture among young people: pragmatism (i.e. the curriculum design must be focused on the practical resolution of problems and not on an ideology); contextualisation (it needs to be based on the needs of the socio-economic environment and connected to it actively and not only symbolically); sustainability (it has to be designed so that it can survive transitory political changes); an overall vision (it must pay attention and remain connected and integrated into international experiences and excellence centres) and a strategic vision (it needs to have long-term clear and specific aims, anchored in a shared vision about the future –on which the community has reached a consensus).

4. PARTICIPATORY FORESIGHT: THE BASIS FOR AN INNOVATION CULTURE

According to the IFA-*International Foresight Academy* (IFA, 2012), Foresight is one of the participatory formats which contribute to shape the agenda setting as well as the political priorities in different countries, being an essential functional element for the formulation of strategies in modern democracies. Hence the explicit support that it received from the European Commission's 7th R&D&I Framework Programme, as well as a transversal development within the different sub-programmes.

As pointed out by the IFA, the role played by Foresight as a tool for the establishment of political priorities and democratic participation has gradually changed during the last few years, as different changes took place in the democratic systems of numerous countries. In a number of regions, Foresight has emerged as a process which favours participatory democracy, networking and interactive approaches through reflection, consultation and joint open debate. Such approaches have permitted a thorough development of common visions about the future and strategies in the communities where they have been implemented.

A review of the different Forecast Types (see Table 1) easily allows us to conclude that the various social systems which have appeared throughout the history of mankind have been entrusting their future –successively, in the arrow of time– to prophets, ideologists, economists and experts of different kinds. Only since the

advent of democratic capitalism –and after the emergence of Marketing and opinion/vote-intention surveys– have citizens been taken into account when it comes to identifying alternative futures, but only and exclusively on a consultative basis and working with closed choice models.

SUPERNATURAL	HERMENEUTIC	TECHNICAL	EMANCIPATORY	PARTICIPATORY
Primitive Societies Old Regime RELIGION Culture Emotional (RH)	Secular Society Nation-State IDEOLOGY Politics Emotional (RH)	Industrial Society Mass-Capitalism PRODUCT Economy Rational (LH)	Post-ind Society Glocalisation KNOWLEDGE Technology Rational (LH)	Liquid Society Technomics+Networks PEOPLE Social System Emotional+Rational
GOD'S ORDERS	UTOPIAS	TRENDS FORECASTING ADAPTATION	DELPHI METHOD FORESIGHT ANTICIPATION	WI-WE CREATIVE FUTURES INNOVATION

Table 1. Forecast Types (Bas, 2012)

This formula (closed choice models + merely consultative participation) seems to have become exhausted insofar as there is a growing demand among citizens –both in the economic field (where they are consumers or users) and in politics (where they are voters)– to have an active involvement in the elaboration of game rules, as well as in the direct control over public management. Corruption as a widespread phenomenon in both contexts (of which corruption could be said to act as an intersection), along with the lack of transparency in management (also in the use of information –Wikileaks, etc.) have sparked off this phenomenon, and not only in western democracies. And, if that was the flame, the extensive development of social network on a global scale together with hyper-communication and the free access to information favoured by ICTs were definitely the wick.

It is currently very difficult to apply forms of Prediction both in public management and in business without considering the horizontality and immediacy (in terms of public opinion generation) introduced by ICTs and, especially, by social networks. The blind belief in a religion, an ideology, or even in the opinion of technicians and experts (with a supposedly greater access to information and knowledge) is no longer the way in which citizens articulate their expectations. Plurality is increasingly demanded in sources as well as in contrast and public participation. In that sense, Civil Society is starting to claim a starring role in the management of collective life.

All the above is favouring the appearance of new ways to 'study the future' –to predict– which integrate that demand. The traditional quantitative predictive models (perhaps appropriate for historical moments characterised by stability, but –surely– inappropriate for periods of instability and structural change) and the techniques on which they are based (time series and surveys, among others) have

long proved insufficient to face this new context. Also the models based on experts' opinions (simulation, Delphi method, etc…) have turned out to be insufficient to meet the compelling need for empathy required by public institutions and enterprises in order to satisfy the demands of citizens and maintain the stability of the system.

