



# ABSTRACTS



**GLOBELICS '13**

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SEPTEMBER 11-13, METU - ANKARA

## **TECHNOLOGICAL AND NON-TECHNOLOGICAL INNOVATION AND PRODUCTIVITY IN SERVICES VIS A VIS MANUFACTURING**

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### **Abstract**

In this paper the links between investment in innovation activities, innovation outputs (technological and non-technological innovation) and productivity in services and manufacturing are explored using innovation survey data from Uruguay. The size of firms, their cooperation on R&D activities, the use of public financial support, patent protection, and the use of market sources of information, are the variables that are more consistently associated with the decision to invest in innovation activities across sectors. The main determinants of technological and non-technological innovations are the level of investment in innovation activities and the size of firms. The results indicate that both technological (i.e. product and process) and non-technological (i.e. marketing an organizational) innovations are positively associated to productivity gains in services, but non-technological innovations have a more important role. The reverse happens for manufacturing, technological innovations are the relevant ones for productivity. Some heterogeneities are found across traditional services and KIBS and high-tech and low-tech manufacturing firms. Finally, the level of education of the workforce is found to be a key element associated positively with innovation activities and greater levels of productivity.

**Keywords:** innovation, productivity, services, manufacturing, Latin America, innovation surveys



## **TECHNOLOGY ADOPTION IN SMALL SCALE OIL PALM FRUIT PROCESSING IN SOUTH WESTERN NIGERIA: A SECTORAL ANALYSIS**

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### **Abstract**

Technologies have been developed for various unit operations in small scale oil palm fruit processing in Nigeria. However, a majority of small scale processors in the country still adopt traditional techniques, with a few adopting new processing technologies for a particular stage in the process. The study utilized an Innovation Systems approach to examine and prescribe policy recommendations for the lack of technology adoption in small scale oil palm fruit processing in South-western Nigeria. The analysis was focused upon interactions among actors in the innovation system; sources of science, technology and innovation (STI) and, doing, utilising and interacting (DUI) forms of innovation and; interactions between fabricators of the innovations and the processors. Results reveal that the innovation system in the sector is divided along formal and informal sector lines. The formal sector institutions comprise the Nigerian Institute for Oil Palm Research (NIFOR) and a few universities with agricultural engineering departments who possess the core of the technology and interact well with one another using the STI mode of learning and innovation and have produced innovations for all the five steps of processing oil palm fruits into crude palm oil. These innovations have not been successfully adopted in the sector. The informal sector includes the processors and artisans who fabricate small scale oil palm fruit processing technologies for two stages in the process using the Doing-Utilizing-Interacting mode of learning and innovation. These innovations produced by the informal part of the system are largely based on imitation and cost innovations and have been widely adopted in the sector. The study recommends that technology adoption can be encouraged through the production of technologies fostered by both STI and DUI modes of innovation and, robust fabricator and processor interactions.

**Keywords:** innovation systems, small scale oil palm fruit processing, user-producer interactions, modes of learning and innovation, technology adoption, Nigeria



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## **ICT USAGE AND EMPLOYMENT GROWTH IN UGANDAN MANUFACTURING FIRMS**

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### **Abstract**

This paper investigated the impact of ICT usage on employment growth in Ugandan manufacturing firms. The study attempted to establish whether the increasing use of ICT create or destroy jobs and whether firm characteristics complement ICT usage in improving employment growth. Little was known about the relationship between ICT usage and employment growth in Uganda. The descriptive results showed that manufacturing firms that use ICT create more jobs than firms that do not use ICT. The regression results however did not find any significant differences in terms of employment creation between ICT using and non-ICT using firms. Average education was shown to be positively associated with employment growth. Firm characteristics, however were shown not to be complementary to ICT usage in improving employment growth. Some policy implication emerges from the findings of this study.

**Keywords:** ICT usage, employment growth, firm level data



## **ANTECEDENTS OF ENTREPRENEURIAL INTENTIONS AND ENTREPRENEURIAL BEHAVIOUR: THE ROLE OF ENTREPRENEURIAL EDUCATION AND CONTEXTUAL FACTORS**

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### **Abstract**

Understanding and predicting the emergence of venture initiation entails research to explore the antecedents of entrepreneurial intention and behavior. In this paper, we examine the same phenomena, propose a model and validate its applicability to the entrepreneurship domain. Our model takes into account the role of entrepreneurial education and the contextual factors that serve as a moderating variable in the model. Our entrepreneurial intention model is one logical link process that allows us to better understand the impact of various antecedents of entrepreneurial education and other diverse factors such as psychological and contextual that are of importance for business creation.

**Keywords:** entrepreneurship development, entrepreneurial education entrepreneurial intention, exogenous factor, contextual factors



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## **HOW DO ICT FIRMS IN TURKEY MANAGE INNOVATION? DIVERSITY IN EXPERTISE VERSUS DIVERSITY IN MARKETS**

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This paper provides a novel taxonomy of firms based on specialisation versus diversification in production and markets. Firms may choose to specialise on few production activities or alternatively may build expertise in many activities. There is an accompanying decision when firms sell their products: whether to serve few or many markets. We argue that the location on the specialisation-diversification spectrum significantly affects how firms manage innovation. For a sample of 90 innovator ICT firms in Ankara we find that cooperation structure, sources of innovation and funding of R&D display statistically significant different patterns according to the specialisation-diversification taxonomy.

**Keywords:** management of innovation, core competency, expertise building, R&D, ICT



## **IMPACTS OF ENVIRONMENTAL, STRUCTURAL FACTORS ON KNOWLEDGE ABSORPTIVE CAPACITY, ORGANIZATIONAL INNOVATION AND PERFORMANCE –TESTING MULTIPLE CONTINGENCY MODELS**

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### **Abstract**

As we know well that no single organizational structural is effective in all circumstances. Contingency theory, which forms on of the bases of this study, offers the potential to understand better how organizational factors such as structure and environment affect organizational innovation and performance directly and also through a mediator role of the multidimensional nature of knowledge absorptive capacity (KAC) within a resource-based view and knowledge-base view theoretical framework. This is because many firms are limited to technical solutions and they have failed to consider the organizational and environmental factors. Also research literature on KAC has failed to consider the complementarity effect of these factors using a theoretical capabilities-based view as a theoretical framework that are necessary to make a knowledge-sharing platform successfully for organizational innovation and performance. The objective of this study is based on resources-based view as framework and contingency theory to analyze the complementarity effect of the environmental factors (customer, competitor, technological, supplier and government) and the organizational structure (complexity, formalization, centralization and integration) on organizational innovation (process, product, and management) and performance directly and through KAC 2 as mediator construct within a knowledge-base capabilities theoretical framework because these relationships have received relatively limited empirical attention. This study explores these relationships using a multivariate data analysis technique i.e., partial least square (PLS), a structural equation modelling (SEM) approach along with reflective-formative type hierarchical latent variables, with data sample of 342 from 193 large, medium and small diversified firms from a multi-sector in Korea. The empirical evidences show that environmental factors contribute positively to KAC, innovation but surprisingly



not to performance. The structure also contributes positively to KAC, innovation and performance. KAC contributes positively to innovation while innovation contributes positively to performance. The role of KAC as mediator between environment and structure has explored. Also the role of innovation as mediator between KAC and performance has also explored. The results also confirm that KAC reveal the multidimensional nature of KAC which has the same notion with that of technological development process of Korean innovation model. It also confirms that the complementary effect of the organizational structure and environmental factors on KAC, innovation and performance. The role of KAC and innovation as moderator is also confirmed while the relationship between innovation and performance has been explored. In conclusion, this study is the first attempt to explore the relationship among, environment, structure, KAC, innovation and performance together by using SEM-PLS, demonstrating that such a study is feasible in terms of comprehension, size, and methodology. Based on finding of this study, an attempt is made to provide and suggest alternative polices and strategies for firms in Korea.

**Keywords:** absorptive capacity, environment, structure, innovation, performance, PLS, SEM, Korea





## **TECHNOLOGICAL INTERFACES OF THE BRAZILIAN NAVAL AND OFFSHORE INDUSTRY**

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### **Abstract**

As an emerging economy, Brazil is facing several challenges in science, technology and in its industrial organization. The recent challenges of the Brazilian naval industry have generated a unique opportunity for studies on technological innovation and economic development. This paper presents the recent developments and future prospects of this industry under the theoretical framework of 'technological interfaces'. Technological interface is a techno-social-economic construct for understanding national, regional and sectoral characteristics involving (1) the recognition and understanding of the existing network of support institutions for scientific and technological development, (2) level of utilization of the existing industry's technical-operational structure, and (3) socioeconomic wealth generation through the development of knowledge and skills for technological innovation. Therefore, technological interfaces seem to be a relevant construct in understanding scientific and industrial organization and dynamics in order to generate wealth and economic development. It is therefore, a theoretical construct and at the same time a tool in order to establish greater coherence to the dynamic set of relationships between scientific and technological activities, industrial-production and innovation. The scenario provided by the Brazilian offshore and marine industry offers an opportunity to studying the benefits of technological innovation for the country's economic development more broadly and not an end in itself, having ramifications on the economy as a whole. Loosely speaking, the development project of shipbuilding and platforms in Brazil, unveils a potential dynamic similar to large national projects, such as the U.S. space project in the 50s. By establishing scientific parameters of analysis for the study of this object, it is possible to generate a broader diagnosis of the technological interface matrix of the industry, but mainly it is possible to map the framework of operational gaps and the needs for technical-scientific development.

**Keywords:** technological interfaces, naval industry, innovation



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## **INNOVATION-SYSTEM BUILDING AND ECONOMIC DEVELOPMENT – THE EVOLUTION OF THE SUGARCANE AND BIOFUEL INDUSTRY IN BRAZIL**

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### **Abstract**

Building systems of innovation is currently a crucial aspect of economic development in the global economy. Still, both the application of the innovation system approach to countries in the South and research on how to build innovation systems is in its infancy. The main goal of the paper is to contribute the latter research gap by analysing how and under which circumstances the sugarcane and biofuel innovation system emerged and grew in Brazil in the period 1900-1990.

**Keywords:** innovation-system building; functional approach; interactive learning spaces; economic development; sugarcane; biofuel; Brazil.



## **INNOVATION DYNAMICS IN NATURAL-RESOURCE BASED INDUSTRIES: WHERE THE GEESE DON'T FLY**

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### **Abstract**

Here we want to further advance our understanding of natural-resource based development by looking closer at the innovation dynamics in natural-resource based industries. Particularly we are interested in whether, and if so how, learning and capability building processes differ between natural resource-based industries and e.g., manufacturing industries. Our suspicion is that there might be something special about natural-resource based industries after all, but it isn't what the resource curse is arguing. The thesis put forward here is that innovation in natural-resource based industries to a larger extent than manufacturing necessitates context-specific capability building due to the idiosyncrasy of the micro-ecologies of natural resources.

**Keywords:** natural resources; development model; knowledge; institutions



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## **LOW-CARBON INFRASTRUCTURES AND SYSTEMS OF INNOVATION. NO TRANSITION WITHOUT TRANSMISSION?**

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It is becoming increasingly clear that infrastructures and infrastructure transformations must play a central role in any form of low-carbon transition. Despite its obvious relevance for innovation dynamics this issue is under-researched both in studies of renewable energy technologies and more broadly in innovation studies. With focus on transmission infrastructure, we propose a conceptual model of infrastructure transformations, illustrate it with a case study, and link it to research on technological innovation systems (TIS). A key proposition is that in the short run infrastructures are static and closed structural components of a TIS while in the longer run they are dynamic and open, and should be considered as a 'slow-moving' TIS.

**Keywords:** low-carbon transition; infrastructure; innovation systems; electricity transmission; Norway.



## **ECONOMIC GROWTH, INNOVATION AND INEQUALITY IN LATIN AMERICA: IMPROVEMENTS, SETBACKS AND PENDING ISSUES POST WASHINGTON CONSENSUS**

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### **Abstract**

This paper examines the evolution of the Latin American economies during the period 1990-2011, with the objective of identifying the improvements, setbacks and pending issues associated to the market reforms that were applied, in keeping with the Washington Consensus, and the economic policies that followed and that drifted away from this orientation. The analysis places special emphasis in three aspects: the expansion of the per capita output, innovation and distribution of personal income. The main objective of the paper is to identify the relationships between growth patterns, systems of innovation and the welfare indicators of the economies. That is, to determine whether the observed trajectories in the long run show the configuration of development regimes in the region. For this purpose, both the modification in the relative weight of the components of aggregate demand in economic growth as well as the repercussions of investment on experimental research and development on the innovation system, are analysed. Additionally, we seek to establish what the effects of these modifications and repercussions were upon welfare as measured by the changes in per capita income and in inequality in income distribution. This comparative analysis aims to contribute to the reflection of the changes, necessary or probable, that public policies in the region must follow in order to boost their development.

**Keywords:** growth, innovation, inequality, Latin America, economic and innovation policies.



## **INFLUENCE OF RESEARCH, TECHNOLOGY AND HR MANAGEMENT DRIVERS ON SMEs INNOVATION: CASE OF BELARUS**

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### **Abstract**

The paper discusses the sources of innovation of SMEs. We contribute to the literature by: (1) proposing a new classification tool for innovative companies – the RTH (Research, Technology and Human Resource Management (HRM) practices) model of innovation; (2) differentiating between the R, T and H drivers of innovation; (3) revealing unique characteristics of innovative firms (we label it -innovation profiles-); (4) distinguishing firms dominated by different innovation profiles and modes of innovation proposed by the RTH model. In this work we attempt to fill the gap by connecting economic drivers of innovation such as the Research and Technology drivers with the HRM driver in one model of innovation.

This analysis is novel for Belarus and data is obtained from 51 SMEs in the IT sphere. We then assess the innovation output–driver relationship within an ordinal regression framework. We have found that the SME's innovation output is in fact more sensitive to the Technology and HRM drivers than to the Research driver. We identified SME's mode of innovation as a combination of innovation profiles and revealed 3 modes of innovation of Belarusian SMEs in IT sector. One of the modes of Belarusian IT firms can be characterized as strong technological and rather strong level of HR practices, that includes innovation profiles of 35 % SME, has the highest innovation output. The implication of our study finding for theory and practice are discussed.

**Keywords:** SMEs, innovation, firms, RTH, drivers of innovation, innovation mode, R&D, technology, innovation management, transition economy, Belarus.



## **ON STRUCTURAL CHANGE, POWER RELATIONS AND DEMOCRATIC KNOWLEDGE POLICIES**

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### **Abstract**

Structural change is characterized as the transition to a knowledge-based and innovation-driven economy. It is taking place in some regions of the world and not in others; nevertheless the whole planet is deeply conditioned by such transition in which a capitalist knowledge society emerges or is already being consolidated. In such context, the role of knowledge as the main resource of power relations generates social and geographic inequalities. Prevailing innovation policies foster rather than hamper such trend. Innovation systems theory focuses its attention on the interactions of a plurality of actors that generate innovations and new capabilities. The type of innovations that take place depends highly on the specific interests of those actors and on their relative power. Thus a main question is which organized networks actually or potentially included in innovation systems may be interested in, and have power for, fostering democratic knowledge policies. The aim of this paper is to explore and explain this set of assertions; it aims as well at presenting a way of addressing democratic knowledge policies able to foster social inclusion.

Key words: systems of innovation, power relations, innovation policies, knowledge politics, inequality, development.



