Reggio Calabria 9th/10th January 2009

International Conference on Cultural and Innovation Dynamics
Explaining the Uneven Evolution of Human Knowledge

CONFERENCE PROGRAM

Friday 9th January 2009

MORNING SESSION – ITALIAN LANGUAGE

ore 10:00 **Saluti del Magnifico Rettore dell'Università degli Studi Mediterranea di Reggio Calabria**

Prof. Corrado Trombetta
Delegato del Rettore per il Trasferimento Tecnologico

Prof. Stefano Brusoni – Bocconi University
Presentazione del progetto di ricerca CID

Tavola Rotonda
Prof. Eugenia Cacciatori – Bocconi University
Il caso dello sviluppo del vaccino contro l'AIDS

Prof. Nicoletta Corrocher – Bocconi University
Cultura e adozione nuove tecnologie: il caso dell'iPod

Modera il Prof. Massimiliano Ferrara
Presidente del Corso di Laurea in Scienze Economiche

ore 13:00 ***Buffet Lunch***

AFTERNOON SESSION – ENGLISH LANGUAGE

Chair: Prof. Massimo Finocchiaro Castro

ore 14:30 **Innovation diffusion as cultural change (WP3)**
Nicoletta Corrocher and Roberto Fontana, KITeS/CESPRI – Bocconi University

ore 15:15 **Do Organizations Dream of Electric Sheep? (WP4)**
Anna Canato, Imperial College of London
Stefano Brusoni, KITeS/CESPRI – Bocconi University

ore 16:00 ***Coffee Break***

Chair: Prof. Domenico D'Amico

ore 16:15 **Shared Leadership in culturally diverse innovation teams (WP5)**
Martin Hoegl and Miriam Muethel, WHU – Otto Beisheim School of Management

ore 17:00 **Inter-organizational knowledge creation in innovation networks: a cross-cultural approach (WP6)**
Anja Schulze and Gundula Heyn, ETH – Zurich

ore 17:45 **Vaccine development: the case of AIDS (WP7)**
Jo Chataway, Open University
Rebecca Hanlin, University of Edinburgh
Stefano Brusoni, Eugenia Cacciatori, Laura Lasio and Luigi Orsenigo KITeS/CESPRI – Bocconi University

ore 18:30 ***General Discussion***

Saturday 10th January 2009 – ENGLISH LANGUAGE

Chair: Dott. Roberto Mavilia

ore 9:00 **Changes in knowledge and culture generating organizations (WP8)**
Francesco Lissoni and Fabio Montobbio, KITeS/CESPRI – Bocconi University
Aldo Geuna, SPRU – University of Sussex

ore 9:45 **The cultural impact of inventions (WP9)**
Alessandro Nuvolari, Christine MacLeod and Bart Verspagen, ECIS - Eindhoven University

ore 10:30 **Innovative culture (WP10)**
Ivan Nový and Martin Lukes, University of Economics (VSE) – Prague

ore 11:15 **Coffee Break**

Chair: Prof. Domenico Nicolò

ore 11:30 **Modelling of the evolutionary processes of cultural assumptions (WP2)**
Elmar Wolff, IBiS -Biotechnology and Systems analysis

ore 12:15 ***General Discussion***

ore 13:15 ***Lunch***

WP2

Integration: modelling of evolutionary processes of culture at different levels of analysis

Key Partner: IBiS

The main aim of this WP is to rely on modern modelling strategies and algorithms based on complex biological systems to develop a comprehensive understanding of the diffuse process mechanism that contribute at various level of analysis (i.e. micro, meso and macro) to sustain the process of cultural innovation dynamics in the society. Our work will proceed in parallel with those of the other WPs to highlight the existing and emerging interdependencies among the various aspects of the project. For example, in parallel to the work of WP5 we will identify those characteristics of the process that are similar to the characteristics of biological systems and that might be described and modelled scientifically like natural systems. Based on this analysis, models of cultural innovation dynamics will be developed and tested also relying on the data that will become available from the work of WP6 and WP7. A synopsis of different methods, models, tools etc. for describing cultural and innovation dynamics will be developed to give advice of some possible applications.

Cultural and innovation dynamics is an extremely complex process depending on different technical, economic, and social determinants. Proceeding in parallel with the projects of the other partners, IBiS will develop a model for describing cultural innovation dynamics inspired to the bio-systemic view of the description of cultural processes to innovation. The following steps will be followed:

- First, identification of the processes as well as of the factors characterising the processes to be explained;
- Second, draw analogies to existing biological models and transfer of concepts to the new “cultural”-model. This procedure can lead to a modified or a totally new description of the system and the underlying processes;
- Third, application of the new procedure to well known cases and comparing the results with other models and classical approaches.

After verification of the modelling process, the analysis of different scenarios will be interpreted by application of the new modelling strategies and the case studies of the Project can be discussed under this new approach. Working on processes like in this Project with the influence of culture to innovation and vice versa, there will never be a simple answer; and the description of such complex systems need a variety ofmodelling tools to enable us to give at least a reasonable answer to the most impotent questions. Therefore, we will write a synopsis, in which we describe the different methodological approaches and compare their abilities to solve questions which are essential for the interdependencies between culture and innovation in the micro, meso or macro level. Also the conditions and the limits of each method will be discussed and advice for the application to the different transfer scenarios will be exemplary described.