The irruption of a generation (Generation Z: the 'digital natives') of youngsters whose main common denominator is that they were socialised in a digital environment which radically altered the social behaviour patterns (relational, commercial, or related to information access) has become essential –despite the obvious ageing of the population in western democracies (that is, the pre-eminence in quantitative terms of individuals socialised in environments which could be described as 'analogical')– for that change to be required when it comes to managing (collect, analyse or mould) expectations. Tools devised to examine social reality which were generated in a particular socio-historical context cannot be used to try and understand another context where those tools have obviously become obsolete –or, at least, insufficient. It is necessary to invent new tools which can meet the demands described here.

The aforesaid tools need to integrate these demands in good time and in an appropriate manner. And that implies the design and implementation of collective participation processes which must pervade every social institution: from the church to enterprises, and including public administration or political parties as well. Our work at FUTURLAB since the last decade has involved R&D&I projects designed along these lines together with international partners such as Manchester University's MiOIR (which headed the European Commission Project *IKnow*), the B.A.T.'s Foundation of the Future in Hamburg (which led the Project *United Dreams of Europe*), Aalto University (our partners in the Project *Flux-3D*) and the IFA-International Foresight Academy, among others.

5. BY WAY OF CONCLUSION: HOW CAN AN INNOVATION CULTURE BE GENERATED? TEN PROPOSALS

These ten proposals have to do with a way to understand the culture of organisations that we advocate (or share, because it is not an invention of ours); with a system of values and with the manner in which work, life within a community, and the future are approached.

A comparison between these proposals and the current panorama in Spain reveals that our functioning on a country level is exactly the opposite: we Spaniards do not think of innovation as a value (because we have been unable to understand innovation or structurally integrate it –for us, it is nothing but fashion); complex thinking is not encouraged (on the contrary, Spanish people tend to simplification and hyper-specialisation instead of promoting interdisciplinarity); there is no contrast of our visions (among other reasons, because no other visions –mainly international ones– are known to us); future is not seen as a 'buildable' space (our actions are guided by other people's predictions and guidelines); uncertainty is not assumed by us (as good Catholics, we prefer to have faith in improbable truths); we do not have a proactive attitude (our preference goes for waiting "to see what happens"); creativity is punished by us (precisely in relation to the slogan "let them invent" mentioned earlier in this article); we prefer determinism (it is easier –or more convenient– for us and no initiatives whatsoever need to be undertaken); we fail to establish efficient connections across spheres (it is difficult for us to understand that universities cannot live without enterprises and vice versa) and, therefore, we are unable to create spaces for interaction, participation and shared creation. No wonder things go so wrong for us.

5.1. THINKING ABOUT INNOVATION AS A VALUE

A key difference exists between 'Innovation Management' and 'Innovation Culture,' even though both approaches share and assume the evidence that Innovation is an essential element for the success of organisations in the 21st century. The former basically sees Innovation as an exogenous element which society –or an organisation– has to assimilate, despite the fact that it was basically generated outside that society or organisation. Therefore, it is a 'predictive' or "preactive" (action as precaution) way to manage change, supported on the –ultimately deterministic– idea that there is an inescapable need not only to adapt to the changes which are bound to happen in the environment but also to rapidly take advantage of them.

Instead, the latter understands Innovation as something which goes far beyond the assimilation of the novelties produced in the environment, treating it as a basically endogenous element (rather than exogenous), as a 'philosophy' that must pervade the society as a whole. It is, in this case, a 'prospective' or 'proactive' way to manage change (action as innovation) which stems from the conviction that the organisation not only must adapt to the transformations which may eventually take place in its environment but also has to play a starring role in those transformations.

Because it is proactive, and since it takes into consideration the existence of 'futuribles,' or possible 'futures,' as opposed to a single –still probabilistic– inexorable 'future,' the Innovation Culture implies adopting an exploratory methodology (Foresight) which makes it possible to define a shared vision about the future and maximises the expectations of a specific society as far as welfare levels are concerned. Therefore, Participatory Foresight methods can be regarded as the 'hinge' which joins Innovation and Design (the specification of actions aimed at implementing Innovation in products, services and processes). The analytical exercise of identifying and evaluating consensus-based alternatives which precedes the action is extremely necessary, as it permits to articulate that 'internalisation' of the accumulated knowledge associated with Innovation in the design of specific initiatives which are in turn the ones meant to provoke changes in the desired direction.