## **INNOVATIVE PERFORMANCE IN BRAZILIAN COSMETICS INDUSTRY**

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### **Abstract**

Although innovation capabilities have been widely investigated, the consensus around its components and their measures hardly exists. Currently, some studies, such as Rush, Bessant and Hobday (2007) and Cetindamar, Phaal and Probert (2009), have proposed models for the evaluation of innovation capability as a result of the technological learning process. According to this approach, being capable of innovating means to acquire information, turn it into new knowledge, promote technological changes and develop new products. Based on this concept and in order to master the process of knowledge absorption, it is necessary to understand the firm's technological change through the amount of activities that contribute to innovation. As a result, activities such as acquisition, assimilation, transformation and knowledge exploitation have been defined as part the innovation capability through the absorptive capacity. To complete the innovation process, technological activities such as identification and selection of new technologies, building technological competencies, technology development, protection and technological exploitation have been included on the research. The purpose of this paper is to compare different innovation capabilities among the firms using clusters of the innovative performance. We conducted the survey over 202 companies of the Brazilian Cosmetics industry. Primary result shows that most companies launch new cosmetics based on the available knowledge already existing inside their supply chain. Thus, customers and suppliers have an important role in product development. Through cluster analysis, four different innovative performance clusters have been identified, as one of them was characterized by having the highest innovative performance.

**Keywords:** innovative performance, Brazilian cosmetics industry, cluster analysis





## **CAPABILITIES, LINKAGES, AND PERFORMANCE. THE RECENT DYNAMIC OF THE ARGENTINE SOFTWARE AND IT SERVICES SECTOR.**

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### **Abstract**

From a theoretical framework that combines the neo-Schumpeterian evolutionary approach with the resource-based view and the social networks perspective, this article studies the impact of both firms' network position and technological, commercial, organizational, and absorption capabilities on the performance of software and IT services firms during recent years in Argentina. The results of the models show that economic performance, in terms of productivity levels, the employment growth rate, and firms' exports, cannot be explained on the basis of a uniform set of capabilities and connectivity indicators. Each of the three performance measures is explained by different indicators.

**Keywords:** capabilities, linkages, performance, software and IT services.



## **STRENGTHENING REGIONAL INTEGRATION WITH THE NEIGHBOURHOOD SYSTEM OF INNOVATION: CONCEPTUAL FRAMEWORK**

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### **Abstract**

Over the years, there has been proliferation of regional monetary, trade and economic blocs in every part of the world from Asia, Africa, Europe and to the Americas. The main reason for this is to combine strength to attain effectiveness in international negotiations, to deal with an integrating world economy, and the effort to enlarge markets and open trade diversification possibilities. What emerges in different regional groupings is the relative importance of one or two leading players ('Regional Economic Poles') with a larger national economy. For Example, Brazil plays a big role in the Mercosul regional grouping, India in SAARC, and China in South East Asia, South Africa in SADAC and NEPAD, and Russia in CIS.

What we propose is how to strengthen regional integration using innovation conception and theoretical lens. That is, we argue that the reciprocal interaction between national innovation systems (NSI) of larger and smaller economies strengthening regional integration within the respective regions can be conceptualized and studied by employing innovation system perspective. We show that an innovation system perspective might be useful for understanding and strengthening regional integration. The paper is exploratory and it focuses on the following questions: 1. What is the role of the NSI of the regional economic pole in influencing the regional integration among the regional economic community? 2. How can the system of innovation concept be used to strengthen the regional integration? It uses the examples of China & ASEAN, South Africa & Southern Africa, and India & SAARC to illustrate the usefulness of the Neighbourhood

System of Innovation conceptual framework for strengthening regional integration.

**Keywords:** regional integration; national innovation system; neighbourhood innovation system; regional economic pole; developing countries



## **EXPLORING THE IMPACT OF UNIVERSITY-INDUSTRY LINKAGES ON INDUSTRIAL INNOVATION: EMPIRICAL EVIDENCE FROM MEXICAN FIRMS**

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### **Abstract**

This paper explores the impact of University-Industry linkages (UIL) on the innovative performance of Mexican firms. Taking into account the diverse nature of universities and public research centres (PRC) we examine the effect of links with universities and PRC separately. Based on original data gathered by a survey encompassing 382 Mexican manufacture and services enterprises, the results of logistic regression models indicates that UIL have significant but mixed effects on firms' innovativeness. Meanwhile links with universities seem to enhance product innovations, interactions with PRC seem to foster process novelties. Our results also confirm empirically the major impact Research and Development (R&D) formal activities have on both types of innovation. Regarding technological intensity of firms we found a significant influence on product innovation but not on process novelties with high technology firms performing better than those from low technology and services sectors. Conversely, size and age have notable influence on process innovation but not on product novelties, with larger and younger firms innovating more than small and aged ones. The variable belonging to a group does not have a significant impact, at least on the sample examined, on the innovative profile of firms. Finally we conclude by reviewing our empirical results and discussing some tentative policy implications.

**Keywords:** university-industry linkages, industrial innovation, product innovation, process innovation, econometric logistic model.



## **SYSTEMIC ANCHORING OF GLOBAL INNOVATION PROCESSES AND NEW INDUSTRY FORMATION – THE EMERGENCE OF ON-SITE WATER RECYCLING IN CHINA**

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### **Abstract**

Understanding why and where emerging industries locate in today's globalizing economy is a much debated topic, especially in the context of the recent evolutionary turn in economic geography. This paper proposes a new perspective based on the technological innovation system (TIS) approach. It argues that existing theories on industry formation could be extended with a systemic and multiscalar view on the social construction processes in the very early industry formation phase. It hypothesizes that regions which successfully locate new industries combine the build-up of a territorial embedded TIS with drawing on innovation dynamics from other regions of a globally distributed TIS. A respective analytical framework is introduced and exemplified with a case study on on-site water recycling technology, based on interviews with 40 experts in Beijing, Shanghai and Xi'an, China. Our data suggests that a considerable on-site water recycling industry developed only in Beijing, which seen from existing theories on industry formation provided the least favorable initial conditions. Its success appears to be explainable with a local innovation system build-up process that recurrently and effectively anchored global TIS dynamics in its local context. We conclude by discussing how the proposed framework can enhance the understanding of industry formation and argue for a systemic innovation policy approach for supporting new industries.

**Keywords:** industry formation; anchoring; technological innovation system; clean-tech; on-site water recycling



## **CULTURAL INDUSTRIES, INNOVATION AND ORGANIZATIONAL FORMS IN A SEMI-INDUSTRIALIZED COUNTRY: THE CASE OF AUDIOVISUAL PRODUCTION IN ARGENTINA**

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### **Abstract**

The aim of this presentation is to make a theoretical and methodological contribution to the discussion on innovation and organizational forms in cultural industries and especially in those related to audiovisual production. This contribution is expressed in three central arguments.

First, any discussion of innovation, skills development and the organization of audiovisual production needs to be framed in the context of political economy. That frame is necessary as it is in the context of political economy in which it is possible to characterize and understand the relationship of forces that results in a truncated national film market (where the share of national films on total tickets sales is around 10%). It is in this economic and political framework in which we can describe and analyze the way in which production and innovation activities in the audiovisual complex are organized. Second, that the market conditions in which audiovisual production works in a country like Argentina and certain national characteristics (such as the importance of state support for domestic production and a long national trajectory in film and audiovisual production) result in a highly diversified orientation to the market and in low levels of vertical integration (with regards to services used in audiovisual production).

Third, these market conditions in combination with certain micro, meso and macro elements at the national level are associated with special modes of innovation. In particular we will examine two instances where innovation activities happen: at the level of the whole audiovisual production complex and at the scale of individual companies. At the level of the production complex we examine distributed innovation processes that accompanied the creation of a new aesthetic movement in Argentine cinema, starting in the mid-1990s. At the scale of the companies we will study three



aspects of innovation processes: (i) the introduction of new products or services, and the use of new technologies, (ii) the outputs and other indicators of appropriability of innovation activities; (iii) information sources for innovation, and (iv) the perception of firms regarding whether their products have an aesthetic that distinguishes them from other companies. This paper makes two central contributions. On the one hand, we sketch a methodological framework for analyzing organizational forms and innovation activities in film and audiovisual production. On the other, we provide new knowledge about cultural industries in the context of semi-industrialized countries occupying an intermediate position in world audiovisual markets. The paper draws on a survey of 55 audiovisual production companies, in various surveys conducted as part of a larger research project and in a number of secondary sources and previous studies.

**Keywords:** cultural industries, audiovisual production, filmmaking, innovation, Argentina, organizational forms



## **INNOVATION IN THE SOFTWARE SECTOR: A COMPARATIVE STUDY BETWEEN ARGENTINA AND BRAZIL**

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### **Abstract**

Latin America is undergoing an increase of activities in the sectors related to Knowledge Intensive Business Services. The aim of this paper is to compare the structural characteristics and innovative performance of the Software and IT Services sector in two Latin American economies: Argentina and Brazil. A Sectoral Systems of Innovation perspective is adopted, trying to offer insights into the innovative behavior patterns of both sectors in terms of their similarities and differences, emphasizing specially on sectoral policies implemented in both countries. From an exploratory and descriptive study, that offer wide possibilities for a deeper analysis. Based on innovation surveys, the paper shows a differential –yet successful- innovative performance between these economies in this sector: in quantitative terms, Argentina's SSI showed a better innovative performance which could be explained, at a first moment, by a differential intensity in the innovation activities; but also the qualitative comparison highlights some differences between its sectoral systems, particularly related to the effective coverage of the policy promoting instruments, their export concern and the production profile of each case.

**Keywords:** sectoral system of innovation; software sector; Argentina; Brazil.



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## **SCIENCE, TECHNOLOGY AND INNOVATION POLICIES FOR INCLUSIVE DEVELOPMENT: SHIFTING TRENDS IN SOUTH AMERICA**

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### **Abstract**

In what ways could science, technology and innovation (STI) help to overcome some of the main challenges of South America's development? How could STI policies promote social inclusion in these countries? More specifically, what policies could substantially contribute to expanding people's choices, and learning capabilities and opportunities, and their inclusion into science, technology and innovation-based development processes? Furthermore, what role and how could other policies and instruments (social, industrial-productive, agricultural, etc.) contribute to that same goal, intertwined with science, technology and innovation policy? What analytical frameworks and theoretical underpinnings could reinforce this integrative approach and help to better understand the dynamics between science, technology and innovation (STI) and inclusive development? The article explores these triggering questions by analyzing the current national plans on science, technology and innovation (STI) and their connection to inclusive development in four South American countries. It does so, first, by posing some of the key issues that conform the idea of inclusive development. Secondly, it explores the relationship between STI and development. The third section concentrates on the role of inclusive innovations for inclusive development, to then analyze the STI policies for inclusive development. Learning from few ongoing experiences in South America is the main issue of the fifth section, before summarizing some of the main final remarks of the article.





## **INNOVATION AS IF PEOPLE MATTERED: DESIGNING INSTITUTIONS FOR LAND-BASED ECONOMIC DEVELOPMENT**

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### **Abstract**

This paper addresses the question of how institutions for innovation should be designed to best promote social-justice governed Triple Bottom Line outcomes in land-based economies. We discuss ideas about Triple Bottom Line accounting in light of the New Sussex Manifesto, political economy and innovation systems theory. We argue that the normative foundations of predominating innovation policies have been insufficiently discussed and that opening such a discussion implies rethinking innovation systems' design. Systems for ethically sound innovation in land-based economies would have to look beyond science, technology and competitiveness; it would have to consider carefully the needs and rights of those whose livelihoods depend on the resources that are affected. Consequently, the innovation system should be open to knowledge and interests other than those represented by science and industry; empowering underprivileged stakeholders would be a key task of innovation systems in land-based economies. We end the article by suggesting a set of general principles for the design of systems for humane innovation in land-based economies.

**Keywords:** innovation, business, ethics, triple bottom line, social justice



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## **DO INTELLECTUAL PROPERTY RIGHTS ENHANCE PRODUCTIVITY GROWTH? EVIDENCE FROM AGRICULTURE**

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### **Abstract**

Using an index of intellectual property (IP) protection for plant varieties, this paper explores the impact of strengthening IP protection on agricultural productivity in a panel of 69 countries for the period 1961-2011. It finds that the impact is positive and statistically significant for high- and low-income countries, while a significant effect of intellectual property rights (IPRs) on yields was not found for middle-income countries. In addition, the IP index was found to be uncorrelated with the growth rate of yields of some of the groups considered. Interestingly enough, for middle-income and developing countries, it turned out to be significantly and negatively correlated with productivity growth. These evidences point out the existence of non-linearities in the effect that IPRs have on agricultural yields.

**Keywords:** intellectual property rights; productivity; agriculture; international comparison



## **INNOVATION, ABSORPTIVE CAPACITY AND GROWTH HETEROGENEITY: DEVELOPMENT PATHS IN LATIN AMERICA 1970- 2010**

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### **Abstract**

The paper carries out an analysis of long-run development paths in Latin America in the period 1970-2010. We focus on three main dimensions – openness, industrial structure and innovation – and analyze how changes in these factors, and the specific combination of them adopted by each country, have affected its income per capita growth. We apply Johansen cointegration approach to time series data for 18 Latin American countries. The analysis leads to two main results. First, we show that Latin American countries have followed different growth trajectories depending on the combination of policies they have adopted to catch up. Secondly, we find a clear correspondence between policy strategies, on the one hand, and growth performance, on the other. Countries that have managed to combine imitation and innovation policy have experienced a higher rate of growth than those economies that have only made efforts to improve their imitation capability.

**Keywords:** innovation; absorptive capacity; economic growth; heterogeneity; development paths; long-run causality; Latin America



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## **FORMAL AND INFORMAL SOCIAL CAPITAL AS DETERMINANTS OF MALE AND FEMALE ENTREPRENEURSHIP IN EUROPE**

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### **Abstract**

This article analyses the effect of social capital on entrepreneurship in Europe, distinguishing between formal and informal social capital and controlling for other forms of capita (e.g. human capital). The analysis is based on an integrated dataset on 27 European countries from the European and World Values Surveys. Social capital has a significant impact on entrepreneurship that differs according to its formal and informal components. Men use the opportunities opened up to individuals in Europe by formal social capital through involvement in organisations to access wage employment. Women tend instead to take advantage of formal social capital to turn to entrepreneurship. Informal social capital, through strong interpersonal relationships, facilitates entrepreneurial activity. To better understand the role of social capital and human capital in Europe, whose country members have different degrees of development, could help to improve policies aimed at encouraging entrepreneurship.

**Keywords:** entrepreneurship, female employment, self-employment, social capital



## **USER-PRODUCER INTERACTION AND THE DEGREE OF NOVELTY OF INNOVATIONS: A GLOBAL PERSPECTIVE**

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### **Abstract**

User-producer interactions have been traditionally recognized as important factor for the innovation process. However, most of the literature on user-producer interactions is based almost exclusively on the evidence of users and producers located in high-income countries. Using original firm-level data collected in nine countries, this paper argues that having international customers has a positive impact on introducing novel innovations. In particular, the results suggest that firms in low and middle-income countries will benefit more from south-south collaboration than a south-north one, at least in terms of innovation.



## **DETERMINANTS OF EMPLOYMENT PROBABILITIES AND EXPECTED EARNINGS OF ENGINEERING GRADUATES: AN EMPIRICAL STUDY IN DELHI, INDIA**

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### **Abstract**

The study aims to analyze the labor market profile of engineering graduates in Delhi using the data collected from the final year engineering graduates (B.Tech) studying in different types of colleges (central government/state government/private) and departments of study (traditional/IT related courses) in Delhi. The survey covers 1178 students in the academic year 2009-10. The analysis of the data is done in two stages. First, the labour market profile of the engineering graduates in Delhi is analyzed on six important dimensions like the percentage of students got job offer upon their graduation, waiting period of the engineering graduates (the time gap between the job obtained and the completion of B.Tech degree), type of job the engineering graduates have got (engineering/non-engineering), location of the job (Delhi and its neighbouring states/other states), type of the company the students are joining their job (domestic/foreign/joint-venture) and the annual salary of the graduates by individual characteristics of the students, household characteristics of the students, students' academic background and factors related to current education of the students. Secondly, logit model is applied to find out the factors (individual characteristics, household characteristics, students' academic background and factors related to current education of the students) determining the employability of an engineering graduates by taking 'whether the students have got job offer or not upon their graduation' as dependent variable, which is a dummy variable. Further, an attempt is made to find out the determinants of the earning of engineering graduates i.e. the amount of expected annual salary of the students contracted at the time of placement by the employers to engineering graduates in Delhi with the help of Ordinary Least Square (OLS) technique. The study has found that even though the graduates of private institutions are investing comparatively more than the graduates of government institutions, their probability of employment through on-campus recruitment is less. Further, the percentage of marks scored



by graduates in their higher secondary examinations (taken as a proxy of quality of the graduates) was positively related with the determination of both probability of employment and the annual earnings of graduates.