WP 3

The role and measurement of human beliefs for cultural change and innovation diffusion

Key partner: CESPRI

WP 3 takes human beliefs (micro level) into consideration and investigates their impact on that scope and pace of the diffusion of new technologies in societies (macro level). The key concept it focuses on is that of belief, i.e. an individual's opinion about what is the 'best' technology available for adoption. The key relationship it focuses on is that between micro-level individual belief, and macro-level outcomes. There are two key sub-objectives here.

- First, understanding the relationship between technological features and individual perceptions of such features. The aim here is to go beyond strictly 'deterministic' explanations of technological diffusion to understand how individual subjective perceptions may lead to the supremacy of technically inferior technologies. We posit that cultural traits should play a role in explaining heterogeneous individual beliefs.
- Second, understanding the outcome of this interplay in terms of different diffusion processes.

At the theoretical level, this research builds upon and extends two approaches to the study of diffusion of new products in competitive markets. On the one hand, models of diffusion of standalone products contend that there exists a link between the characteristics of the technology embodied in new products and their speed of diffusion (Stoneman, 1983; Stoneman, 2002). On the other hand, models of diffusion of network products claim that, given the technical characteristics of the products, the speed of diffusion depends on the time required for adopters to achieve co-ordination (Arthur, 1989; Habermeier, 1989; Foray, 1997). This research argues that both these approaches capture distinct facets of the relationship between technical change and the speed of diffusion of new products. This research proposes an analytical framework for analysing this relationship that accounts for the effect of technology-induced quality expectation biases on early adoptions on the one hand (Rosenberg, 1976; Balcer and Lipman, 1984; Weiss, 1994), and the effect of legitimacy (Geroski, 2000) and informational externalities (Bikhchandani *et al.*, 1992; Bikhchandani *et al.*, 1998) on the rate of diffusion on the other hand. The objective is to account for different outcomes of diffusion processes (i.e. inertia, partial crowding out, rapid diffusion etc.) depending on the effect of the rate and direction of technical change on the way adopters evaluate innovation.

Two types of activities are planned. At the theoretical level, an analytical framework will be developed. At the empirical level, an attempt at measuring quality expectations biases will be carried out.The development of the analytical framework requires two types of analysis. First, it requires an analysis of the determinants of adoption decision, since it is from the individual adoptions that demand for innovation arises. Second, it requires an analysis of the mechanisms underlying the process of innovation diffusion. Concerning the analysis of the determinants of adoption, we propose an approach that highlights the role of learning in influencing adoption decisions. In particular, we argue that technical change modifies the quality of innovation. When this occurs, individual adoption decisions are the result of a process of learning about quality which is, at the outset, uncertain. A consequence of this approach is the establishment of a relationship between timing of adoption and expectations on the quality of innovation as well as beliefs in the model of technical change that underpins the expectations formation. Concerning the second point, to explain the mechanisms underlying the process of diffusion of new products, we propose an approach that is based on informational externalities. According to this approach, the diffusion of new products will be conceptualised as a process in which potential adopters use the observation of the actions of previous adopters to make inferences about the quality level of new products. Potential adopters become actual adopters in a sequence 'ranked' on the basis of the strength of their individual 'beliefs'.

On the basis of this framework, we will proceed with an empirical investigation of the role played by expectations and beliefs in affecting innovation diffusion. We will adopt a two step strategy. First we will consider how technological improvements can influence adoption through the creation of 'expectation biases' which influence the individual evaluation of the innovation quality by adopters. A related set of indicators of 'expectation biases' based on the measurement of the characteristics of innovations will be developed. Second, a specific technology will be selected and a survey of adopters carried out in one or more countries.

WP 4

Identity and the evolution of organizational culture in multinational companies

Key partner: CESPRI

WP 4 investigates organizational identity in globally dispersed innovation-driven organizations (micro level), considering the influence of national context (macro level). Specifically, it will explore two related sub-objectives:

–First, the change of organizational founding cultural traits during a phase of strategy renewal.

–Second, the interaction among cultural traits in different countries but within the same organization.

The first objective will be analyzed looking at the consequences of an explicit effort to change the prevailing organizational culture which followed the hiring of a new CEO at the HQ level. The second objective will be analyzed comparing the responses to such a change in strategy within a large division of the multinational corporation chosen for this study, and the headquarters located in the US. Empirically, the study will reconstruct the processes through which employees in the HQ and in the Italian division made sense and interpreted the strategic aims set by the new CEO, and how they responded to them.

The choice of these issues is based on the consideration that the literature seems to lack attention to the unfolding of organizational identity's change. While various scholars have investigated the causes that lead to a change in organizational identity, we do not know much about the mechanisms that sustain organizational identity evolution and the process of sense making of organizational members during and following such unfolding. In order to fill this gap, this WP will build upon and extend the rich literature on *organizational culture*.