Foresight would consequently act as the catalyst for innovative action: the instrument which helps society to shape a desirable and plausible image about the future and to orient the design activity towards the identification of products, services or processes suited to that future. From this point of view, Foresight is the tool that will allow us to know and assess society's future expectations, an information which becomes crucial when it comes to designing 'empathetic innovations', that is, adapted to the future –or latent– social demands.

5.2. THINKING ABOUT PROBLEMS (AND SOLUTIONS) IN TERMS OF COMPLEXITY

The whole is more than the sum of its parts and that requires the development of a holistic vision when it comes to tackling any problem or challenge. It is an evident fact that social reality is a multidimensional system, which means that any analysis leading to its interpretation will have to bear in mind that social events –even if they become clearly evident in one of the social reality contexts– result from the convergence of complex as well as multiple phenomena, the origin of which can be exclusively found in one of the dimensions that make up the social system (García Ferrando *et al.*, 1986).

Furthermore, social events are not only the consequence but also, and in turn, the cause of processes which may be triggered, annulled, strengthened or diminished in contexts other than those where those events took place. Therefore, this key mainly concerns the initial R, Research, the seminal process which lays the foundations for Innovation. The strategic management of change cannot be undertaken without having a thorough knowledge of the social environment in which one is operating, and that means building a diagnosis from the joint reading (as opposed to the sum of readings), the 'total reading' of the information obtained regarding the different dimensions which are likely to affect the social environment, either directly or indirectly.

Interdisciplinarity and creativity are needed to approach problems from a holistic perspective and to look for innovative solutions which can turn those problems into opportunities. The former makes it easier to understand the various dimensions of the problem (both the possible origins and the potential consequences, referred to different areas) and creative thinking is required in order to be able to connect seemingly unrelated issues in space and/or time, with an identical aim.

5.3. RELATIVISING OUR PERCEPTIONS, SUBJECTING THEM TO AN ONGOING CONTRAST

Reality depends on the eye (or the method) of the beholder. And, as is well known, the information that is available to us (its quantity and quality) will determine our interpretation of social reality. Nevertheless, it is also true that the method used to collect, order, prioritise, classify, analyse and interpret that information entails (due to the lacks and potentials inherent to any method) an equally important bias in our possible perception of a social event.

Every 'reading' of social reality, whether it is past (history), present (news) or future (forecasts) is predetermined by the method and information used for that purpose. This evidence is very often ignored under the pretext of looking for a supposed objectivity with the aim of placing social sciences on a level with natural sciences in terms of 'rigour,' without taking into account the principle of reflexivity (Lamo de Espinosa, 1990), according to which the observation of a social fact largely differs from that of a natural phenomenon, insofar as the observer forms part of the reality observed, thus making it literally impossible to reach the degree of objectivity which is typical of natural sciences.

Despite not being an advantage, this does not represent a disadvantage either; it is quite simply a type of evidence which needs to be considered in order to relativise and contextualise any analysis and any value judgment derived from it. The fact that any interpretation of social reality is a direct consequence of the method used in its construction leads us to another conclusion: there is no such thing as a universal truth in social events; they are all more or less grounded interpretations. Therefore, relativising any analysis of social reality (Berger & Luckmann, 1968), whether it is our own analysis or someone else's, becomes an essential requirement –together with a holistic attitude– to face the first of the processes on the path to Innovation: Research.

5.4. THINKING ABOUT THE FUTURE AS A BUILDABLE SPACE THAT CAN BE MOULDED AT CONVENIENCE

The future is an open, buildable space; it is not predetermined by immutable divine or scientific laws. No compass consequently exists which indicates the course to be taken: regardless of the information available and the method used to analyse the past and present reality, and to anticipate futuribles, it will never be possible to find a marked path towards the future, since it does not exist as such…it has to be built.

The deterministic compass, which shows us the north, the right path, is no use. It is a fallacy. Therefore, our maximum possible aspiration would be to draw a cognitive map of plausible options for a future –futuribles– constructed in accordance with the information and methodology at our disposal, and appraise –in terms of probability and desirability– the dangers and opportunities entailed by each of the different destinations –as well as by the different paths which may lead to each one of them.