**Keywords:** engineering education and labour market; traditional and IT related courses in engineering education; determinants of job offer; expected earnings; India



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SEPTEMBER 11-13, METU - ANKARA

## **THE LEGISLATION OF PUBLIC PROCUREMENT POLICY FOR INNOVATION IN CHINA**

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### **Abstract**

The Chinese PPFi policies have taken place quite late comparing to the developed countries. And it has to face the reality of huge economic gap between the East, the Middle and West area in such a vast territory, the truth that Chinese enterprises are still struggling in the gradual process from imitation stage in both technologies and business pattern to innovation driven stage. Yet from the case of Shanghai's PPFi policies we can see that, the Chinese government is adopting the expertise and knowledge of innovation stimulation by transferring the supply policies into demand policies for innovation, which may present the political innovation from inside itself. Yet there are still a lot of hindrances and problems if the government want to further exploit the function of PPFi policies such as the flexibility of public procurement organization setting, the changes of fund save-first priority needed and the level of innovation stimulation that the government should interfere with. Besides, the government should aware that innovation can only be realized through combination of the need for product or service innovation with transparent process to ensure fair competition in public procurement.





## **TRUST AND INNOVATION WITHIN GLOBAL VALUE CHAINS: METAL MECHANIC AND INFORMATION TECHNOLOGIES SME'S IN NORTHERN MEXICO**

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### **Abstract**

This paper presents the results of a study conducted in 2011 in Sonora, Northern Mexico, a regional environment populated by large multinational corporations and where small firms face many difficulties to innovate and participate in global value chains. The relation between trust and technological innovation in SME's is analysed under the assumption that trust reduces uncertainty and transaction costs by replacing the incomplete information in the client-supplier relation. Trust is classified in three dimensions: normative (based on honesty and good will), technical (based on technical skills) and strategic (based on leadership and prestige). Results indicate that the influence of normative and strategic trust is indirect since both are mediated by learning processes resulting from the client-supplier relation, meanwhile technical trust exerts a direct influence on innovation.



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SEPTEMBER 11-13, METU - ANKARA

## **STRENGTHENING INNOVATION CAPABILITIES FOR INCLUSIVE TERRITORIAL DEVELOPMENT IN EL SALVADOR, CENTRAL AMERICA**

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### **Abstract**

Achieving inclusive territorial economic development in the context of extreme structural inequalities in El Salvador, demands strategic action to strengthen innovation capabilities of economic initiatives, as well as in other public and private actors integrated in emerging territorial systems of innovation. This paper applies a robust but flexible conceptualization of innovation capabilities to the analysis of illustrative case study examples of associative business ventures that integrate small scale agricultural producers into associative efforts to add value through transformation and introduce innovative products in dynamic national and international markets. The paper concludes with forward looking reflections on lessons from this case study analysis for the design of public policy and development programs to facilitate the emergence and strengthening of innovation capabilities in similar initiatives, as well as for the construction of territorial systems of innovation, as key elements of strategies for inclusive territorial development.



## **INNOVATION FOR THE “BASE OF THE PYRAMID”: DEVELOPING A FRAMEWORK FOR POLICY EXPERIMENTATION**

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### **Abstract**

There is increased interest in innovation for people at the bottom of the pyramid (BOP innovation). The term is used loosely and there are various definitions. This chapter offers a broad definition of BOP innovation and gives a rationale for BOP innovation. It provides a framework for thinking about BOP innovation and presents some case studies. It discusses policy instruments for promoting BOP innovation and suggests some policy approaches, contrasting those of India and China. Finally it proposes some ideas about what more could be done.



**GLOBELICS '13**

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## **ENVIRONMENTAL PROTECTION AND INNOVATION IN DEVELOPING COUNTRIES: EVIDENCE FROM TURKEY**

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### **Abstract**

Using unique data on the innovative and environmental protection activities of firms, this paper investigates the determinants of firms' environmental performance in the Turkish manufacturing sector where firms are faced with fairly lax environmental regulations and possess lower innovative capabilities compared to their counterparts in developed countries. Focusing on the case of a developing country, we aim to explore the applicability of 'Porter's win-win hypothesis' which suggests that stricter innovation-inducing environmental regulations encourage firms to innovate in ways that protect the environment while also saving costs and/or improving their market shares. Unlike a large body of literature confirming the validity of Porter's hypothesis in the developed world, our results point to potential areas this hypothesis may need amendments in the case of developing countries. We find environmental protection is most closely determined by generic innovative activities of firms; but an increased stringency in environmental regulations fails to improve the environmental efforts of firms. We conclude that unless the innovative capabilities of firms in developing countries can be improved, regulating the industries will not prove efficient for improving environmental protection in developing countries.

**Keywords:** environmental innovation, eco-innovation, Porter's hypothesis, environmental protection, Turkey.



## **AFRICAN SOLUTIONS FOR AFRICAN PROBLEMS: SOUTH AFRICAN NANOTECHNOLOGY RESEARCH FOR AFRICAN DEVELOPMENT**

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### **Abstract**

It is more in relation to political problems that the 'African Solutions for African Problems' notion is usually applied. It rarely meant African technologies for African problems given the low level of technological demand and development in Africa. However, there is an exception when it comes to the level of technological development in Africa. If 'African solutions for African problems' is meant to subsume notions of 'African technologies for African problems', then it mainly applies to South African technologies. With numerous world-firsts in technological inventions under its belt, South Africa boasts a world class science and technology infrastructure on a par with the advanced countries. This is true of nanotechnology - the epitome of 21st century techno science. While nanotechnology's trajectory was heavily tilted towards meeting the demands of first-world consumer markets, it is having an important twist in South Africa as it embarks on a mission to tackle poverty related societal malaises like Poverty Related Diseases (PRDs) in particular. South African nanotechnology is proving to be a veritable translation of the rather nebulous rhetorical 'African Solutions for African Problems' approach. The paper argues that South Africa is in a unique position to effect the realisation of the idea and suggests that the rest of Africa has to draw on not only the opportunity that South African nanotechnology research offers but also the opportunities arising from South Africa's partnerships with other countries. The paper raises some of the challenges that may dilute the 'African solutions for African problems' philosophy with respect to nanotechnology research and development.

**Keywords:** African solutions for African problems (ASAP), nanotechnology, hybrid response, nanotechnology for development (Nano4D), millennium development goals (MDGs), South Africa, networks



## **CLUSTER DEVELOPMENT IN LOW RESOURCE SETTINGS: THE CASE OF BIOETHANOL AND FRUIT PROCESSING CLUSTERS IN UGANDA**

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### **Abstract**

Innovative business clusters are being adopted in low income countries. The challenge is to make them grow to become competitive. This paper identifies enabling conditions and barriers to the growth of two clusters in Uganda viz: bioethanol and fruit processing clusters. A technoscientific<sup>1</sup> innovation systems approach with a specific technological innovation systems analytical framework is used. The clusters were taken as sectoral innovation systems. In each cluster, focus group discussions with cluster firms and interviews were held, cluster activities were observed, and relevant documents were reviewed. Findings reveal that active participation of university scientists in the clustering process is an enabling factor, especially when they maintain a significant presence in the cluster communities. The clusters, however, need to be more inclusive of other actors including financial institutions, business associations, farmer groups, inputs suppliers and relevant non-governmental organizations. The absence of targeted goals and incentives specifically to attract investments in the cluster areas and to drive formation of markets for the cluster products is a major barrier. However, the goals, if formulated, should balance promotion of cottages<sup>2</sup> with developing more larger-scale industrial enterprises. This work shows that it is possible to use a techno scientific innovation systems approach to identify and address cluster development challenges in low resource settings, taking into account unique socio-economic and cultural issues.

**Keywords:** bioethanol, cluster, fruit processing, innovation system, university, Uganda.



## **AN INNOVATION AT THE MANAGEMENT MINDSET OF DEVELOPMENT AGENCIES: COBIT-5**

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### **Abstract**

It is widely accepted that innovation is not optional and not just ascribed to technological aspects due to the fact it is a requirement of ever changing multidimensional environment that affects every determinant and parameters. By the drive of global competition based on management of innovating cutting edge technology, more and more people within business functions need to have IT skills and will inevitably be involved in IT processes, decisions and operations. Therefore business and IT need to be better integrated as they are becoming interdependent and intertwined. Since poor integration of different IT systems incongruent with business needs and strategies is accepted as one of the major explanations for inertia and traditional approaches reflected in the mindset of management and governance that cause failures of effective accomplishment of the business and IT goals and objectives of organizations, this paper tries to analyze the need and effects of change at IT governance infrastructures of Development Agencies (DAs) in Turkey that can be positively developed and promoted with COBIT-5 model revealed at the end of 2012 by Information Systems Audit and Control Association (ISACA). This paper introduces needs for innovation in management and governance mindset of DAs and compares the holistic and integrated application of COBIT-5 framework to improve and promote the level of better management and good governance from both a theoretical and practical point of view.

**Keywords:** development agencies, COBIT-5, innovation, paradigm shift, change management.



## **CAN RENEWABLE ENERGY SOLVE THE PROBLEM? PRELIMINARY REMARKS ON BASIC PROBLEMS IN TURKISH ENERGY SECTOR AND SUGGESTIONS FOR SOLUTION**

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### **Abstract**

In Turkey, the share of fossil fuels in primary consumption and electricity generation are very high and they are mostly imported sources. This energy scheme threatens energy supply security indirectly because Turkey seems to be not self-sufficient for supplying needed fossil fuels. To meet the increasing energy demand in sustainable manner; Turkey may decrease the share of fossil fuels in energy supply and provide energy security in long term through clean ways. For this purpose, increasing the share of domestic renewable sources in energy consumption can be seen as a promising solution. Therefore energy demand in Turkey can be satisfied by a balanced energy bundle in which the shares of wind energy and solar energy are in considerable rates. The main assumption in this paper is that the basic problem in Turkish Energy Sector is the pressure on energy supply security as a result of import dependency for fossil fuels. The suggestion for solution can be increasing the share of domestic renewable sources in energy consumption. We inferred this intuitively by analyzing current Turkish Energy Sector Scheme. In this paper, it is aimed to question these basic inferences by interview-based research. For this purpose, in-depth interviews have been conducted with experts from Turkish state authorities, firms, and researchers. Interviewees have been asked about the current situation of Turkish energy sector, the main problems, their suggestions for solution and their perception of change in energy sector towards renewable sources. The paper is an attempt to understand the main background behind the existing situation of Turkish Energy Sector and to learn whether renewable energy can be a solution or not.

**Keywords:** energy problem, renewable energy, technological systems, Turkey





## **THE IMPACT OF FDI THROUGH BACKWARD LINKAGES ON THE EMPLOYMENT GROWTH AND TECHNOLOGICAL INNOVATIONS OF LOCAL FIRMS IN EMERGING ECONOMIES**

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### **Abstract**

This paper investigates the impact of foreign direct investment through backward linkages in eight Central and Eastern European countries on the innovation and employment growth of local firms. Based on 38,000 firms, our econometric results show that local firms with backward linkages to foreign-owned enterprises exhibit significantly higher average employment growth rates in the subsequent two years. The magnitude of this effect increases with local firms' levels of absorptive capacity. However, the effect of FDI through backward linkages is insignificant for small firms and services. Furthermore, the innovation performance of local suppliers will only benefit from the presence of foreign-owned firms if the labour productivity gap is not too large. Finally, backward linkages have a greater effect on product innovations than on new market products.

**Keywords:** foreign direct investment, backward linkages, technology transfer, employment growth, technological innovations, Community Innovation Survey.



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11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **INNOVATION POLICIES IN THE MEDITERRANEAN AREA: BUILDING A MEDITERRANEAN SYSTEM OF INNOVATION**

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The contribution of this paper has theoretical and policy relevance. It is one of the first exploratory studies of the Mediterranean System of Innovation built on the concept of Innovation Systems. The paper contains a brief literature review and discussion of some data on innovation and research studies in the Mediterranean Area. Our analysis suggests that a Mediterranean research and innovation community capable of competing and integrating itself at a global level still needs to be developed. Mediterranean countries have to compete in the face of international competition, hence building successful knowledge networks across the region and establishing a cooperative innovation system that could improve the competitiveness of the overall area is crucial.

In this context, the paper shows, after exploring the situation of this area and the main theoretical approaches to the topic, the contribution of the European policies for the development of innovation networks in the Mediterranean moves toward a Mediterranean System of Innovation.



## **RESOURCES ON THE STAGE: A FIRM LEVEL ANALYSIS OF THE ICT ADOPTION IN TURKEY**

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### **Abstract**

This study examines the impact of firm resources on ICT adoption by the Turkish business enterprises using firm level data. ICT adoption is measured at three levels: The first level is technology ownership. The second level is the presence of enterprise resource planning (ERP) and customer resource management (CRM), and the third level is the use of narrowband and broadband technologies. The effects of the three main features of each technology level, which are complementarity, specificity, and the complexity, are analyzed by using firm level data in Turkey. This study has three main conclusions. As for the complementarity, firm's resources play an important role in the adoption of technology while advancing from single technology to the multiple ones. Further, in the use of specific technologies such as ERP and CRM, firm resources generate differential effects between those technologies. Finally, the use of simple technologies does not require the same amount of firm resources as complex technologies.

**Keywords:** adoption, ICT, complementarity, specificity, complexity.



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **IS THERE A PATH TO INCLUSIVE AND LOW CARBON GROWTH?**

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### **Abstract**

Poverty eradication and climate change are two of the greatest challenges facing the world today. The dilemma is how to reconcile the need to reduce carbon emissions to mitigate climate change with the need to eliminate income poverty through economic growth, which in its turn increases emissions. This paper examines whether is possible for developing countries to achieve inclusive and low carbon growth through the emulation of more productive and low carbon sectors of developed economies. It finds that there is no absolute decoupling of carbon emission from growth. An inclusive and low carbon growth path would only exist if more diversified economies focus on low carbon innovation and less diversified economies are given the policy space to emulate the production of the former, regardless of the carbon footprint.

**Keywords:** diversification, innovation, technological change, growth, low carbon



## **CATCHING UP IN USING AND PRODUCING RENEWABLE ENERGY TECHNOLOGIES IN THE BRICS**

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### **Abstract**

This paper examines the technological catching up in renewable energy technologies in a group of fast growing countries, Brazil, Russia, India, China and South Africa (BRICS). We focus on these countries because these countries, for its size and high rate of growth, hold a key to lower carbon emissions. Understanding catching up process in renewable energy technologies among BRICS countries may contribute effective policy elaboration for other emerging countries. In particular, we look at the process of catching up in using existing technologies to generate renewable energy and producing renewable energy technologies and equipment, with the objective of understanding whether and how these two components of catching up are intertwined. We focus specifically on wind and solar energy. Our empirical analysis uses aggregated national data from the World Development Indicators, the International Energy Agency, and secondary sources.