The chosen setting of this WP is one of a large multinational firm, 3M, which was founded more than 100 years ago and has been part of the Fortune 30 ever since.This firm has a strong diversified connotation, and is present in markets as different as healthcare, electro-communication, industrial and consumer markets. It started its international operations in the 1950s, establishing subsidiaries in European markets. Today international markets carry more revenues than US ones.As market positioning, 3M developed quite early in its history a well defined vision, focusing on continuous innovation and technological development in niche markets. This vision got supported by a series of organizational practices that dated back to the late 1940s and that were followed until few years ago. Recently, organizational members have experienced a profound change in the company, a change that they associate to the appointment -in late 2000, for the first time in 3M history – of a CEO coming from a different firm. As a matter of fact, since 3M early operations, CEOs as well as other organizational leaders were always chosen among internals. Since 2001 this leader introduced in the firm a series of initiatives, the more of influential of which is the launch of a process control method. As organizational members recall, this was presented to them as an attempt of "DNA change" in the organization.

WP 5

Shared leadership in culturally diverse innovation teams

Key partner: St. Gallen

WP5 (Shared Leadership in culturally diverse innovation teams) aims to contribute to the examination of culture and innovation dynamics focusing on a level of analysis at which innovation endeavours are commonly organized and where innovative behaviours can thus directly be observed, namely on the project team level. Thinking of cross-cultural innovation teams two dominating questions arise: Why do we need international cooperation knowing about the problems of intercultural communication? And how can we achieve successful innovation in this setting?The answer to the first question essentially points to the benefits of cultural diversity as a prominent ingredient for innovation. Divergent thinking, due to different cultural and functional background, personality and experience of the individual, enables teams to unfold their creative capacity. On the other hand, teams do not only need to explore possible solutions, but also have to solve a given task with respect to limitations of time and resources (Lewis, Welsch, Dehler & Green 2002). Thus, successful innovation relies on balancing exploration as well as exploitation within the project (Smith and Tushman, 2005). To master the dual demands of creativity and operational efficiency, companies increasingly use cross-functional and cross-cultural innovation teams.We argue that leadership in this context should rather be thought of as shared leadership in terms of a simultaneous and ongoing mutual influence process relying on a dynamic exchange of lateral influence among peers (Pearce 2004, Pearce & Manz 2005). The central idea of this concept is that shared leadership activities conducted by individual team members can either be directed toward their own area of responsibility (i.e., proactive followership) or toward the other team members (i.e., mutual influence). So rather than considering shared leadership primarily a team-level phenomenon (Pearce, 2004), we conceptualize it as inherently cross-level, differentiating between proactive followership and mutual influence. As such, we consider shared leadership (in some shape or form) as the natural response to the peculiar circumstances of cross-cultural innovation teams (i.e., dispersion and diversity). Although prior theorizing has provided an initial conceptualization of shared leadership, a detailed elaboration and operationalization is still missing, particularly with regard to the cross-cultural context.

The aim of this research therefore is to:

–specify and empirically validate the concept of shared leadership in cross-cultural innovation teams;

–conceptualize and test country-level determinants of shared leadership in culturally diverse innovation teams.

In doing so, we conceptually and empirically investigate how elements of the societal context (both cultural and institutional) affect how shared leadership processes are enacted by teams and individuals; and, how this in turn influences the innovative performance of such team projects. The theoretical framework and the empirical evidence from this research will serve as basis for the deduction of policy implications for reaping the benefits of cross-cultural innovation.

In order to achieve our objectives we will follow a five-step procedure. First we will create a shared understanding across all work packages of the fundamental theoretical questions at stake to be able to define the role of shared leadership within the whole research project. Second, we proceed to reviewing literature and conceptualizing the phenomenon of shared leadership in the cross-cultural context, i.e. we define variables on the individual and on the team level unfolding their individual meaning as well as their relationship with another. Third, a qualitative empirical investigation will be conducted to understand the complexity of the phenomenon. This may serve as the basis for any necessary adaptations to our initial research framework and operationalizations. Fourth, we conduct a quantitative empirical inquiry to test the relationships specified in our research framework. Fifth, the theoretical and the empirical analyses will allow us to derive implications for research and practice. These will focus as well on the organizational level of European enterprises as on the institutional level, displaying options for reaping the benefits of cross-cultural innovation. As such, this research has the potential to offer, for instance, policy implications for the development of curricula for training programs (by universities or chambers of commerce) to support the development of cross-cultural competencies, or for the development of guidelines for funding agencies to evaluate applications of multinational innovation projects.

WP 6

Joint knowledge creation in inter-organisational cross-cultural innovation networks

Key partner: WHU

WP6 will draw attention to the potential that the increasing cultural diversity of the EU has with regard to New Product Development (NPD) projects. This subject experiences an increasing importance as the EU grows and intensifying collaboration among the EU countries is sought. On the one hand, this movement brings about positive effects, such as a contribution to the dissemination of knowledge across countries as well as an increase of innovativeness. On the other hand, excessive diversity is a major obstacle to successful (inter-organisational) cooperation.