If the future is predetermined neither by natural nor by supernatural laws, then it must be a construction of human beings; there precisely lies the emancipatory nature of Foresight as a way to forecast the future: in the assumption that the future will inevitably be a consequence of previously undertaken actions. The construction of the future is thus based on human action. A wide variety of actors and factors can combine –with different action capacities, as will be shown below– in the future development of a social event. The realisation that the future is to a greater or lesser extent in our hands becomes essential in the Development process which leads to Innovation: an organisation will only value and promote the transfer (D) of knowledge and technology if it is aware of its usefulness, of the tremendous transforming potential that this transfer confers upon the organisation, making it – to a larger extent– the true owner of its destiny.

5.5. LEARNING TO ASSUME AND INTEGRATE UNCERTAINTY INSTEAD OF ISOLATING IT

Identifying weaknesses and limitations is a strength. After decades trying to isolate and avoid uncertainty (very often reduced to a supposedly identifiable and measurable 'error' in closed models), the evidence provided by categorical facts has highlighted the weakness of some predictive models that –guided by a positivist and deterministic reading of social sciences– tried to associate the future of human societies with natural laws; so, it seems that the time has come to start coexisting with uncertainty and to learn how to manage it.

Uncertainty results from the lack of control over social events. However, as fuzzy logic (Kosko, 2000) teaches us, control over social events cannot be interpreted in a dichotomous way: 0/1, *on*/*off* or black/white. Rather, it might be compared to a grey scale where the ends are hardly identifiable, and even so reachable. Before the evidence that absolute control –which would imply the complete absence of uncertainty– over a social event is impossible and that an influence can be exerted (though in an unchecked way) on the evolution of events even from inaction, the most reasonable option for organisations when it comes to dealing with their strategic management lies in trying to minimise uncertainty through their capacity to influence reality by means of innovative action; in other words: proactively.

Uncertainty should consequently not be taken as something necessarily negative; instead, it can be seen as a factor which facilitates the generation of strategic opportunities. The non-existence of natural laws (and, therefore, the impossibility of identifying those laws and using them) leading to a predetermined future is likely to provoke a certain feeling of helplessness, bewilderment and insecurity, but this can be read positively too: if nothing is predetermined, then everything is possible. The absence of total certainty should not be understood as a black, bottomless hole, but precisely as just the opposite: as the opportunity to trigger a chosen future; as a chance for emancipation.

The way in which uncertainty has traditionally been managed, trying to isolate it and making an effort to control it with methodological subtleties ('error margin,' 'likelihood,' etc.) is a product of the traditional complex that social sciences have had with respect to natural sciences, due to which decades have been spent trying

to cope with the fruitless challenge of transferring the predictive models of the latter to the former. It has proved to be an inefficient way to deal with the analysis of social reality "towards the future." Thus, the social events which have caused dramatic structural changes of a larger magnitude and with a greater impact on contemporary human societies have been brewed outside the narrow limits of closed predictive models and have come as a result of innovation actions and processes based on the creative and transforming capacity which derives from a positive and proactive reading of Uncertainty: from the Internet to 9/11.

That represents the large potential impact of what is highly improbable according to the 'black swan' thesis (Taleb, 2008). Uncertainty, which cannot be placed within the supposedly controlled niche of the falsely objective probability, as far as social reality is concerned, appears as a space of risk but also as a space of opportunities which are likely to provoke an exponential qualitative jump that could lead us towards a desired scenario. For this reason, the most innovative organisations, such as NOKIA in Finland, advocate ways to manage uncertainty which are far away from deterministic prediction: for instance, the Weak Signals methodology developed by the FFRC-*Finland Futures Research Centre* (Hiltunen, 2007).

5.6. ACTING PROACTIVELY: LEARNING TO IDENTIFY, EVALUATE AND CHOOSE OUR ACTIONS ACCORDING TO OUR GOALS

Good luck is created (Trias de Bes & Rovira, 2005); the randomness of uncontrolled events and/or processes may result in situations that are positive or negative for us, but we are largely responsible for our destiny. After assuming the inexorable fact that it is necessary to coexist with uncertainty, and to try and manage it, as previous explanations have tried to make clear, and the equally evident fact that our future will depend on our capacity to influence the construction of reality depending on the extent to which we can intervene in the development of events that affect us; once all of that has been assumed, as said above, the next step consists in maximising our sphere of control and influence on the actors and factors which are likely to determine or condition the social events that can have an impact on our future.