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **WHAT HINDERS LEARNING AND INNOVATION OF SERVICES FIRMS IN MEXICO? AN EXPLORATION**

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### **Abstract**

This paper draws and contributes to two strands of literature, namely innovation in Services, and studies on the barriers to innovation from a developing country perspective. Based on survey data about firms in Mexico, we used a methodology to analyze Services and manufacturing firms within the same framework; hence we explored the effects of two kinds of barriers to innovation, namely revealed and deterring obstacles. We documented that although manufacturing firms tend to be more innovative than Services, overall, both firms show a somewhat limited innovation behavior in Mexico. Such behavior is mainly explained by deterring effects associated with regulatory environments and the actual cost of innovation. Revealed or learning effects associated with cost, markets and regulation were reported mainly by firms not belonging to larger groups. Policy interventions intended to improve interactivity within Mexico's system of innovation and stronger internationalization, through exports for example, would help in addressing these problems. Our findings lend some support to the proposition that firms need to go beyond a certain threshold in their involvement in innovation in order to be able to identify and qualify the obstacles that hinder such activity.

**Keywords:** innovation, innovation barriers, services, Mexico



## **LOW CARBON ENERGY INNOVATIONS SYSTEMS IN NATURAL RESOURCE RICH DEVELOPING COUNTRIES: THE CASE OF BRAZIL**

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### **Abstract**

The transition to low carbon economy requires deep changes in the energy systems of the great majority of developing countries. However, only a small group of these countries is really engaged in significant efforts to develop renewable energies. The success in the diffusion of renewable energy technologies request dynamic systems of innovation. In this paper we analyze the recent evolution Brazilian sugarcane innovation system that was pioneering in the development and diffusion of bioethanol. This system is increasingly challenged by the speeding up of the technological frontier, which is motivated by the energy crisis and the transition to a low carbon economy. The Brazilian innovation system has different capacities to cope with this challenge. In this paper we differentiate the agriculture subsystem, which function in a STI (science, technology and innovation) mode from the industrial subsystem, which operates in a DIU (doing, using and interacting) mode (Jensen et al., 2007). The agricultural subsystem has demonstrated a better ability to cope with the technological challenges of the new biotech research methodologies while the capital goods industry has a much lesser propensity to deal with with the second generation technologies for bioethanol. We describe also the present ethanol supply crises and its probable causes.

**Keywords:** rewables energies, innovation systems, ethanol, sugarcane



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **EMERGING INNOVATION SYSTEM AND ENVIRONMENTAL INNOVATION: THE CASE OF MITIGATION TECHNIQUES AND CCS**

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### **Abstract**

While the environmental innovations will play a key role in the transition towards new energetic systems, their implementation is rather difficult to be realized in advanced economies. The techniques at stake are rather difficult to implement, implying scale and network economies, with an important technical and economic uncertainty. As latecomers developing countries can benefit from these innovations without incurring their development costs, but are reluctant to move towards a more decarbonized economic model without a financial support from the more advanced countries. From this point of view, mitigation techniques, especially Carbon Capture and Storage techniques, from fossil fuels (CCS) or bioenergy (BCCS) appear to be a promising way to reach stringent greenhouse gas reduction targets. It allows to preserve the use of fossil fuels during a transition towards a more decarbonized economy. These techniques are nevertheless submitted to the evolution of mitigation costs, to the regulatory uncertainty and to their social acceptability.

**Keywords:** environmental economics, innovation economics, energy economics, carbon capture and storage (CCS), carbon capture and storage from biomass (BCCS).





## **INTRODUCING A TRANSITION MODEL FOR IRAN'S PETROLEUM INDUSTRY: TOWARDS FORMATION OF A SECTORAL LEARNING SYSTEM**

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### **Abstract**

Petroleum industry is the most vital and important sector among Iran's various industries and Iran's economy is highly dependent to this sector. Therefore, proper performance of this industry and its effectiveness is required for the development of the country. One of the factors effecting such development is the research and technology (innovation) system in the oil industry. If this system functions properly, it fosters the technological base of oil industry and hence facilitates successful and timely execution of oil projects and helps towards economic growth. This paper focuses on the performance of oil innovation system considering sanctions proposed to Iran (which is believed to have a major impact on the performance of the system and is considered to be the initiative ground for developing an adaptive model for the innovation system) and tries to provide a good understanding and analysis for the same and pursues this aim through a functional approach. Having done such analysis, barriers and issues fronting effective and efficient performance of the oil innovation system has been identified and upon such basis, an adaptive model has been provided which promotes the formation of a sectoral learning system through a transition process within the Petroleum industry. Promoting production capabilities, technological improvement, focusing on learning processes and increasing the absorptive capacity in the oil industry are among the points which have been emphasized in this paper.

**Keywords:** transition, learning, multi-level perspective, petroleum industry



## **APPROPRIATE VERSUS ADVANCED TECHNOLOGY: A CASE STUDY ON CHOICE OF TECHNOLOGY BY SERICULTURE FARMERS OF KARNATAKA, INDIA**

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### **Abstract**

In spite of being world's second largest silk producer, India's sericulture is marked by low productivity and poor quality of produce. Because of this reason, the country imports raw silk mainly to meet the demand of the high speed power-looms. Because of the inability to maintain quality standards, India is also facing tough competition in the domestic market with imported silk. It is of general consensus that adoption of *Bivoltine* hybrid silkworm is the only answer to this problem. But in spite of serious efforts the *bivoltine* technology diffusion in India has been very slow. Our analysis of the adoption process of *bivoltine* hybrid silkworm highlighted importance of profitability. The three variables capturing reduction in profitability of *bivoltine* sericulture showed significant negative influence on its adoption; however the linkage between productivity and adoption could not be explained due to data constraints. From the supply side, while subsidies appear to be an encouraging factor for *bivoltine* adoption the extension efforts of private CRCs (supplying cross breed worms) is found to deter the choice of *bivoltine* hybrid by the farmer. The extension efforts of the government agencies are found to be insignificant in this respect.

**Keywords:** sericulture, bivoltine technology, adoption, diffusion



## **INNOVATIVE WAVES IN THE DEVELOPMENT OF SOCIO-ECONOMIC SYSTEMS**

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### **Abstract**

In the article considered some issues related to the wave processes which are taking place in the evolving socio-economic system. Application of econophysics postulates and transdisciplinary methodological approach allowed to study the flow of the innovation process and make conclusions which could be used in the practice planning of innovation activities.

**Keywords:** management of innovation, innovation, innovative wave, sensitive period, temporality, transdisciplinarity, cyclical development



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SEPTEMBER 11-13, METU - ANKARA

## **THE IMPACT OF ICT BASED SOCIAL CAPITAL ON ORGANIZATIONAL LEARNING**

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### **Abstract**

Information and communication technologies (ICT) are not only tool for communication but also a catalyst for both social capital and organizational learning. The effect of ICT may differ from one style of workplace organization to another. It may also differ from one community to another. This study can be seen as a propositional framework which covers how online communities of practices externalize a part of tacit knowledge by capturing some sort of learning activities that occurred in social context.

**Keywords:** ICT, social capital, organizational learning



## **TECHNOLOGICAL PARADIGMS AND AGRICULTURE: LESSONS FROM THE DIFFUSION OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) IN COMMERCIAL FARMS IN ARGENTINA**

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### **Abstract**

The diffusion of ICT in agriculture in Argentina has taken place mostly among commercial farms (both big farmers and medium and small specialized producers). Among other factors, this diffusion is based on the rapid growth of agricultural production, on the diffusion organizational innovation (networks, contratistas), and on the increase of international prices. This new scenario raises several questions concerning the role of ICT to foster the competitiveness of agriculture production in Argentina: in what ways do ICT and related technologies promote the competitiveness of agriculture productions? Which are the characteristics of the learning processes associated with the diffusion of ICT in agriculture? And who are the central actors in these learning processes and what role do the farmers play on it? In this paper we postulate that ICT diffusion in the Argentinean commercial agriculture has had its main impact in facilitating and improving the farmer's information management, boosting organizational innovations and the efficiency of the production and commercial processes. Less evident has been its impact on the farmer scientific and technological knowledge management. Additionally, we postulate that translators, advisors and other services suppliers are the main actors of the agricultural network, benefiting from the learning processes associated with these technologies, in close interaction with the new input and machinery suppliers.

**Keywords:** ICT diffusion, agriculture, learning processes, information management



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **TRANSNATIONAL CORRUPTION AND INNOVATION IN TRANSITION ECONOMIES**

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### **Abstract**

In this paper, we examine how transnational corruption affects host country firms' innovation behaviour and performance in transition economies of Eastern Europe and Central Asia. Using firm-level data from the Business Environment and Enterprise Performance Survey, we show that both the involvement of foreign firms in corruption practices and the intensity of their bribing activities reduce the propensity of firms in host countries to invest in research and development and harm their ability to improve their existing products and services. Using a simultaneous equations recursive model and controlling for various innovation determinants, we also show that mainly through the reduction in innovation effort, corruption ultimately also hurts the host country's long-term ability to successfully bring new products on the market.

**Keywords:** transnational corruption, innovation, transition economies



## **RECONFIGURATION OF FIRM CAPABILITIES FROM EMERGING COUNTRY FIRMS AS A RESPONSE TO THE EMERGENCE OF BIOSIMILAR MARKETS: EVIDENCE FROM THE INDIAN PHARMACEUTICAL INDUSTRY**

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### **Abstract**

As new possibilities for biosimilars are created by evolving regulation, we show how firms in emerging markets are responding to opportunities by developing dynamic capabilities in biosimilar production and supply. We ask; What shapes heterogeneity in firms and what is the origin of heterogeneity when different firms operate in the same environment with the same resources base? How do firms in developing countries create capabilities to respond to emerging markets governed by new and evolving regulatory frameworks? And what are the implications for growth and survival of firms?

We use Indian firms as case studies to explore and answer these questions. Indian firms operate in a context where significant capabilities in generics production exist, there is a strong domestic market and where the government has adopted policies to encourage the development and production of biosimilars. Primary data for the case studies was collected through a variety of sources including interviews with R&D presidents and senior scientists, and industry observers. The data was triangulated by using information in annual reports, analysts' presentations and articles in the business press. The firms selected for study are in different stages of developing biosimilar product portfolio's and thus provide a basis on which to examine reconfiguration of firm level capabilities. The cases also represent a mix of biotechnology dedicated firms and pharma-biotech firms, allowing us to explore the significance of path dependency, differences in strategies and the role of established routines in reconfiguration of capabilities.

Through the development of a novel matrix analysis we show that a number of strategies are being developed by innovating companies and emerging suppliers to develop capabilities in order to compete in the biosimilars market, including investment, acquiring key skills through diaspora connections, collaborations, partnerships and mergers and acquisitions. At the same time there are challenges in addressing the high costs of regulatory compliance, capital investment for new biological production methods and innovating to improve analytical methods and product differentiation. Risks still remain with costs of litigation stemming from regulation that is still evolving.



## **THE ROLES OF INTERMEDIARIES AND THEIR CAPABILITIES DEVELOPMENT IN SECTORAL INNOVATION SYSTEMS: A CASE STUDY OF THAILAND**

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### **Abstract**

This paper investigates the roles of both public and private intermediaries in sectoral innovation systems of developing countries by analyzing three case studies of hard disk drive (high-tech sector), automotive (mid-tech sector), and frozen food (resource based sector) in Thailand. There are three important findings. Firstly, different sectors need different types and roles of intermediaries. In high-tech sector, government research institutes and international industrial associations can have the trust of Transnational Corporations (TNCs) and be able to keep pace with rapid technological change. In mid-tech sector, public sectoral development agencies can act as 'brokers' leveraging TNCs' knowledge to strengthen local suppliers' capabilities, while local industrial associations can act as 'mediators' solving conflicts between local firms. In resource-based sector, public sectoral development agencies can act as 'resource providers' to local firms, whereas local industrial associations can broker coordinated efforts among members to achieve common goods. Secondly, division of labor between public and private intermediaries is crucial. Public intermediaries should play leading roles in producing 'public goods' which are necessary for upgrading of sectors. Private intermediaries should play active roles in producing 'club goods' for sustainability of sectors. Thirdly, different intermediary roles require different underpinning capabilities.

**Keywords:** intermediaries, sectoral innovation systems, public and private, Thailand, roles and capabilities





## **KNOWLEDGE SHARING, INNOVATION POLICIES AND INCLUSIVE DEVELOPMENT IN THE OIL AND GAS INDUSTRY IN NIGERIA**

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### **Abstract**

This study assessed the factors influencing innovation, knowledge sharing and inclusive development in the indigenous oil and gas firms in Nigeria. This was done with a view to providing information that will increase knowledge sharing among the indigenous in the sector and create value addition which is needed to improve the much desired local content in the industry.

The study used primary and secondary data sources. The numbers of sampled firms were 140. Structured questionnaire were administered in the firms. This was supplemented with field observations and interviews. A total of 140 questionnaires were administered to heads of production and engineering departments in the firms with 50% response rate. Secondary data were obtained from published sources. The data were analysed using descriptive statistics.

The study found out that the challenge of innovation centred on high cost of innovation, lack of skilled personnel especially in their R&D departments and poor economic conditions in the country. However, an estimated 30% of the firms were innovation active in the period 2001 to 2010. The reasons why these firms innovated were to take advantage of new technology (88.9%), to stake out market position (61.3%), lower production cost (42.9%) while competing with their foreign counterparts (50%). The study also found out that the principal initiators of innovation in the firms included information from the trade association (50.9%), competitors, clients/customers (58.3%), and suppliers (46%). The study found out that the level of government support for innovation practice was generally poor however, firms enjoyed knowledge from interaction with competitors (81.2%), customers (79.4%), suppliers (71.7%) and trade association (95.4%). There was a weak relationship between the knowledge centres and the firms (Universities, 57.7%; Public Research Institutes, 22.9%; Private Research Institutes, 22.2%). The study also found that there was weak (9.4%) collaboration between the firms and government ministries. The study concluded by providing policy recommendations that would increase indigenous participation in the industry while stating clearly what roles the industry, government and academia will play to achieve Nigeria's desired local content status.

**Keywords:** innovation, foreign firms, indigenous firms, knowledge sharing, local content policy.



## **EXPLORING THE EFFECTIVENESS OF LOCAL CONTENT REQUIREMENTS IN PROMOTING SOLAR PV MANUFACTURING IN INDIA**

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### **Abstract**

In a bid to make renewable energy technology deployment strategies politically acceptable, many countries are linking them to socio-economic goals, such as job creation, economic development and building competitiveness. A controversial industrial policy tool that is becoming increasingly popular is the use of local content requirements (LCRs). These regulate the extent to which certain projects must use local products and are often justified on the basis of supporting local employment and private sector development. The debate has centred around the rights and wrongs of protecting infant industry, with little progress being made to find a common ground. This paper seeks to move beyond this stalemate to understand under which conditions LCRs might be a legitimate and effective tool for promoting local manufacturing. To do so, it applies an effectiveness framework to LCRs for solar PV in India's National Solar Mission. The paper finds that for LCRs to be effective, they must be (a) limited in duration and incorporate planned evaluation phases, (b) focused on technologies and components for which technical expertise is available and global market entry barriers are manageable, (c) linked to additional mechanisms, such as training and promotion of business linkages and (d) implemented in tandem with measures to support other stages of the value chain and wider services that are integral to success of renewable energy industries.

**Keywords:** industrial policy, renewable energy, solar PV, India, international trade, infant industry protection, competitiveness.



## **UNDERSTANDING GRASSROOTS INNOVATION: PATTERNS AND SOURCES OF CONTRIBUTION OF HONEYBEE NETWORK**

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Activists, government, communities and businesses increasingly recognize the need for more environmentally sustainable and socially just development paradigms in India. Grassroots innovation movements are being identified by the policymakers to play an important role in the transition to socially and ecologically just patterns of development. But our understanding of the process and contribution of grassroots innovation movements making is quite sketchy at present. Evidence needs to be developed on the patterns and sources of grassroots innovation making to test the propositions being advanced in respect of the possible contribution to the challenge of policymaking for “inclusive innovation”. Because this expectation exists their practice of innovation making and the policy response need to be discussed in a systematic way. In this article our investigations are focused on understanding the impact of promotion of grassroots ingenuity by “Honey Bee” Network at the level of the analysis of the patterns and sources of grassroots innovation and their impacts underway on the grassroots innovation scene in India.