In terms of this WP specific sub-objectives, previous research investigated cultural components of international NPD, considering the R&D activities of and within multinational companies (De Brentani and Kleinschmidt 2004; von Zedtwitz, Gassmann et al. 2004). This research, however, will investigate diversity and cultural components of interorganisational cross cultural NPD. Moreover, instead of activities preceding collaboration, such as the search for feasible partners, the selection of those, negotiations or contracting, the WP will focus on a later stage, which contains the first projects conducted within the collaboration. Here, a shared knowledge base is essential in order to tap the mentioned innovation potential of the cognitive distance of development partners (Cohen and Levinthal 1990; Lane and Lubatkin 1998; Grant and Baden-Fuller 2004). While a number of scientific contributions has focused on alliance collaborative capabilities (Doz 1996; Dyer and Singh 1998; Dyer, Kale et al. 2001) the phenomenon of a shared knowledge base has not been investigated in detail. This is especially true for a cross cultural setting. The following research questions arise:

Which knowledge (contents) constitute a shared knowledge base that is effective on the success of interorganisational cross cultural NPD projects? This question is important to clear at the very beginning of a product development partnership. We propose that important components for a successful collaboration are technological knowledge (e.g. about interfaces of subcomponents or modules of a technical product), procedural knowledge (e.g. knowledge about the partner's history or processes important for collaboration) or cultural knowledge (e.g. regarding norms or behaviours).

What is the extent of a shared knowledge base that is effective on the success of inter-organisational crosscultural NPD projects? Opposing to earlier perceptions of the objective of alliances, to gain as much knowledge of the partners' knowledge base, recent research recognizes the sufficiency of limited shared knowledge. Partners neither need to gain all of the partners' knowledge nor is it objective to transfer and gain the partners' core competencies. The questions remains: What is the efficient extent of the shared knowledge base? (How much is necessary, how much is sufficient).

How can an effective shared knowledge base be efficiently generated in the context of cultural diversity? After content and extent are defined, the efficient creation of the shared knowledge base is essential, especially regarding the increasing importance of time to market in NPD as well as existing resource constraints. Based on previous research on diversity we assume a negative impact of diversity on the generation of a shared knowledge base. In this WP, we will investigate, what aspects will have a moderating effect on this negative relationship, turning it to a positive one. Possible moderators are a firm's collaboration strategy, knowledge transfer abilities (absorptive and disorptive capacities and capabilities of both partners), or conscious knowledge transfer and knowledge creation activities.

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WP7

The uneven development and distribution of vaccines across cultures: the case of AIDS

Key partner: Open University

In recent years, the adequacy of the systems that govern the processes of discovery, development and delivery of vaccines has become hot and controversial in the economic, social and political debate. The main issue is that the development of vaccine appears to be quite uneven. Either the discovery of new vaccines seems to lag behind expectations (especially where diseases affecting principally the Developing World are concerned) or, when a vaccine is discovered, access is restricted because of cost. It is not surprising, then, that it is increasingly perceived that the existing arrangements for vaccine innovation have become inadequate, on economic, social and humanitarian ground.

The organization of AIDS vaccine research is an exemplary case of how successes and failures are defined not simply by the 'nature' (i.e. public vs. private) of the organizations involved *per se*, but rather by the specific micro-level processes which structure relationships within networks of heterogeneous organizations.. The objective of this work package is to unpack the cultural dimension of such processes, to show that the cultural dimension plays an important role in explaining successes and failures in vaccine development, and to clarify the mechanisms through which this happens. This will provide an improved understanding of innovation and its cultural dynamics, providing a crucial input to research focusing on how innovation can be brought about and fostered in developing countries. In this case, we look at the effect of the conscious decision to develop 'vaccines for developing countries', as opposed to 'vaccines for the market'. Also, we shall engage with the analysis of the impact of different selection criteria on knowledge generation. In this case, we shall operationalize this problem in terms of the different objectives that the International AIDS Vaccine Initiative (IAVI), the subject of our study, when compared to large pharmaceutical corporations. In turn, these differences should be reflected in, for example, differences in the chemical routes IAVI research explores, or its publication and patenting strategies, or its project evaluation criteria, or the way in which formal contracts regulate collaboration.

IAVI is the most relevant unit of analysis for this study as, since its foundation in 1996, it aimed at furthering HIV vaccine research and to ensure that a vaccine would be available cheaply in the regions of the world where it is needed.IAVI is based on a new form of collaborative mechanism that brings together public and private sector players in order to overcome a biotechnology divide whereby R&D related to certain diseases is deemed too risky and expensive to warrant investment by private industry. IAVI evolves around the interactions between groups working on a particular vaccine candidate and a portfolio approach which ensures there is more than one vaccine candidate being pursued at various stages of the research-development-access (R-D-A) continuum. Such an approach is heavily influenced by a private sector ethos with many staff originating from private industry. This has brought a strong emphasis on issues of manufacturability and delivery, as opposed to research alone that characterises most public sector bodies involved in vaccine development. Thus already there are two major differences between IAVI and other more 'traditional' research organizations: a focus on product development from basic research through to delivery and, secondly, a merging of public good (developing a vaccine for the world's poor) and a private sector business ethos.