Thus, our ability to minimise uncertainty will be directly proportional to our capacity to maximise the degree of control over the actors and factors which are most likely to influence our activity and the achievement of our aims. Since absolute control over a situation is hardly reachable, not to say impossible, at least in the context of social sciences –where the possibility to reproduce perfect causal formulas in a zero atmosphere (as if we were working in a laboratory) does not exist–, an effort needs to be made in order to maximise our control capacity, being aware of the fact that this by no means guarantees our potential ability to manage things in a way that suits our objectives.

And being able to maximise our action capacity requires the deepest possible knowledge of our current reality and our potential, both in absolute and in relative terms. In absolute terms, through a self-diagnosis and identification of (manifest) weaknesses and strengths in the organisation; in relative terms, through the contextualisation of such weaknesses and strengths and the subsequent identification of (potential) threats and opportunities which may affect the organisation, so that they can serve as a reference for us to be able to develop an internal 're-engineering' process that permits to restructure weaknesses or emphasise strengths, defuse threats or create opportunities by means of action.

5.7. STIMULATING CREATIVE THINKING IN LEARNING, COMBINING IT WITH SCIENTIFIC KNOWLEDGE

In our view, the correct formula when it comes to facing Innovation is: Systematisation + Creativity. It has been repeatedly highlighted earlier in this paper that the decision to apply the –quantitative– method typical of natural sciences to the letter does not work in social sciences, for the reasons explained above. The integration of qualitative parameters into the interpretation, understanding and prediction of social events can also be systematised, as qualitative sociology and anthropology have shown us, which means that social sciences are in a position to develop their own scientific method adapted to their peculiarities; a more open and heterodox method than that of natural sciences which incorporates uncertainty as a positive, opportunity-generating element, and additionally encourages and integrates creativity instead of punishing it.

Systematisation without creativity is like a soulless perfect machine; creativity without systematisation is an erratic spirit. The former becomes essential to establish diagnoses and forecasts based on well-grounded as well as comparable premises. The latter, apart from complementing both –by enriching them– has proved to be a basic element in therapy design. As explained above, systematisation is a must because the collection and analysis of information serve as the basis for the diagnoses and forecasts which are carried out following a set of specifically-defined and comparable theoretical and methodological assumptions (sources and methods). The error in a prediction developed in the area of social sciences under a positivist quantitative approach does not lie in the utilisation of the scientific method, but in the conviction about its infallibility. In other words, the definition and interpretation of a social event from predictive models represents a useful and necessary contribution to innovative action, insofar as it provides the strategic management process with referents; what represents a crass error is to assume that a model –no matter which one– can be identified as a universal truth, believing that –collective or human– behaviour is governed by immutable natural laws which, therefore, are totally predictable.

Consequently, heterodoxy prevails: there is no such thing as a perfect formula for the management of human organisations; the action protocols designed for specific situations in specific contexts, for which they are effective, may become ineffective –or even counterproductive– with the slightest change of nuance in the context (i.e. by the introduction/exclusion of a variable from the model and/or a variation in the parameters for the values that those variables can take). Moreover, improvisation inevitably leads to chaos, above all because it stops the organisation learning either from its past experience or from the changes operated in the environment on a diachronic level, which completely deprives that organisation of its strategic potential, making it completely unable to articulate a vision about the future supported on that learning process –which is so necessary too.

5.8. TRYING TO BANISH THE EXTRAPOLATION OF OUR THINKING: A TREND CAN BE REVERSED

Determinism is not innovative (it is "more of the same") as repeatedly stated in this paper. The basic idea underpinning innovation says that things can be changed; that reality is nothing but a construct. A deterministic vision about the future manages change in a static way, 'objectivising' the future as a unique space which is a product of the past as well as of the present; a mere extrapolation. The fact that it fixes the analytical limit in the present and ignores the link between present and future (our actions and those of others) means that determinism can only carry out extrapolative predictions: how things are going to be according to how they have been so far. In other words: what the future will be like if nothing changes.

In our opinion, it is not possible to develop innovation on the basis of a deterministic vision about the future. Innovation requires a vision about the future

which envisages it as an open, multiple and buildable space (it has already been explained above); innovation requires a prospective vision. Prospective Vision –as a concept (and in capitals)– somehow integrates the other six preceding keys, since it might be defined as a "holistic and multidisciplinary working method, based on a proactive and emancipatory conception of foresight which attempts to orient strategic design and planning through the detection of futuribles and the determination of action alternatives within uncertainty environments favoured by change and complexity."