## **WEDDED TO TRADE, DIVORCED FROM INNOVATION: AN ANALYSIS OF THE OUTCOMES OF INFORMATION TECHNOLOGY AGREEMENT OF WTO**

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### **Abstract**

The Information Technology Agreement (ITA) of WTO has been touted as a landmark agreement ever undertaken and a stepping stone to multilateralism through sectoral agreement route wherein developed and developing countries could work in a mutually beneficial manner. The basic premise of the agreement is that by liberalizing the trade in IT goods the members could harness the manifold benefits of ICT. Earlier studies have shown that ITA has been instrumental in augmenting the trade in IT products and helped innovation, strengthening Global production Network along with greater diffusion of ICT. However, while countries world over toady are wedded to ICT, majority of developing countries prefer to keep away from ITA. In this context the present study analysed the effect of liberalizing trade by neglecting innovation. The major point of departure of the present study is that, while the previous studies were concerned only with the post ITA period, this study compared the performance during the post ITA period with the pre ITA period. Empirical analysis undertaken in this paper tends to suggest that ITA, being simply a tariff cutting mechanism with neglect of neglect of innovation and competence building systems, has led to a deceleration of trade IT goods, increased market concentration and increasing prices. While there is evidence to the effect that the share of Asia in global trade has increased significantly after ITA, once we keep away “the China factor”, the emerging picture is not encouraging. There is hardly any empirical evidence of either old entrant to global production network (eg. Malaysia, Thailand, Indonesia) improving their position or the entry of new countries from Asia into the electronics production network. The study attributes the ‘ITA fiasco’ to its scant attention to innovation and competence building systems which is quintessential for promoting production and use of ICT.



## **INNOVATION AND DEVELOPMENT IN INDIA: CHANGING PARADIGMS AND TRAJECTORIES**

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### **Abstract**

India has the credit of being one of the pioneering developing countries that recognized science, technology and innovation as key factors in development. This paper has been an attempt, through a survey of studies, to map the broad contours of changes in the paradigms and trajectories governing innovation and development. This has been undertaken by considering our understanding on the link between innovation, growth and development and the discourse on how to facilitate socio-economic transformation or catching up of the developing countries. The inquiry into the former located different heuristic frameworks that included the classical legacies of Marx and Smith, Schumpeterian approach, Arrovian legacy, endogenous growth models, technological capability paradigms and National Systems of Innovation approach. Of these the last two are particularly concerned with innovation and development in developing countries. Enquiry into the second issue revealed that with the development strategy shifted towards globalization, there arose the new paradigm of globally integrated innovation that involved harnessing all possible external sources for stimulating domestic capability building process for fostering an internationally competitive economy. The new trajectory involved liberalised access to embodied technology (capital goods) and FDI and technology, increasing participation in global innovation networks through R&D in FDI, greater reliance on outward FDI and a new patent policy compliant with the TRIPs regime of WTO. Though the new strategy has led to higher growth, it was not found inclusive. As the development strategy shifted from growth to inclusive growth, the innovation paradigm shifted from innovation for development to inclusive development. The accompanying trajectory involves the creation of institutional architecture at the national regional and sectoral level that is geared towards creating more 'frugal, distributed, affordable, innovation' that produces more 'frugal cost' products and services that are affordable by people at low levels of incomes with a near neglect of building innovation and competence



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

building systems. The paper argues that innovation induced development has been a highly cherished cheque for the poor as it has helped improving the living conditions of millions in different parts of the world. Unfortunately in India this cheque repeatedly bounced. This needs to be seen in the institutional context that gave rise to multiple contexts of exclusion like active, passive, constitutive and instrumental exclusion (Amartya Sen 2000). Despite heightened concern for the poor, innovation towards inclusion often turned out to be illusive and at best subordinating and that instead remaining as transient, sustained over the years, Hence the paper calls for a walking on two legs strategy of addressing these varied institutional spaces exclusion through strengthening innovation and competence building systems along with frugal innovations.



## **HIGHER EDUCATION, TECHNOLOGICAL CHANGE AND LOCAL DEVELOPMENT. EXPERIENCES AND CHALLENGES IN CUBAN CONTEXT.**

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In the 90s, Cuban universities directed their efforts toward innovation. This “innovation turn” intended to increase the role of higher education (HE) in the economic recovery of the country and the solution of significant social problems. At the beginning of last decade universities began to project over the subject of local development (we have called this process “territorial turn”). In the document is explored the capacity of HE to unfold nets that allow the flow of knowledge and technologies for local development. Its role as key actor on the promotion of innovation in municipalities is also analyzed. Through case studies methodologies, it is discussed a group of practices related with alternative energy production, food production based in agroecological methods and the echo-materials production for housing. Each one of those socio-techniques trajectories, emerged in Cuban HE institutions, pay attention to social inclusion, cohesion and social integration goals.

**Keywords:** higher education, technology, innovation, local development



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **REGULATION QUAGMIRE, INCLUSIVE INNOVATIONS AND ARRESTED DEVELOPMENT: EVIDENCE FROM THE INDIAN MEDICAL DEVICE INDUSTRY**

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### **Abstract**

In any healthcare sector, the medical device industry plays an important role in reducing overall healthcare costs and ensuring effective access to healthcare. However, in developing countries such as India compared to the success of the pharmaceutical and biotechnology industry, the medical device industry has not witnessed similar growth. In this context this paper studies factors and issues that hampered development of the medical device industry in India. Specifically it explores the link between regulatory policies and their impact on innovation and technology capability development in the Indian medical device industry. Further it examines the complex relationship between healthcare regulation, innovation, and sustainable development within the context of an increasingly globalising economy. It shows crucial role of smart and appropriate regulation in creation of the basic technological capabilities, incentivising inclusive innovation and affordable healthcare.

**Keywords:** healthcare, medical devices, India, regulation, development





## **INCLUSIVE INNOVATION: AN ARCHITECTURE FOR POLICY DEVELOPMENT**

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### **Abstract**

The past two decades have been characterised by an increasing uncoupling of economic growth and social and economic development. Outside of China, the numbers living in absolute poverty have remained stubbornly large; in Africa, they have increased substantially. Although this uncoupling has multiple sources, the trajectory of innovation (large in scale, capital intensive in nature and destructive of the environment) has contributed to these outcomes. Reorienting towards a more 'inclusive innovation' path has an important role to play in overcoming exclusion. However, we have only a weak understanding of the definition, nature and dynamics of inclusive innovation and this paper seeks to fill this conceptual gap. It argues that inclusive innovation needs to be understood and developed in the context of a holistic conception of the innovation cycle, the distinction between process and product innovation and the roles played by the poor as both producers and consumer. It further charts the growing interest of private sector actors in inclusive innovation (including, but not confined to TNCs seeking the "fortune at the bottom of the pyramid") and large global funds working in tandem with the private sector and governments. Consideration is also given to the role which growth trajectories play in determining the direction of innovation and in promoting linkages between the globally absolute poor (incomes below \$1pd) and those with discretionary cash incomes living in the margins above \$1pd. The paper concludes with a call for a more holistic and balanced approach to inclusive innovation to be adopted by a range of stakeholders so that resources are deployed most effectively to aid the recoupling of growth and development.

**Keywords:** inclusive innovation, bottom of the pyramid, frugal innovation, grass roots community based innovation, inclusive growth



## **FIRM INNOVATIVENESS IN EMERGING ECONOMIES: EVIDENCE FROM R&D INITIATIVES IN TURKISH FIRMS**

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### **Abstract**

A long-standing research tradition has studied processes of late industrialization, with China as the most recent and publicized case. A strong trend among late industrializers is to move rapidly from manufacturing, to product design and to creation of indigenous R&D capabilities. This paper analyzes such a process taking place close to Europe, in the rapidly growing Turkish economy. Most of the literature on R&D internationalization and innovation in emerging economies studies the country level. To these studies the paper brings an important complement by analyzing the performance of individual innovating firms and the structural conditions underpinning their development, such as the role of state support, business group ownership and business group orientation. The paper builds on a comparative case study of two firms in the automotive and white goods industries, and their R&D and product development trajectory, and a brief comparison of the involved business group with other types of business group orientation in Turkey. Insights in innovative, knowledge-acquiring firms in emerging economies are key to understand the broader dynamics of the global knowledge economy, and the new challenges for technology-based firms in the West, where firms from the 'periphery' suddenly emerge as competitors, not based on low cost but on innovation, patenting and product design. By showing that firms may pursue different roads to upgrading from close collaboration with multinational companies to independent strategies based on autonomous development of proprietary technological knowledge, the paper calls for a differentiated understanding of emerging economy dynamics.

**Keywords:** emerging economies, innovation, patenting, Turkey, white goods, automotive industry, business groups



## MACRO AND MICRO ISSUES RELATED TO NATURAL RESOURCE-BASED ECONOMIC GROWTH

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### Abstract

Natural resource based growth resulting from expanding exports of industrial commodities such as oil and gas, minerals, iron and steel, forestry products and foodstuffs has been the subject of heated debate among economists. While some of them consider such strategy a 'curse' due to the fact that it makes the economy more strongly to depend upon the volatility of world prices for raw materials and therefore more exposed to externally induced turbulence, others point out to the fact that natural resource processing industries provide a valuable road for the introduction of new technologies opening up a 'window of opportunity' for skill intensive activities in biotechnologies, machinery and equipment, logistics and more. Macro and microeconomic consequences result from expanding exports of natural resource based commodities. Received literature has examined said consequences under such exotic names as the 'Dutch Disease' syndrome and the "Tragedy of the Commons". Propelled by the rapid expansion of Chinese demand for the above mentioned industrial commodities many countries in Latin America have attained significant growth over the past decade. Argentina, Brazil and Chile constitute three major examples whose comparison we undertake in this paper. Between 2004 and 2012 GDP grew at an average rate of 7%, 3.9% and 4.8% respectively. While Brazil and Chile opted for an inflation targeting macroeconomic policy regime, Argentina relied on an administered exchange rate policy. Major macro consequences in terms of currency appreciation, tradable vs non tradable growth, employment creation, and else can be observed which we examine in the paper. Also major microeconomic consequences have emerged associated to a more intense exploitation of natural resources. Aspects such as environmental mismanagement, lost of biodiversity, increasing desertification and more have emerged which we look into studying Chilean aquaculture and soybean production in Argentina. On the other hand, none of the three countries has been able significantly to reduce the technological and productivity gap they exhibit vis a vis more developed industrial countries in knowledge intensive activities.. Pro-active and sector-specific industrial policies seem to be required for said gap to be gradually reduced Natural resource based industries indeed provide a valuable window of opportunity, but high value added and knowledge intensive activities demand different public goods which conventional market forces do not seem capable of delivering.



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **THE CHANGING STRUCTURE AND BEHAVIOR OF LATIN AMERICAN UNIVERSITY MARKETS**

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Three different sets of co-evolving circumstances have been inducing a rapid process of transformation of the structure and behavior of university markets in Latin America over the past two decades. There is first the significant success the economy of many countries in the region has experimented in the 1990's and 2000's as a result of the rapid expansion of exports of natural resource based commodities – oil and gas, minerals and foodstuffs – to emerging China, India and other South East Asian economies. Chile, Argentina, Brazil, Bolivia, Ecuador, Paraguay, Peru and Uruguay enormously benefitted from these global trends. Commodity prices, terms of trade and external trade balances attained historic high records. Rapid GDP growth brought about a significant process of upward social mobility which induced the expansion of a new local middle class in the above mentioned countries featuring a wide appetite for a variety of goods and services, including housing facilities, vehicles and higher education. For many families in these countries this has been the first time ever somebody in the family managed to enter higher education...(continues from the introduction)



## **NATIONAL INNOVATION POLICIES GOING GLOBAL TAXONOMY AND THE CASE OF FINLAND**

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### **Abstract**

A need for policies to govern globalization of innovation has been evident for decades but surprisingly few new policies have been created by national governments. This is the case also in Finland where innovation policy has had an important role to play, and where a low level of internationalization has been a well-recognized challenge. Recently the conditions for internationally-oriented innovation policy have been altered by the rise of emerging and developing economies to champions of globalization as well as by the growing role of individuals, small-firms and open modes of innovation activities. Consequently, we have to go beyond science-based collaboration dominated by the multinational companies (MNCs), to the emergence of new markets and the level of individuals and innovation-communities energizing the global economy. This paper aims to respond to these needs by outlining a framework for internationally oriented innovation policies. Drawing from multiple cases in Finland and internationally, the paper comes up with taxonomy of internationally-oriented innovation policies that are the facilitating, bridging and inclusive innovation policy modes with their versatile sub-modes.

**Keywords:** innovation policy, government, innovation platform, internationalization, global, region, inclusion, policy taxonomy



## **TECHNOLOGY INTENSIVE MANUFACTURING AND INNOVATION IN SOUTH AFRICA: A COMPARISON WITH THE BRIC COUNTRIES AND AN EMPIRICAL EXAMINATION OF TECHNOLOGY BASED FIRMS**

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### **Abstract**

There is considerable interest in the economic progress of the BRICS and in their capacity to enter into more technologically demanding activities. But, there is considerable variation in the rate of innovation as between the BRICS. This paper focuses on South Africa. The first part of the paper examines South Africa's poor performance by comparison with other BRIC countries over the past two decades in respect of innovation and the development of high technology manufacturing sectors and activities. The second part of the paper examines a number of technology and innovation indices, both on the input and on the output side, to show that while in the mid-1990s, South Africa led the BRIC countries in terms of innovation, it has now fallen significantly behind.

Brazil has many similarities with South Africa particularly in relation to the manufacturing sector – *inter alia* share in the economy and long term growth rates as between the two countries are similar. Accordingly, particular attention is paid to comparing South Africa with Brazil.

While comparative statistical data are lacking, South Africa is developing comparatively few new technology based firms. The third part of the paper accordingly examines a number of high technology firms and sectors in South Africa. Utilising extensive interviews and case study material, supplemented where available by statistical data, the concern is to map the nature of the technology or innovation undertaken by South African firms; the constraints under which they operate and the extent to which current government policy addresses these constraints.

The conclusion draws some broad implications of the analysis for government's current industrial strategy.

**Keywords:** innovation performance, South Africa, BRICS, new technology based firms



## **THE DEVELOPMENT OF THE RUSSIAN INNOVATION SYSTEM AND THE MONOPOLISM AS ITS DISRUPTING FACTOR**

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### **Abstract**

In this paper, the processes of building and development of the innovation systems in the emerging market economy are described with special reference to Russia. **Objective:** to analyze the development of innovation systems in Russia, and to identify the main features of this process in emerging market economy during global economic recession.

**Keywords:** innovation, innovation system, monopoly, government, innovation policy



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SEPTEMBER 11-13, METU - ANKARA

## **OPEN INNOVATION AS A DYNAMIC RELATIONAL CAPABILITY: A REFERENCE TO THE SANOFI GROUP**

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### **Abstract**

The principal objective of this article is to show that open innovation is one of the dynamic capabilities of firms. Among these, relational capabilities play a particularly important role in

High-Velocity Markets. By relational capabilities we mean all the aptitudes of an organization to forge business relationships, to acquire and integrate resources and skills in order to adapt to its environment. The paper is organized in three parts. First we formulate a concept of dynamic capabilities based on the evolutionist approach (Teece and Pisano, 1994) particularly by presenting organizational memory as the mediation interface between an organization and its environment. Next, we deal with relational capabilities through open innovation practices. Finally we illustrate these theoretical considerations by referring to the innovation strategy adopted by Sanofi, particularly since 2008.