Such differences have led IAVI to develop a unique approach to knowledge management. IAVI places a strong emphasis on advocacy, awareness raising and education to build extensive networks of relationships perhaps at the expense of traditional innovation knowledge management activities. Furthermore, IAVI seems to be particularly conscious of the importance of cultural differences in determining whether a vaccination campaign will be successful, and particularly willing to adapt its approach to the cultural specificities of each developing country in which it operates, so that IAVI projects and partnerships tend to be significantly diverse from country to country. Does this mean IAVI operates using different values and cultures to more 'traditional' research organizations? How does this diversity impact on IAVI's ability to manage knowledge across its different projects? Does this new approach create a trade-off between local success and the ability to replicate success elsewhere? This research intends investigate these issues in greater depth, building on initial work we have conducted on IAVI's work on the ground in Africa and India.

WP 8

Changes in knowledge and culture generating organisations:

technology transfer and entrepreneurship in the European university system

Key Partner: CESPRI

The analysis of the evolution of the European university system is relevant to CID for two reasons: the university system's key output is knowledge and, more broadly, culture. Secondly, in recent years a major effort has been undertaken in many EU countries to make their university systems more US-like (for reasons we summarize below). In more operational terms, this WP has to goals:

(I)To verify common assumptions on European academic scientists' resistance to "new entrepreneurial ethos" in science, and the negative consequences on technology transfer this resistance may induce;

(II)To explore the existing relationship among academic career, commercialisation and entrepreneurial activities in Europe

The historical development of modern economies has gone hand-in-hand with an increase in the number of functions assigned to universities both by policy-makers and the society at large: from education to research to technology transfer. These changes have gone along with changes in the way universities, and in particular academic research, are funded: block grants are increasingly superseded by targeted funds, while overall budgets are declining, or growing less rapidly than in the past (Geuna, 1999). In addition, recent years have seen both many national governments and the EU placing more and more emphasis on the commercial and entrepreneurial functions of university, defined broadly as technology transfer through research contracts, patenting-cum-exclusive licensing, and spin-out firm creation. This new function is often promoted through the creation of monetary incentives for individual researchers and the exertion of pressure on university administration in the direction of market-based research financing (Slaughter and Leslie, 1997; OECD 1999 and 2003; Bok, 2003). Policy activism in this field, however, contrasts with lack of research on the degree of acceptance or resistance to these changes by academic scientists; and on the related issue of whether university scientists perceive these new commercial and entrepreneurial possibilities as alternatives or complements to their academic careers. Some indirect evidence exists for the US, which draw upon various methodologies. Jensen and Thursby (2001) argue that university patenting can help overcoming agency problems, which may otherwise block the process of technology transfer. Thursby and Thursby (2002) go on to argue that the universities have indeed become more entrepreneurial as a result of the incentive scheme created by the Bayh-Dole Act. However, these results have not gone undisputed.

For example, a number of empirical contributions have tested the hypothesis of a trade-off between commitment to scientific (basic) research and patenting by academic scientists. These studies suggest that, as far as individual scientists are concerned, patenting does not change traditional motivations and behaviours, but it simply offers a way to access industry's support, for which the patent is both as a signal and a bargaining tool. This is confirmed by historical works within the "science studies" tradition initiated by anthropologists and sociologists such as Bruno Latour and Michel Callon.This literature offers many examples of star scientists who cultivated relationship with industry not so much for short-term personal enrichment, but for the longer-term objective of promoting their own disciplinary ambitions (see for example: Latour, 1988, on Louis Pasteur). If this was proved to be the case, we should conclude that the incentive scheme behind academic patenting may be quite complex. Rather than pursuing patenting just for the sake of personal enrichment, scientists may disclose their research results because they hope to access further funds for their ongoing research, and support their careers within the academy.Interestingly, controls for gender in the above mentioned studies on the relationship between scientific (basic) research and patenting have revealed that women scientists may be at a disadvantage when it comes to technology transfer, that is ceteris paribus they are less likely to obtain patents from their research results. These preliminary findings need to be substantiated by additional statistical analysis. If confirmed, they also need to be explained: may they be the results of a different specialization of women scientists, who concentrate on research topics less prone to industrial application? Or is it the case that women scientists are at a genuine disadvantage in linking up with industrial research partners?