Neither does it seem possible to us to develop successful innovations –from a social point of view– unless it is done from the empathy with the user/beneficiary of the resulting products/services/processes. Thus, the open and participatory exercises focused on the definition and evaluation of alternative future scenarios (Participatory Foresight) become absolutely necessary at this point, since they will help us to determine the future expectations that a specific society or collective has. Such expectations will therefore allow us to assess the success or failure of innovation design –on a social level.

5.9. INTEGRATING EDUCATION INTO THE KNOWLEDGE MANAGEMENT CYCLE OF ORGANISATIONS

The educational system and, especially, the higher cycle (university) cannot remain alienated from the socio-economic reality. We are living in a world system characterised –with few exceptions– by economic capitalism (globalisation, free market, financial economy, etc.) and political democracy (representation, universal vote, etc.). In this context, both countries and enterprises badly need a human capital management based on a training model which –avoiding exclusions and in a sustainable way– can maximise the potential of individuals, facilitate their integration into the emergent labour market dynamics, and improve the competitive capacity of the organisations where those individuals develop their professional activity.

However, the educational system is sometimes designed without taking account of that reality (as may have happened in Spain); on some occasions due to incompetence, lack of perspective and/or the absence of a strategic vision, and other times, because of the imposition of a normative ideological model (or another). Thus, for example, the political debate in Spain has paid more attention to imposing (or vetoing) Religion or Valencian as subjects than to a real reflection – considering the global context and the probable future scenarios– on what our youngsters (and future citizens) were going to need in order to reach an optimum living standard in keeping with the position that our country is supposed to occupy.

One of the keys seems to lie in the integration of the training system (the educational system) and, above all, in higher education, with research (where knowledge and opportunities are generated) and the transfer of knowledge (which will only be effective if it is based on the resolution of problems posed by the socio-economic environment). Didactic processes cannot be exclusively supported on theory; instead, the latter needs to be accompanied by some practical learning that provides the student and future professional with various abilities and skills (problem-solving capacity, analytical capacity, creative capacity, empathetic capacity, teamwork capacity, self-critical capacity, etc.) Such practical learning must be based on the study of cases and relevant up-to-date information produced in the international context (research) and also be oriented to the resolution of specific problems arising from the different sectors which make up the socio-economic fabric (transfer), so that the training process and professional learning can be transversally approached.

In other words, the convergence of the educational system with both the national innovation system and the productive fabric must aim at generating a type of human capital that can remain competitive and integrated into a sort of social brain, of a collective intelligence community; this is something absolutely necessary for us to have any chances of reaching a prosperous future in the technological information and communication society.

5.10. IMPLEMENTING OPEN INNOVATION ECOSYSTEMS (OIEs)

OIEs (as those mentioned above in our reference to the Finnish innovation model) are physical spaces where an effort is made to achieve a sustained convergence between knowledge and initiatives on the basis of: interdisciplinarity; pragmatism (problem solving); creative thinking; and the active, integrated convergence (open participation) of all the actors involved in the socio-economic fabric. *Aalto University* (Helsinki, Finland) would be the paradigm of a European OIE –the same as Silicon Valley (California, US) on the other side of the Atlantic Ocean.

A necessary condition for us to be able to speak about an Innovation Culture is the prior existence of an Ecosystem (physical space + living beings) designed in such a way that it can favour, stimulate and sustain that 'intelligence community,' that 'collective brain' which represents the axis for synergies in the immediate environment as well as in other (national and international) environments – integrating and not only adding. In other words, promoting an Open Innovation System (OIE) instead of a closed –or rigid– one (as it has been happening, for instance, in Spanish Technological Parks: little more than hotels for enterprises sharing common expenses among which there is no information flow and synergies are hardly ever produced). That OIE has to be a multilevel space based on interaction and creativity.

An OIE works as a seedbed of ideas: a breeding ground which permits to develop the two stages that precede the 'planting': the Nursery (that is what Technological Parks are in the best of cases), of course, but also the seeding stage (endogenous generation of business ideas), which is where talent and competitiveness are fed, where opportunities are found, and where students have a lot to say, since they are truly the main characters in this system. Therefore, an OIE like Aalto University places its most important human capital (students) at the disposal of projects promoted and financed by private enterprises which seek a solution to their problems (or the identification of emergent opportunities), thus leading to a synergy which –both in the short and in the medium and long term– benefits everyone: students, enterprises, the academic institution around which that dynamics is structured, and the country itself.