**Keywords:** open innovation, dynamic capabilities, relational capabilities, Sanofi





## **STRUCTURAL INNOVATIONS IN MATURING INNOVATION SYSTEMS: THE EMERGENCE AND FUNCTIONING OF INNOVATION INTERMEDIARIES IN CHILE**

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### **Abstract**

In many Latin American countries, it has been suggested that intermediary organizations which build linkages in innovation systems are needed. The purpose of this study is to analyse the innovation intermediaries which have emerged in Chile, and how these intermediaries have contributed to structural innovation towards a more mature innovation system. The findings indicate that a great diversity of innovation intermediaries has emerged which have helped induce a shift towards more networked or open innovation processes. They have however not completely altered the relationships in the Chilean innovation system, but rather helped actors to better navigate the current system. They have been able to obtain a legitimate position, though experience tensions as regards the understanding of their role. While having emerged in the context of a policy discourse emphasizing networked or open innovation, clearer support policies as well as coordination of the innovation intermediary field could enhance their functioning and contribution.



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SEPTEMBER 11-13, METU - ANKARA

## **OPENING THE DOORS TO INNOVATION IN CENTRAL AMERICA: EMPOWERING THE MOST MARGINALIZED TO ADDRESS THEIR DEVELOPMENT CHALLENGES THROUGH PARTICIPATORY RESEARCH**

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### **Abstract**

The psychological barriers of social and physical marginalization hinder the efforts of poor farmers who want to change their realities, enhance their practices, and improve their products or market linkages. Participatory Plant Breeding (PPB) programs seek to build new knowledge that will help marginalized farmers improve their livelihoods, however new knowledge alone is not leading to the sustainable development these families need. The empowering effect of participation in such programs can act as the key that opens the door to innovation and problem-solving for these individuals. This study employed Photo Voice to explore the mechanisms that connect PPB to psychological empowerment and subsequently to innovative behaviour.

**Keywords:** innovation, marginalization, participatory research, psychological empowerment, sustainable development



## **SECTORIAL FUNDS EXPERIENCE IN ARGENTINA AND BRAZIL**

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### **Abstract**

Sectoral Funds are financing tools for science, technology and productive innovation (STI) that stand out for abandoning the neutral, horizontal logic of development promoting predominant in the decades of 80's and 90's, particularly in Latin America. This shift of approach involves replacing a demand model in the use for a systemic one, which implies a greater interaction between the different actors in scientific-technological systems (business, academia and State). Both in Argentina and Brazil, this has been achieved through the implementation of specific design and management methodologies for the Sectoral Funds, which are also included in STI Plans.

**Keywords:** sectoral funds, innovation policy, productive innovation, planning, state, Argentina, Brazil.



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SEPTEMBER 11-13, METU - ANKARA

## **CATCHING-UP UNEQUAL ACCESS TO ICT: A CASE OF RURAL URBAN TELECOM DIVIDE IN INDIA**

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### **Abstract**

Developments in information and communication technologies (ICTs) have transformed the societies across the world. These technologies are a major source of national Gross Domestic Product (GDP) by increasing proportion of their contribution in comparison to the other traditional sectors of economy. The penetration of ICTs was concentrated largely in the developed countries earlier however; diffusion of ICTs shows a significant growth in developing countries, including rural areas particularly the telecommunication services. Subsequently, the technological innovations such as mobile phones and wireless broadband access are playing an important role in building telecommunication capabilities in rural areas yet inequality in the access of telecommunication services still existed between rural and urban spheres. The unequal access of telecommunication led rural urban telecom divide in India. Therefore, in this paper an attempt is made to analyse the magnitude of telecom divide and diffusion pattern of telecom in India. It also tries to explore the ways to catch-up and narrow down inequalities in the access of telecom in India.

**Keywords:** teledensity, substitution model, telecommunication capabilities, telecom divide, ICT



## **WINDOWS OF OPPORTUNITIES AND CHANGES IN INDUSTRIAL LEADERSHIP: TOWARDS A HISTORY FRIENDLY MODEL**

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### **Abstract**

In this paper we present a history friendly model on catching up. The model draws from a series of catch-up episodes that have characterized several global industries, such as steel, semiconductor, IT services, cameras, aircraft, wine, games, and mobile phones. Our focus is on the role that windows of opportunities play in favouring changes in industrial leadership. The results of the simulations show that: a) windows of opportunities can indeed have an important impact on catch up – when windows are absent (or too small) catch up is very difficult to succeed; b) in the case of technology based windows the size of the windows matters in a non-trivial sense, i.e. for catch up to succeed the window need to be just of the right size; c) learning is an important driver of catching up, especially when new opportunities are created; and d) catch up benefits from the combination of distinct windows of opportunities. In particular, policy interventions play an important role in favouring the exploitation of both technology based and demand-based windows.



## **CHANGES IN INDUSTRIAL LEADERSHIP AND CATCH-UP BY LATECOMERS: TOWARD A THEORY OF CATCH-UP CYCLE FROM THE CASE IN THE WORLD STEEL INDUSTRY**

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### **Abstract**

This study analyzes the sources of changes in industrial leadership and catch-up by latecomers in the world steel industry since World War II. The successive shifting of leadership is explained, such as from the United States to Japan, from Japan and Korea, and partly from Korea to China, with a single theoretical framework. We suggest calling this a theory of industry catch-up cycle, which is suggested as a new alternative, based on our criticism against the existing theories, such as Vernon's (1966) product life cycle theory and Markusen's (1985) profit cycle theory, such that they are either about global location of site of production not about changes in the leadership of an industry or about within-a-country shift of industry location. We rely on Neo-Schumpeterian concepts of windows of opportunity for latecomers in catching up with the forerunning countries, and the windows are changing techno-economic paradigm (Perez and Soete, 1988), business cycles and demand shifts (Mathews, 2005), and regulation and government interventions (Lee, Mani and MU, 2012). We find that one or more of these windows have been involved in the successive changes in the leadership in the steel industry. For Japan, the window was first opened up with the appearance of the new technologies, namely basic oxygen furnace and continuous casting, and subsequently grabbed by promotion by the Japanese government. For Korea, the downturns in the global steel industry in the 1970s and 80s served as a good timing for entry with low costs for facilities and technologies, which were taken advantages of by the determined Korean government. We also analyze why other latecomers failed to grab such opportunities. Given that such exogenous windows tend to open always and the incumbent often tend to respond to them later, with good reasons, than new entrants or latecomers, we predict that changes in the industry leadership also tend to happen again and again, with a skillful coordination by the latecomers, such as China recently.

**Keywords:** industrial leadership, catch-up cycle, latecomer, window of opportunity, steel industry



## **CHANGES IN INDUSTRIAL LEADERSHIP AND CATCH-UP BY LATE-COMERS: TOWARD A THEORY OF CATCH-UP CYCLE FROM EIGHT SECTORAL STUDIES**

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### **Abstract**

Changes in industrial leadership from the incumbent to the latecomer country are often witnessed in various industries. To explain the successive change in the industrial leadership, we combine the concept of sectoral system with the ones of windows of opportunity and of firms capabilities and strategies. We examine three windows: radical changes in technology and knowledge base, changes in demand and business cycle and changes in government intervention or regulation in an industry. The paper presents and discusses the theoretical framework proposed and then provides a brief discussion of several sectors, such as steel, semiconductor (memory chips), cameras, games, wines, information technology (IT) services, aircraft (mid-sized jet planes), and mobile phones.

**Keywords:** catch-up, sectoral systems, capabilities



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SEPTEMBER 11-13, METU - ANKARA

## **A RESOURCE-BASED AND DYNAMIC CAPABILITY PERSPECTIVE ON BRANDING CAPABILITY AND FIRM PERFORMANCE: EVIDENCE FROM THE STOCK MARKET**

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### **Abstract**

The resource-based and dynamic capability view of the firm attributes superior financial performance to organizational resources and capabilities. This paper develops the concept of brand as an organizational capability and empirically examines the association between branding capability and firm performance as measured by abnormal returns. A panel data regression is used to assess the stock market response to new product announcements released by the pooled sample of firms with strong brands from high-tech industries.

**Keywords:** branding capability, organizational capabilities, resource-based view, dynamic capabilities, firm performance





## HOW DO PROXIMITIES MATTER TO MNCs' GLOBAL INNOVATION NETWORKS: A GEOGRAPHICAL-ORGANISATIONAL PERSPECTIVE

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### Abstract

This paper investigates the influence of geographical proximity and organisational proximity on the patterns of relations in multinational companies' (MNCs) global innovation networks (GINs). Based on primary relational data of two MNCs GINs, the paper finds that both case firms' intra-firm relations are globally organised. This is because organisational proximity solves the problem of the absence of geographical proximity by providing a central control system to smooth coordination and by offering opportunities for people to meet face-to-face frequently. It is also found that the case firms' external linkages have different pattern of relations. One case is more globally organised while the other is more locally organised. Such difference comes from the feasibility and necessity of long distance knowledge transfer. The evidences in this paper suggest that when there is organisational proximity, geographical proximity is not important while organisational proximity is absent; the importance of geographical proximity differs.

**Keywords:** global innovation network, multinational company, geographical proximity, organisational proximity, social network analysis



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **DIFFERENT LEARNING STYLES IN ARGENTINEAN AND MEXICAN SOFTWARE AND INFORMATION SERVICES FIRMS**

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In this paper we analyze the relationship between different sources of learning and firms' capabilities development in 40 SITS firms from Mexico and Argentina. To address this, we have proposed a methodological approach based on descriptive statistics and cross-tabulations of different learning sources and firm capabilities taken by country. The relationship between learning and capabilities development shows strong differences when comparing the cases of Argentina and Mexico, even though there are no significant biases in the distribution of skills and learning sources between the two countries.



## **MEASURING SKILLS IN EUROPE**

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### **Abstract**

'Skills' is a central concept in a number of academic and policy debates. Yet measurement of skills of labour force remains highly problematic. The dominant approach uses signals of individual capacities (for e.g. level of education) as a proxy of skills. This paper develops and tests methodology for more direct measurement of skills by focusing on how individuals perform their tasks rather than what they could be capable of doing. The level of skills is measured on three dimensions: degree of uncertainty, autonomy and skills-building. Assessment of specificity of skills focuses on transferability of skills (difficulty of switching employer) and specificity of work (difficulty of replacing employees). Empirical analysis utilises survey data on more than 20 European countries.

**Keywords:** measurement of skills, level and specificity of skills, transferability.



## **EFFECTS OF ACADEMIC RESEARCH GROUPS' PERCEPTIONS ON UNIVERSITY-FIRMS LINKAGES: BENEFITS, RESULTS AND OBSTACLES**

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This paper tries to put more light in the discussion about how some perceptions of research groups affect their number of interaction with firms. Based on a survey of university-firms linkages, it analyzes empirically how results, benefits and obstacles perceived by academic research groups affect the number of interactions between these groups and firms. It was used a Nonparametric Item Response Theory (IRT) technique to validate the questionnaire and create clusters to explore patterns in the perception of respondents. The estimated model – that controls groups characteristics such as research quality and size - shows that academic groups tend to be more interactive when groups perceive, as more important, '*intangible benefits*' and '*academic results*'. Among the barriers, only '*transactional obstacles*' are relevant and imply in less interactions with firms.

**Keywords:** university-firms linkages, benefits, obstacles, results



## **DRIVERS OF FIRM GROWTH: MICRO-EVIDENCE FROM INDIAN MANUFACTURING**

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### **Abstract**

The paper presents micro evidence on firm dynamics for enterprises in Indian Manufacturing sectors on the grounds of Prowess database provided by the Centre for Monitoring Indian Economy (CMIE) covering the period 1991-2010. The parameterization of the distributions of growth exhibit high level heterogeneity displayed among firms even within the same sector, which widens over time. The transition probabilities matrix reveals the coexistence of firms with very different characteristics and performance within sectors. Given the wide heterogeneities, the paper resorts to quantile regression to identify the differential effect of regressors at different deciles of the conditional distribution.

**Keywords:** firm dynamics, AEP distribution, heterogeneity, quantile regression



## **HEALTH AND INNOVATION IN THE TERRITORIAL SPHERE: EVIDENCES FROM BRAZILIAN LOCAL PRODUCTION AND INNOVATION SYSTEMS**

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### **Abstract**

This paper presents and discusses the main findings of five empirical studies focusing on local health innovation systems in Brazil. It focuses on the articulation of the varied service and manufacturing segments within the Health complex and the other organizations and relations that constitute a Local Innovation and Production System (LIPS). Considering the relation of the health system with a specific territory and its role for development leads us to consider its dual role: (i) as a vector of social development and inclusion; and (ii) as a driver of economic development. Since the country established a universal and integral public health system, a main challenge is to favor an evolution of this system that magnifies the positive impacts on local territories. Thus, in this paper we analyze the learning, capacity building and innovation processes in this local systems and their effective and potential impact on the local health system. The findings suggest that the types and intensity of interactions are closely related to the characteristics of what can be called a local cognitive territory. The directions of capacity building and scientific and technological evolution are directly influenced by conflicts among individuals and groups. The influence of these power relations, which are often associated with diverging private and public (collective) interests, highlights the importance of the institutional and policy dimensions for mediation and for promoting an evolution of the system that favors social inclusion and efficiency.

**Keywords:** health innovation system, local production and innovation systems, learning and capacity building, innovation, power relations and institutions



## **NATIONAL DIVERSITY OF INVENTIVE GROUPS: AN INDEX BASED ON PATENT DATA**

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### **Abstract**

This paper, still in a provisional version, discusses the extent and dynamics of internationalization in inventive groups by means of an indicator adapted from a different research field, which is based on cross-country patent data. The index we propose is designed

to measure the degree of national diversity of inventors working in a same research group. By applying our index to the EPO PATSTAT database, we then conduct a descriptive empirical analysis exploring main trends in the national diversity of research groups as resulting from patent applications data going from 1979 to 2008. While being overall very low, the observed level of national diversity of inventive activities shows on average to have steadily increased over time. Instead, a negative trend appears when research groups include inventors from BRICS or the Asian Tigers. Moreover, the amount of collaboration between inventors residing in different countries and its trend over time turns out to differ markedly across technology classes.

**Keywords:** national diversity, inventive activity, inventors, research groups, patents, emerging economies



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SEPTEMBER 11-13, METU - ANKARA

## **RURAL HEALTH SYSTEMS IN SOUTH AFRICA: THE ROLE OF LOCAL INNOVATION IN SOCIAL INCLUSION**

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### **Abstract**

This paper explores innovation in rural health care systems in remote or marginalised areas where limited public health care is available. To overcome this challenge and satisfy the universal demand for health care, populations in remote rural areas often rely on multiple private providers that deliver services based on various sources of knowledge (both traditional and modern sciences). Rural healthcare is thus a versatile and dynamic sector which includes a variety of economic activities. This paper presents evidence collected in two marginalised localities: Ingquza Hill Local Municipality and Mbizana Locality; both in the Eastern Cape Province, one of the poorest provinces in South Africa. On the basis of this evidence the paper explores: (1) the key actors that compose rural health systems and, (2) examples of interactions and innovations that emerge amongst these actors in such contexts. It is argued that a better understanding of the solutions that are originated within local systems of innovation constitutes a suitable approach towards sustainable and inclusive development.