Research on academic commercialisation and entrepreneurship in Europe has been much less substantial than in the US. The most part of it has dealt with the issue of patenting, looking for an explanation of quantitative differences in the patenting patterns by universities in the Europe and the US. Most European universities have for long lacked the autonomy and administrative skills required in order to take advantage from their professors' patenting activities, typical of their US counterparts. They traditionally resisted to being involved in commercial activities, and took the shortcut of allowing scientists engaged in cooperative or contract research with various business companies or PROs to sign blanket agreements that left all IPRs in their partners' hands. This suggests that a large part of academic patents in Europe simply escape from the most commonly available statistics, which classify the origin of the patent according to the identity of the grantees or applicants, not of the inventors. If this methodological remark were true, traditional comparisons with the US may be proved to be misleading, insofar they exaggerate the scarcity of academic patents in Europe. Following this clue, Meyer (2003) for Finland, and Balconi et al. (2003) for Italy have re-classified patents by inventor, and crossed the inventor's names with available datasets on university faculties. They found out that in both countries a significant percentage of the business companies' patents originate from academic inventors (3% of EPO patents in Italy, 8% in Finland). Gering's and Schmoch's (2003) rougher calculations suggest that academic inventors' patents at the German patent office have grown from about 200 to almost 1800 between 1970 and 2000. On the basis of the PatVal database, a recent study of Crespi et al. 2006 has confirmed that universities own only about 20% of the patents with an academic inventor in 6 European countries.

Some studies have also started exploring, although indirectly, academic inventors' motivations. Breschi et al. (2005a,b), Calderini and Franzoni (2004); Calderini et al. (2004), Meyer et al. (2003), Meyer (2005) have found that also in Europe academic scientists engaged in patenting, far from neglecting research, are among the most productive researchers; and that their research productivity seems to benefit from patenting efforts. But much more remains to be done. Proper censuses of academic inventors are not yet available for key countries such as the UK, France, or Sweden. The survey PatVal it's the only source of information on academic inventors' motivations for patenting. In particular, we still know very little on the relationship about academic inventors' career strategies, including the role of key variables such as age and discipline. Academic inventors are important witnesses not just because of their patenting activities, but also because we expect them to be particularly alert also to non-patent-based technology transfer activities. As such, they can be an

ideal subject to study to infer some conclusion on the general attitudes of university scientists towards commercialisation of research results.

The available empirical evidence on Italy and Finland we reported above suggest that common perceptions on the comparative disadvantage of European universities vs US ones in transferring technologies through patenting are possibly exaggerated. Ongoing research by the proponents of this WP will soon strengthen this suggestion with evidence on France and Sweden. Overall, we expect many more European academic inventors to exist and be active in patenting than it was previously believed. However, most of their patents do not belong to their universities but to business companies or large public agency (such as CNR in Italy of CNRS in France). This evidence suggests that European academic scientists may not be opposed to commercialisation activities as it is often believed. Rather, it may be that the distinctive features of many European academic systems induce different strategic attitudes in scientists. For example, administrative rigidities within the university may induce brilliant scientists to dispose personally of their intellectually property rights when engaging in contract research with industry. In this context, patents may be much more valuable for signalling the industrial applicability of a research line, than for the economic return they will generate.

It is also worth exploring whether European academic inventors feel threatened, rather than supported, by their universities' technology transfer offices: are the latter's activities perceived as a useful mean to reach out in industry, or as an interference in the scientists' patenting strategies? Moving at a more general level, we touch upon questions related to the second goal of the research: Is patenting the first step towards leaving the university, or a necessary step to increase the researcher's stance within his scientific community? Is it just a mean to get some supplemental income, or the result of a strategy to access industry's funds for research? Does patenting come at a cost in terms of publication productivity, or on the contrary it reinforces it (and, along with it, it reinforces career prospects)?

WP 9

Inventions, their social effects and modifications of inventions' functions made by society

Key partner: ECIS

Technologies often acquire meanings which transcends their direct function or ordinary use in society. In some cases, the icon can become so powerful as to fully absorb the 'spirit' of a certain historical epochs (Klingender, 1947; Marsden and Smith, 2005). On the other hand, there are technologies that, despite their critical social function, achieve an uneven development and remain almost invisible in a broader cultural perspective. This appears to be particularly the case in the 'feminine' spheres of household and personal technologies, which, in part, reflects the gendered and racial construction of the inventor as a white male. Accordingly, a full fledged understanding of the process of technological change and of its social effects requires taking explicitly into account the cultural dimension of the process of technological evolution (Basalla, 1988). Recently, a growing number of studies, dealing with particular technologies and inventions, have considered the process thorough which technologies acquire broader social and cultural significance. However, we are still short of a systematic (and comparative) assessment of this phenomenon (Staudenmaier, 2002). This work package aims at providing a comprehensive perspective on the relationship between the way technologies develop (i.e. evenly or unevenly) and the broader cultural landscape. This is done by examining the process of representation/construction of technologies and inventions in a wide range of historical sources. The sources are chosen with the aim of providing a comparative perspective of the impact that different technologies exert on the cultural ambience.

Ongoing research on the cultural representation of technologies tends to adopt a 'case studies' approach. Although, it is possible to compare the insights provided by these studies within a view aimed at distilling general interpretive hypotheses, it would seem desirable to examine systematically the representation of different technologies in a coherent set of historical sources. One of the merits of this approach is that it allows tackling this research question by employing a combination of both quantitative and qualitative tools of analysis. The attempt of implementing a quantitative perspective represents a remarkably novel feature of this research project, as the existing literature so far has been mainly qualitative.