**Keywords:** inclusive development, innovation systems, rural health, local innovation





## **TECHNICAL EFFICIENCY IN THE MANUFACTURING SECTOR IN INDIA: STOCHASTIC FRONTIER APPROACH**

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Substantial benefits can be obtained from using the resources at hand more efficiently (Pack, 1988). The post-colonial resource scarce India formulated its industrialization policies of import substitution with the implicit assumption that the period of protection would be utilized to increase technical efficiency (ibid). These policies did accelerate industrial growth but only till mid 1960s; after which the period of prolonged stagnation loomed. The literature of the time found that the initial growth of the industrial sector is due to capital accumulation based on the Harrod-Domar and the Mahalanobis model of growth rather than the efficiency with which the capital and labour is used (see Ahluwalia, 1991; Mookherjee, 1995). This put in scepticism the policies adopted by the economic planners and started a search for an alternative path paving development and growth. The policies adopted by the then successful East Asian Tigers aroused a new wave of optimism. The flexible outward oriented policies were viewed as generating greater efficiency as a result of: greater capacity utilization, greater horizontal specialization as each firm concentrates on a narrower range of products, increasing familiarity with and adoption of new technologies, greater learning by doing (Pack, 1988)...(continues from the introduction).



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **MAPPING THE ORGANIZATIONAL DESIGN FOR INNOVATION IN BRAZILIAN PETROCHEMICAL INDUSTRY USING SOCIAL NETWORK ANALYSIS**

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### **Abstract**

Both existing literature and cases studied herein indicate that the Organizational Design for the development of radical and incremental innovations should be different from each other, but in practice is not clear how exactly companies should do it. This paper attempts to contribute to the literature in the area of Innovation Management by analysing how is the Organizational Design for Incremental and Radical innovations in consolidated companies of mature sectors, using the Social Network Analysis as analytic tool. To this end, eleven innovation projects in three companies from the Brazilian petrochemical sector were studied.

**Keywords:** Innovation, Organizational Design, Petrochemical Industry, Social Network Analysis



## INTERACTIVE LEARNING SPACES FOR SMALL PRODUCERS IN LATIN AMERICA

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### Abstract

Inclusive development is the main challenge, especially in Latin America countries, in order to fight against exclusion raised from neoliberal policies implemented along the '90s decade. Two case studies are presented in order to discover and analyse the set of relationships emerging to address economic and social inclusion issues. In the first place, the milk small producers at the Loma Blanca community in Almoloya Juarez, Mexico State, Mexico is studied. Then, the case of olive small producers at Aimogasta, La Rioja, Argentina is presented. The information is collected taking in mind a complementary approach built from the evolutionary economic theory, actor-network theory, social construction of technology and localized agri-food systems. The obtained information was interpreted through a deductive / inductive process and then depicted by applying the social networks method. The results showed that even though both cases presented different pattern of relationship, they have some common points. Idiosyncrasy, cultural and bad / good experiences lived in the past are the most relevant ones. Public policy should harmonize such factors with their mean objectives in order get success as social and economic inclusion tools. In that way interactive leaning spaces can be visualized in both cases and new intervention strategies can be projected for future cases starting with these experiences.

**Keywords:** localized agri-food systems, innovation system, México, Argentina, small production, family production, milk, olive, learning network



## **A MULTI LEVEL ANALYTICAL FRAMEWORK FOR INSTITUTIONALIZATION OF LEARNING: CASE STUDY OF PETROLEUM INDUSTRY OF IRAN**

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### **Abstract**

In this paper, we propose an analytical framework to institutionalize technological learning in large socio technical systems. Based on an in-depth and inductive empirical study of the upstream petroleum industry of Iran and the challenges facing this industry, we found that technological learning is a missing piece which needs to be institutionalized within the system; in order to do that we need to consider learning in various micro-meso-macro levels of a large socio technical system. Most of the studies in this field have focused on a particular level, while we believe that institutionalizing learning in a large socio technical system requires an overall and multi-level consideration of learning throughout the system. Hence this study tries to fill this gap by provision of a taxonomy of learning which is aligned and coordinated with micro-meso-macro levels of a socio technical system and structures an analytical framework for institutionalizing learning within the same, which (particularly in developing countries is deemed necessary for moving towards increasing the absorptive and thereafter innovation capacity and ultimately facilitates the development of that system).

**Keywords:** technological learning, institutionalization, petroleum industry



## **HOW SOCIAL CAPITAL AND COGNITIVE FACTORS INFLUENCE THE ENTREPRENEURIAL INTENTIONS: A STUDY OF TWO EMERGING ECONOMIES**

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### **Abstract**

An individual's intention to enter into an entrepreneurial activity in future is a complex phenomenon. Recent empirical work in social cognition literature suggests that formation of intentions is influenced by cognitive conditions and social structures in which an individual is embedded. Existing cognitive models of entrepreneurial intention ignore the significant role of social conditions of an individual. In this paper for a better understanding of the formation of entrepreneurial intention we incorporate social capital into cognitive entrepreneurial intention model based on the theory of planned behaviour. Using a sample of 636 Turkish and Pakistani undergraduate business students we find that social capital shapes the entrepreneurial intentions of young people through the path of cognitive infrastructure. Findings also suggest that cognitive antecedents of entrepreneurial intention model are good predictors of intentions in the context of countries of our study where socio-cultural structures are quite varied than occidental societies. Unlike most studies our study finds that subjective norm has a strong influence on entrepreneurial intentions both through direct and indirect path. Our study contributes to apprehend the influences of the social and cognitive factors upon entrepreneurial intention process in the social contexts, which are different from Western democracies.

**Keywords:** entrepreneurial intention, social capital, TPB



**GLOBELICS '13**

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## **INNOVATION FOR DEVELOPMENT: WHITHER ZIMBABWE**

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### **Abstract**

From the period 2000 to 2009 Zimbabwe's economy suffered its sharpest contraction since independence. This period was characterised by hyper-inflationary environment, high interest, and unemployment, declining GDP, currency rate instability and political instability. Indeed what was once the bread basket of the region had fallen mightily, yet on paper Zimbabwe has produced some of the best economic policies in the region. There exists a gap between policy formulation and policy implementation hence the economic situation in the country remains unchanged. Therefore it can be concluded that monetary and fiscal policies are necessary but not sufficient for economic development. The paper employs the national innovation systems (NIS) framework to analyse Zimbabwe's economy. NIS framework is increasingly being recognized as a more suitable, adaptable and useful approaches to development planning. This is a literature review based paper which posits that innovation technological change and the corresponding structural reconstruction of economy are the means to overpower the economic meltdown that had befallen Zimbabwe. This will in turn ensure smooth steady recovery and sustainable economic growth. Furthermore innovation technological determinism shapes and positions the country in the global competition and consequently creating employment opportunities.

**Keywords:** innovation, economic development, systems, technology, knowledge



## **THE INTERNATIONALIZATION OF CHINESE AND INDIAN PHARMACEUTICAL COMPANIES**

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### **Abstract**

The rise of multinational companies based in emerging countries is an established phenomenon. Less well understood are their different paths and strategies. This paper compares the internationalization strategies of Chinese and Indian multinational pharmaceutical firms and addresses their strengths and weaknesses. China's pharmaceutical companies have little ownership advantages and are far less advanced than Indian ones, but are able to internalize major positive externalities from their domestic environment (funds and science); Indian pharmaceutical corporations are moving from imitation to innovation fairly swiftly, even in a less encouraging environment, an evolution that most founding fathers of LDC MNC theory (Lall, Wells) did not see and other present day authors who speak about "emerging country copycats" (Luo et al, 2011) are not seeing either, but Linsu Kim has seen, at least for some Korean firms. Thus our paper challenges the general assumption of MNC theory that all transnational firms possess unique ownership advantages.

**Keywords:** Chinese and Indian pharmaceutical companies, internationalization, emerging market, market entry strategies



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## **SMALL IS BEAUTIFUL: AN ANALYSIS OF INNOVATIVE PERFORMANCE OF SMALL FIRMS**

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### **Abstract**

This paper shows that the sectorial distribution of micro and small businesses (MSBs) *versus* medium and large enterprises (MLEs) is not homogeneous in Brazil. Thereby, the aggregate technological effort of these groups reflects the differences related to this sector composition. It is further considered that in sectors with greater technological intensity the innovative performance of companies of different sizes is similar; this fact is not observed in low-technology sectors. The paper raises the hypotheses that in high-technology sectors MSBs aim to take part in the market through differentiation, technological niches and opportunities, while in the lower technology segments the MSBs innovative processes are limited to technical improvement of their industrial plants.

**Keywords:** size, micro and small business, innovative activities, Brazilian industry





## REGIONAL SYSTEMS OF INNOVATION IN THE ARAB REGION

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### Abstract

This paper employs both the descriptive and comparative approaches and uses the definition of systems of innovation used in the literature to examine the existence, characteristics and implications of the regional systems of innovation in the Arab region. We examine three hypotheses, that the regional systems of innovation exist but characterized by serious weaknesses in the Arab region compared with other world regions, that the structure of the economy has significant effect in the performance of innovation systems in the Arab region and that the poor Arab systems of innovation has serious implications in the Arab region. We explain two common characteristics of Arab regional systems of innovation concerning poor subsystems of education, S&T, R&D and ICT institutions in the Arab region and concentration of R&D activities within public and universities sectors and small contribution of the private sector in R&D activities. We find that the major implications are the poor performance of the Arab region in terms of S&T indicators, competitiveness indicators, technology achievement index and poor integration in the knowledge economy index. Therefore, it is essential for the Arab region to enhance the institutions of higher education, S&T, R&D and ICT to build the Arab regional systems of innovation and to achieve economic development in the Arab region.

**Keywords:** education, S&T, R&D, systems of innovation, economic structure, Arab region



## **TECHNOLOGICAL LEARNING IN MNC SUBSIDIARIES OPERATING IN REGIONAL INTEGRATION PROCESSES: A CASE STUDY ON AN AUTOMOTIVE COMPANY IN THE MERCOSUR**

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### **Abstract**

In the last decades, MNC have tended to organise their business activities around regional areas. This process has involved a progressive delegation of innovation responsibilities to subsidiaries located in developing countries, thus allowing these units to accumulate technological capabilities. Through the examination of an automotive MNC operating in the Mercosur, this article analyses how the process of technological learning is carried out in the particular case of subsidiaries operating in a regional integration agreement among developing countries. The evidence collected for this case study shows that the MNC developed a highly hierarchical division between the subsidiaries operating within the Mercosur and concentrated the most intense technological learning processes in one single country of the integration process.

**Keywords:** automotive industry, product development, MERCOSUR, innovation management, emerging markets



## **INSTITUTIONAL INNOVATION AND INCLUSIVE GROWTH: LESSONS FROM THE COFFEE AND PALM OIL SECTORS IN COSTA RICA**

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### **Abstract**

This paper presents an analysis of the contribution made by a number of institutional innovations aiming towards more inclusive growth in the coffee and palm oil sectors. The analysis is historical, considering the concepts of sustainable development and inclusive growth and based on the system of innovation. The point of departure is that development involves more than just growth. The need to consider a variety of challenges (economic, social and environmental, as well as the trade-offs between them became clear when considering both these areas. In this sense, the possibility of sustainable development and its application at sectoral level in terms of performance has influenced most of the changes, although not always explicitly.

Historically, certain institutions provided opportunities for inclusive growth in the coffee sector in Costa Rica. Regulation of prices and a system of R&D with diffusion of technology for all participants are good examples. In the palm oil sector the structure of the market changed drastically once cooperatives began to participate in activity. In principle, institutional innovations form a part of both sectors, and have impact on the performance of the entire sector but also on the country's economy in general. We also argue that the way the global value chain is governed could be a limiting factor in terms of possibilities for innovation, especially in the coffee sector. This analysis is based on a system that takes an innovative approach, studying the main innovations and the main components of these systems, as they contribute towards answering the multidimensional challenges in each sector. We use historical information referring to the main institutions through time and statistical data to substantiate the main arguments.



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## **LOCALIZATION, INTERNATIONALIZATION AND INNOVATIVE SUCCESS: AN ASSESSMENT OF EUROPEAN REGIONS**

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### **Abstract**

Regions are one of the units of scale for understanding the innovation structure, functions and process. The literature on regional innovation systems (RIS) is quite large and the main focus has been to explain the dynamics of the innovation and learning process and the universal factors which bring success to the localized systems. RIS is a complex system and it is hard to explain the innovation process with a single model. Localization and internationalization are two popular concepts which are viewed as important factors that bring success to a regional system. However, the literature lacks empirical evidence about the relevance of these concepts with the innovative output. This paper provides a model to evaluate the role of localization and internationalization on the innovative success of regional systems. By using the patent applications, R&D human resource indicators and European Union Framework Programmes project participation statistics of 280 regions in Europe, a four-quadrant matrix was constructed in order to analyze the general effects and make inter-regional comparisons. This analysis was made for all technological fields and in particular for information and communication technologies.



## **KNOWLEDGE CREATION IN DIFFERENT INDUSTRY REGIMES: THE ROLE OF ECONOMIES OF SCOPE**

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### **Abstract**

In this paper, we investigate learning dynamics in different industry regimes. In the agent based simulation model, firms select partners based on complementarities in two dimensions. First one is complementarity in the market dimension, with respect to the similarity in their product portfolios. The second one is complementarity in technical dimension, which refers to the similarity in their knowledge base. The question that the model addresses is, what types of alliance strategies, in different learning regimes yield higher learning? Alliance strategies are taken in exploration and exploitation dimensions. According to the results, learning strongly depends on the extent to which economies of scope is made use of in an alliance. Being similar in one dimension, like the knowledge base, and being different in the other dimension, like the market, yields highest learning results. Such ambidextrous firms can find opportunities to apply similar knowledge to meet diverse market needs. The model has direct implications for the software industry, which is characterized by rich economies of scope.



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## **WHICH FIRM CHARACTERISTICS MATTER? IDENTIFYING THE DRIVERS FOR ECO-INNOVATION**

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### **Abstract**

Besides the conventional technology-push and market-pull drivers, environmental regulations and standards are considered of the utmost importance for eco-innovation. However, the innovation process is highly complex, path-dependent and cumulative (Dosi, 1988, Pavitt, 1984) requiring certain firm specific characteristics to have determining role in the eco - innovation process. The aim of this research is to identify those certain firm characteristics essential in the firms innovation process, and to what extent these characteristics are inherent in the realization of eco-innovation. We utilized the Heckman selection model of the 4th wave of the Community Innovation Survey (CIS 4). The results assert that eco-innovative firms tend to be large individual firms that are open to use of internal and external sources of information. Moreover, results indicate a substitution effect between cooperation with scientific and other non-scientific institutions, and basic R&D efforts. The results are robust to country-specific analyses.

**Keywords:** Eco-innovation, Heckman, CIS 4, firm characteristics, environmental consequences



## **ORGANIZATIONAL SLACK, TMT CHARACTERISTICS AND INNOVATION PERFORMANCE: AN EMPIRICAL STUDY OF HIGH-TECH LISTED COMPANIES**

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### **Abstract**

Nowadays, how to effectively utilize the capacity of the top management team (TMT) directly affects the enterprise's speed of growth and sustainability. This research is to explore the inner links between the characteristics of TMT and the enterprise's innovation performance with the moderation effect of organizational slack, which has received extensive focus in the academic circle. Based on a review of previous studies, this research chooses the listed company in both knowledge-intensive and technology-intensive high-tech industry as research sample, and then further elaboration of how the difference of TMT demographic level, motivation level and social network characteristics influence the innovation performance will be provided. Organizational slack is used as a moderator to testify the trigger mechanism of TMT capability and its effect on innovation performance.

**Keywords:** TMT characteristics, high-tech industry, organizational slack, innovation performance



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## **ENTREPRENEURIAL ORIENTATION, BUSINESS MODEL INNOVATION AND FIRM PERFORMANCE**

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### **Abstract**

A business model guides a firm's interactions with its diverse stakeholder to create value. The innovation in the business model helps the firms to create and capture value either by creating new market or use new ways to reach existing markets. In this study we explore the antecedents and consequences of business model innovation. Based on the data from 192 SMEs in India, we found that entrepreneurial orientation significantly influence business model innovation. Moreover, our findings also highlighted that business model innovation significantly impact both competitive and social performance of the Indian SMEs. The finding of the study adds to the extant literature on business model innovation and informs managers about the importance of business model innovation and the ways to improve it.