The first sub-objective of this WP aims at providing a critical assessment of the existing literature on the cultural dimensions of technological change. This represents a necessary preliminary step as the existing literature on the topic is highly fragmented and scattered across a variety of disciplines (history of technology, sociology of technology, economics, gender studies, etc.). On the basis of this critical survey of the literature, it will be possible to formulate a number of hypotheses concerning the process of representation/construction of technologies in the cultural landscape and, in particular, of the factors accounting for the varying degrees of awareness and visibility of different technologies.

The second sub-objective of the WP will consist in a systematic appraisal of the representation of technologies in a variety of historical sources. A particularly interesting source, which is highly valuable by virtue of its detailed coverage, is represented by authoritative works of collective biography such as the Dictionary of National Biography and the Dictionary of American Biography. By looking systematically at the representation of technologies and inventors in these works, it is possible to derive important insights on the process through which technologies become carriers of specific cultural meanings and values. This is confirmed by recent research contributions which have studied the representation of inventors in works in collective biography for specific historical periods (Khan, 2005; MacLeod and Nuvolari, 2005). The aim of this part of the project is precisely to expand on this research, by enlarging the geographical scope and the time frame of the analysis. Another set of sources that are of particular interest in this context are those journals and publications that are at the interface between the inner world of science and technology and the wider cultural ambience (journals such as Scientific American, New Scientists, etc.). This is a type of source that has been so far very little investigated in the science and technology studies literature. This research project will provide an appraisal of the way the cultural significance of technologies is, implicitly and explicitly, elaborated in these sources.The comparative perspective will be implemented also by the construction of a proper set of bibliometric indicators which will reveal the relative "visibility" allocated to different technologies.

The third sub-objective of this WP is to examine the purposeful construction of cultural spaces such as exhibitions and museums aimed at "celebrating" particular technological undertakings. This will be done by means of detailed historical studies of the processes leading to the creation of these spaces. Recent research on this topic has provided interesting insights on how the cultural meanings of technologies are constructed and further elaborated by different social actors (MacLeod, 2006). We propose to expand on these recent studies, adopting a broad comparative perspective which will consider the creation of the most significant museums of science and technology in Europe.

WP 10

Innovative culture: The characteristics of national and organizational cultures supporting innovations in firms

Key partner: VSE

According to the European Innovation Scoreboard 2005, major differences exist across European countries in terms of their innovation performance. A gap exists between leading countries (e.g. Switzerland and Germany), average performers (e.g. Italy), catching up countries (e.g. the Czech Republic) and countries which are losing ground. Despite the fact that many studies on the relationships between innovation inputs and outputs have been done, there is not sufficient information on the relation between the characteristics of national culture and the unevenness of innovation outputs. Conceptual arguments relating cultural characteristics to innovative performance have been around existed for decades. It has been argued that cultural characteristics of innovating societies include willingness to face uncertainties, have a dynamic long-term orientation, low power distance and value creativity. However, the topic has not received appropriate research attention. Most of the existing studies used Hofstede's dimensions (e.g. Shane's studies) and came with some evidence of relations between broad cultural dimensions (e.g. high individualism, low uncertainty avoidance) and innovations (e.g. national innovation output). Nevertheless, the findings are not consistent in time.

An independent measure of cultural values that are directly related to innovations as well as a comprehensive theoretical model of the association between culture and different outcomes of innovative behaviour need to be developed. While not diminishing the significance of innovations in other fields, our backgrounds and interests lead us to further consider innovations in the organizational context and examine the interaction between national and organizational cultures and their joint effects upon innovation. Indeed, the European cultural diversity can be due to the current economic and business climate either triumph or failure of European multinational companies on the global markets. Multicultural companies have more complicated management of human resources than mono-cultural ones. On the other hand, in cultural diversity lie opportunities for the creation of innovations and their development. On a larger scale, innovation is not vital just for companies, but also for the economic and social development at a societal and global level.

The main sub-objectives of this WP are identification and operationalization of the key characteristics of both national cultures and organizational cultures of international companies that support innovative actions. In particular, our goals are to deliver:

a. A better understanding of key characteristics of particular national cultures that support innovations will be beneficial for policymakers.
b. A model of organizational culture of international company to support and generate innovations will be helpful for companies.
c. The definition of key characteristics of innovation culture and their operationalization and the methods of measurement of innovation culture on the national and organizational level will be important for further research in the field.

Particular cultures' strengths in relation to innovations will be explored both at the national and at the organizational (ethnocentric, polycentric and geocentric types of corporate culture) level. Specific type of company (business sector, size, level of inner multiculturalism) with specific firm history (continuity vs. discontinuity) will be taken into account. In the context of encountering of different organizational and national cultures crucial methodical tools for creation and enforcement of organizational innovation culture will be formulated.To empirically study the relationship between culture and innovation at both the individual and the organisational level, this work package will relay on a representative survey of innovation characteristics of national cultures.

Based on literature review, analysis of relations between national culture and innovations will be done and will result in methodology for representative survey of innovation characteristics of national cultures. These adult population surveys will be done by selected vendors in Italy, Switzerland, Germany, and the Czech Republic. Data evaluation will contribute to a National Innovative Culture report. Empirical survey in the companies will follow with an analysis of critical situations in companies in relation to innovations and in relation to cooperation between cultures and innovative actions. Different types of cooperation of two and more cultures (e.g. dominance vs. submission, cooperation, integration, innovation) as well as intrapreneurship and the level of empowerment will be described and analysed. Also hard data will be taken into account: Measures of innovation activity outputs (e.g. patents, new products) and inputs (e.g. financial strength, technological background). Suggestions for accelerating cultural dynamics towards innovations will be produced. Implementation of these recommendations in the selected companies will be finally used for the verification of the methodical tools.

NEST
Pathfinder

INNOVATION AND GROWTH: FOR MANY, BUT NOT FOR ALL?

CID

Innovation is a fundamental engine of growth, prosperity and wellbeing. Yet it is evident that the benefits of new ideas and new technologies are very unevenly distributed – both geographically and across different types of organisations. Addressing this imbalance is especially important in the current context of the newly enlarged EU. CID is seeking to identify underlying cultural reasons for its existence, as a step towards the definition of policies to promote greater equality and entrepreneurship through cross-cultural interaction.

While some countries are enjoying unprecedented affluence and quality of life, others remain mired in poverty and disease. Similarly, whereas some sectors and organisations prosper from a ready grasp of new technologies, others lag behind and stagnate. And great strides in some areas of medical research are matched by discouragingly slow development in others.

Today, the widening boundaries of the EU pose a tremendous opportunity to foster the spread of innovation, learning, and eventual wealth creation through diversity. But the processes of cultural dynamics remain poorly understood, and difficult to manage.

Cultural basis for variation

The CID project's aim is to lay the foundation for a more integrated understanding of the phenomena causing this uneven evolution and spread of scientific and technological knowledge. Its approach to the issue is based on the premise that cultural assumptions play a focal role in determining why and how problems are selected for solution, how they are framed and solved, and how their solutions are implemented and diffused.

Cultural assumptions can be defined as the predominating values, beliefs, attitudes and behaviours that are shared by the members of a society, and which shape the functioning of individuals, groups and organisations within that society.

A variety of partial theories has been advanced to explain the variations in ability to cope with problems, find solutions and reap their benefits, but no clear common thread has emerged. One prime reason for this is that many explanations focus solely on the specific contexts (cultures, industries, etc.) within which they were developed. Another is that prior contributions have largely remained focused on a particular level of analysis: micro – the individuals; meso – projects, products and organisations; and macro – cultures and society at large.

The CID consortium led by Italy's Bocconi University is therefore pursuing a strategy that is both multicultural and multi-level,

"Cultural assumptions play a focal role in determining why and how problems are selected for solution, how they are framed and solved."

spanning all three levels and a number of countries. The collaboration between partners builds upon a range of disciplinary backgrounds: economics, history of technologies, cognitive sciences, organisation theory, innovation management and network analysis – with physics and biology providing tools to model and conceptualise the complexities of cultural evolutionary processes in abstract terms.

Complex relationships

A key objective will be to explain the unevenness by analysis of the interplay between cultural assumptions and variables at the different levels. To avoid over-simplification, phenomena will be investigated at the appropriate levels, rather than being aggregated (for example, studying individuals' attitudes at the national level) or disaggregated (for example, studying national cultural assumptions at the organisational level).

Recognising that these levels are not independent of each other, but rather highly interrelated, critical cross-level relationships will also be specified.

Parallel cross-contextual analyses will explore the interaction between culture and the evolution of different types of knowledge. For example, medical, managerial and technical knowledge differ in several respects: generality versus specificity, abstractness versus contextuality, and tacitness versus codification. Likewise, the processes of knowledge evolution and innovation in industries, such as fashion pharmaceuticals and transport, have little in common.

Taking account of such differences will provide fresh insights into how cultural assumptions interact with knowledge evolution, as well as with innovation and diffusion.

Real-life studies

Separate workpackages will gather data in a number of real-life case studies. One particularly appropriate example is an investigation of how the Accession Countries – having adopted an institutional framework broadly similar to that of Western Europe – are coping with the challenge of adapting behaviours and attitudes to it.

Another case study looks at the university system and its evolution in terms of functions, such as technology transfer and entrepreneurship. Here, too, the lessons learned could be of instructive value to the Accession Countries.

A third focuses on AIDS vaccine development in a bid to discover how success rates for such charity-mediated development projects could be made to match those of the pharmaceutical industry. Further packages explore organisational identity and leadership behaviour in multinational companies, partnerships and culturally diverse innovation teams.

Integration of the findings will provide a set of tools, measures and conceptual categories to form a platform for on-going research.

This wide-ranging project is expected to deliver significant policy-relevant results in several areas: by facilitating more rapid diffusion of existing technologies, independently of their origin; by showing how the management of diversity can boost innovation in intra-and inter-organisational cooperation; and by defining a more efficient process for institutional change in the education system and other culturally influential value-setting sectors.

AT A GLANCE

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Cultural and Innovation Dynamics: Explaining the Uneven Evolution of Human Knowledge

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Rapid advances in some areas of human knowledge have not been matched by similar conquests in others.