## **LEARNING FROM NANOTECHNOLOGICAL SYSTEMS OF INNOVATION: DEVELOPING INDICATORS TO SUPPORT NANOTECHNOLOGY INNOVATION POLICY IN BRAZIL**

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### **Abstract**

Nanotechnology has been considered an emerging general purpose technology with the potential to affect several domains of economic activity and social configuration in the coming years. Over the past years, developments in nanotechnology have drawn the attention of governments, industry, academia and the public as to the potential industrial benefits. The perception that nanotechnology promises important changes, advocating for its early exploitation, holds a rare opportunity to policymaking. In this context, understanding the innovation process of nanotechnology represents a key factor in order to design and implement relevant and adequate innovation policy. Nevertheless, innovation process in nanotechnology is still poorly understood and traditional innovation indicators are not suitable to fully comprehend such process. This paper is an attempt to contribute to the development of innovation indicators for nanotechnology in Brazil by understanding the different nanotechnology systems of innovation in order to provide more meaningful data to policy-makers to design and implement more adequate innovation policy to enable nanotechnology development in Brazil.

**Keywords:** nanotechnology systems, innovation survey, innovation policy, Brazil



## **ECONOMIC GROWTH, INNOVATION AND INEQUALITY IN LATIN AMERICA: IMPROVEMENTS, SETBACKS AND PENDING ISSUES POST WASHINGTON CONSENSUS**

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This paper examines the evolution of the Latin American economies during the period 1990-2011, with the objective of identifying the improvements, setbacks and pending issues associated to the market reforms that were applied, in keeping with the Washington Consensus, and the economic policies that followed and that drifted away from this orientation. The analysis places special emphasis in three aspects: the expansion of the per capita output, innovation and distribution of personal income. The main objective of the paper is to identify the relationships between growth patterns, systems of innovation and the welfare indicators of the economies. That is, to determine whether the observed trajectories in the long run show the configuration of development regimes in the region. For this purpose, both the modification in the relative weight of the components of aggregate demand in economic growth as well as the repercussions of investment on experimental research and development on the innovation system, are analyzed. Additionally, we seek to establish what the effects of these modifications and repercussions were upon welfare as measured by the changes in per capita income and in inequality in income distribution. This comparative analysis aims to contribute to the reflection of the changes, necessary or probable, that public policies in the region must follow in order to boost their development.

**Keywords:** growth, innovation, inequality, Latin America, economic and innovation policies.



## **DEVELOPING A FRAMEWORK FOR THE ANALYSIS OF INNOVATION POLICY IN A WEAKER REGION**

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### **Abstract**

The overall aim of this project is to enhance our understanding of innovation and economic growth in weaker regions, and specifically the role government plays within the innovation system. This study brings together theories of innovation into a framework that allows them to be applied to a weaker region within an economically developed nation, with a focus on the role of government as a driver of growth. Through a case study approach employing document and policy analysis and stakeholder interviews, this study aims to further our understanding of innovation policy making in Wales; the decision making processes, how it is implemented, the roles of different actors within the innovation system, and how these actors view government as a driver of growth. This study will critically apply a selection of theories of innovation to the Wales case study to establish which theories are applicable to the context of a weaker region. Innovation theory is employed as a means of analysing and understanding the Welsh case, and findings from analysis of the Welsh innovation system will help us to understand more about the applicability of theories of innovation.

**Keywords:** innovation policy, theories of innovation, weaker regions



## **STRATEGIES FOR KNOWLEDGE-BASED ENTREPRENEURSHIP IN CENTRAL AND EAST EUROPEAN ECONOMIES**

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### **Abstract**

This paper explores the entrepreneurial strategies of 60 knowledge intensive firms in four CEE countries. The analysis is framed within the entrepreneurial orientation (EO) framework as multi-dimensional construct. This framework includes innovativeness, proactiveness and risk taking, autonomy and competitive aggressiveness dimensions to which we add networking and employment as important additions. Our main question is whether firms in emerging markets like CEE have all the attributes of developed EO or whether the specific external constraints and opportunities affect their EO.

Our data show a combination of individual start-ups as well as corporate spin-outs whose establishment and growth are closely interdependent with a variety of networks or network related factors. They are either organizational spinoffs (machine tools) or new starts-ups (software) but whose founders brought accumulated work experience and network capital built during their previous career. Institutional barriers in setting up and operating company are present but far less than would be expected. The major barriers are related to demand and market constraints, technology risks and skills shortages i.e. barriers are more developmental than institutional.

Our research suggest that indeed networks are quite positively important in establishing company (networks inherited from previous employment), in new product development or innovativeness (value chain partners and market networks), in exploring new ideas or proactiveness (value chain partners and market networks), and partly in sustaining competitive advantages (alliances in software). Although networks are important feature of KIEs they are not improving risk taking ambition and do not generate potential economies of scale and scope through labour pool or joint specialized services.

Overall, policies to increase entrepreneurial orientation in knowledge intensive sectors should be embedded in their specific market context and thus be very much sector or technology specific. This requires an in-depth understanding of the major drivers of competition in specific sectors and firm oriented policies appropriate to an open market context.



## **GLOBAL SHIFTS IN WORLD SCIENCE BASE? A COMPARATIVE ANALYSIS OF CENTRAL AND EASTERN EUROPE WITH THE WORLD'S REGIONS**

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### **Abstract**

This paper explores the changing role of world regions (CEE, EU15, South EU, Former USSR, North America, Latin America, Asia Pacific and the Middle East) in science base with special reference to EU15 (developed EU) and Central and Eastern Europe (CEE) in 1981-2011 period based on bibliometric data. The data are extracted from Thomson Reuter's National Science Indicators (2011) for 21 broad disciplines in science and social sciences. We investigate over time changes in descriptive indicators such as publications, citations, impact as well as scientific specialization measured by revealed comparative advantage (RCA) applied to citations and papers, in three periods – i.e. 1981-1989, 1990-2000 and 2001-2011. Multidimensional scaling and hierarchical clustering are used to comment on divergence/convergence among world regions. In view of common historical legacy in science we are particularly interested in process of divergence within the post-socialist world as well as in the process of the EU convergence in terms of specialization in major scientific disciplines. Our results show that there is global shift in science largely in terms of quantity (papers) and much less in terms of impact (citations). We argue that this should be interpreted as shift in terms of absorptive capacity of science but not necessarily in terms of knowledge generation at world science frontier. Science systems are characterised by strong inertia and by long lasting historically inherited advantages and disadvantages. Moreover, three major changes at regional level have been the loss of the excessive specialization of South EU in applied sciences; excessive specialization of CEE and Former USSR in fundamental sciences that has been followed by reduced specialization of the CEE and continuous excessive specialization of the Former USSR and its de-specialization in life sciences; excessive specialization of North America and the Middle East in social sciences (albeit for opposite reasons) that has been followed by reduced specialization of the Middle East and by continuous high specialization of North America. Lastly, CEE has shown strong



comparative advantages particularly in fundamental sciences and has been catching up in the last decade in applied sciences. This is accompanied by a divergence from the former-USSR and a convergence towards EU15 from 1981-89 period to 2001-2011 period. Together with the Former-USSR region CEE continue to be specialized in fundamental sciences when compared to other world regions which suggest that these regions are facing disproportionately higher problem of (ir) relevance of their science base for technological and industrial bases. Changes in the CEE science systems have been largely in terms of their absorptive capacity rather than in terms of the world frontier activities.

**Keywords:** bibliometrics; absorptive capacity in science base; scientific specialization; world regions, Central and Eastern Europe.



## **AN INNOVATION SYSTEM FOR RURAL ENTERPRISES IN INDIA**

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### **Abstract**

There is perhaps little that is as bleak as the rural enterprise scenario in India, especially within the context of rural poverty. But it is precisely this bleak picture that opens up countless possibilities to tackle the obstacles which plague the health of rural enterprises in India - particularly the possibility of articulating and strengthening the linkages between institutions and other vested actors and the implementation of rules and norms for rural entrepreneurship, i.e. an innovation system. This paper contends that an innovation system for rural enterprises would inject rigor into a dilapidated, entrepreneurial spirit in rural India and enable rural enterprises to thrive in regional, national, and even international markets given their current status. There are examples of actors, such as S&T-capable NGOs, currently operating in the rural enterprise realm in India and advocating for such an innovation system through their work, as this paper illustrates.



## **EMERGENCE OF CONTROVERSY IN TECHNOLOGY TRANSITIONS: GREEN REVOLUTION AND BT COTTON IN INDIA**

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### **Abstract**

Technology paradigm shifts that follow radical technological breakthroughs are often marred by controversies and the introduction of the Green Revolution (GR) and genetically modified (GM) plant varieties in India were no exceptions to this rule. Controversies can lead to misallocation of resources by economic actors, leading to sub-optimal outcomes and are therefore social dilemmas for governments to deal with. Then, how do controversies emerge during technology paradigm shifts? To answer this question, we develop a novel conceptual framework adapting the innovation system perspective to agriculture. Nature or Agro-ecology is integrated as an actor in the game that responds to transitions in technology paradigms. We then apply the framework to analyse the GR and GM paradigm shifts in cereal production and cotton in India respectively. Through a meta-analysis of the literature and survey of farmers who have adopted GM cotton, we find that controversies are centred on ecological outcomes rather than socio-economic consequences. Furthermore, controversies are likely to increase as the innovation system for seeds becomes more complex and the locus of scientific knowledge shifts more to the private sector. Scientific uncertainty has very little role to play in the diffusion of controversial technologies in the presence of high immediate payoffs. In emerging countries like India, more than the environmental risk, the real danger in approving future transgenic crops lies in not being able to ensure actor cooperation and consensus building in the agricultural innovation system in order to preserve environmental security

**Keywords:** Technology transition, Controversy, Green Revolution, GM cotton, India





## **ACCESS TO CRITICAL MEDICINES: WHEN ARE COMPULSORY LICENSES EFFECTIVE IN PRICE NEGOTIATIONS?**

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### **Abstract**

The availability of drugs for public health programs depends on the quantity of drugs that the State is able to buy given its health budget, which in turn will depend on the pricing and distribution strategies of pharmaceutical companies, both local and multinational. With respect to patent protected drugs supplied by Western pharmaceutical majors, governments of developing countries are particularly in a vulnerable position as often the technology cannot be licensed or independently developed by local firms. Therefore, when there is a major disease that calls for patented medicines, the sustainability of public health programs may be put at great risk. When faced with such a problem, one possible solution is to negotiate for a price-drop with the patent holder in lieu of issuing a compulsory license. The present paper develops a game theoretic model of such bargaining and identifies the conditions under which compulsory licenses can be issued. It shows that while compulsory licenses are impossible under complete information, they can be issued under incomplete information. We show that compulsory licenses is more likely the higher the initial drug price, and stronger the domestic manufacturing or access to imports of the drug. The findings of the model are compared against the real incidence of issue of compulsory licenses by emerging countries and policy insight is derived.

**Keywords:** intellectual property rights, compulsory license, access to medicines, technological capabilities, game theory



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## **FUNDING UNIVERSITY-INDUSTRY INTERACTIONS: EVIDENCES FROM A BRAZILIAN UNIVERSITY SURVEY**

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### **Abstract**

The objective of this paper is to investigate if the nature of the funding source matters in Brazilian university-industry interactions, in respect of different modes, channels, results, benefits and obstacles observed in these relationships. We presented data from a survey with research groups' leaders affiliated to Brazilian universities and research institutes. We analyzed 440 responses from the perspective of the predominant sources of funding of collaborative projects, in order to infer if the nature of funding matters in university-industry interactions. We found that private funding does not affect the generation of knowledge in universities, as projects financed with private resources also resulted in academic products like new research projects, dissertations and publications. We also found that public policies may be inducing research groups to use instruments related to the 'entrepreneurial university'.



## **STICKY SPOTS ON SLIPPERY SLOPES: TECHNOLOGICAL UPGRADING IN THE INTEGRATED CIRCUITS INDUSTRY IN EMERGING EAST ASIA**

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### **Abstract**

This paper draws from an inductive study of 36 integrated circuit (IC) production firms to examine the role of institutions and intermediary organizations in supporting technological upgrading in the integrated circuit industry in emerging East Asia. The evidence shows that IC firms in Korea and Taiwan have reached the technology frontier to show that they are deeply rooted on the slope of competition. IC production have also become sticky in Singapore and China where the provision of grants and government-industry coordination has attracted participation in the high value added activities of wafer fabrication, IC design and supportive R&D activities. Although IC production in Malaysia has enjoyed functional upgrading, particularly since 2005, its capacity to follow the path of Singapore and China will depend heavily on the dismantling of ethnic considerations by the government in the promotion of the industry. IC production is not sticky at all in the countries of Philippines, Thailand and Indonesia because of a lack of institutional deepening. Consistent with the global production network approach, the successful experiences examined in this paper show that the development of institutions and intermediary organizations through effective coordination between governments and industry is critical to stimulate technological upgrading in the IC industry.

**Keywords:** integrated circuits, technological upgrading, institutions, intermediary organizations, East Asia



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## **TOWARDS REGIONAL INNOVATION FACTORIES EVOLVING PLATFORMS FOR POLICIES AND INNOVATION COMMUNITIES**

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The regional innovation factories (RIFs) may be seen as the most recent evolutionary phase of science parks. Regional innovation factories offer a constellation of premises and services for different innovation-related communities in the region. They aim to nourish innovativeness and community building practices among and within these communities. The key functions of regional innovation factories are a) business generation (e.g. new incubator and start-up practices); b) hands-on training of future innovators in global environment; c) attracting innovators and investors around the world and; d) supporting the emergence of regionally-rooted innovation communities. RIFs have extended their practices to abroad and thus they represent the policy measures that build trans-regional platforms for border crossing innovation activities. As they emphasize the business development and DUI-learning, they offer a global gateway for regional innovation systems to internationalize their tacit knowledge base and learning processes, rather than science based knowledge transfer only. RIFs aim to empower individuals (e.g. students, entrepreneurs) and enhance innovation related community building. Concept is rather cost efficient and do not necessarily require strong university research and institutional setting in order to work properly, since key content is carefully planned processes. Therefore, RIF model may be more relevant for policy making also in developing and emerging economies, than more traditional science park models, although clear distinction between the two may be sometimes rather blurred.

**Keywords:** regional innovation system, innovation policy, policy platforms



## **FEITO NO BRASIL? MADE IN SOUTH AFRICA? BOOSTING TECHNOLOGICAL DEVELOPMENT THROUGH LOCAL CONTENT POLICIES IN THE WIND ENERGY INDUSTRY**

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### **Abstract**

How can local content requirements (LCR) boost technological capability for renewable energy? This paper investigates the implementation of LCR in the wind energy in Brazil and South Africa. Brazil tried to grow a local wind industry requiring 60% domestic content in each installation since 2004. South Africa demands up to 45% domestic content in its recent program. The benefits of these requirements are heavily debated. The rationale behind LCR is that governments in developing countries intend to stimulate jobs in new industries and to accelerate technological development. This market intervention imposes a barrier for international manufacturers, as local manufacturing can push up the technology prices. Based on evidence from Brazil and South Africa, we find that LCR fall short as a single technology policy instrument. The Brazilian case shows that LCR incentivized the domestic production of low and medium technology content. These are the heavy parts, such as the towers, which are difficult to transport. Recently, parts of the nacelle, hubs and blades have increasingly been manufactured locally. High technology-intensive components, however, continue to be imported. Boosting local industries requires not just restrictive measure such as content requirements but, more importantly, it requires active support of technological capability.

**Keywords:** renewable energy, energy technology policy, emerging markets



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## **FUNCTIONALITY OF THE TURKISH BIOTECHNOLOGY SYSTEM**

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### **Abstract**

This paper analyzes the performance of the Turkish biotechnology system, and identifies barriers and enablers to its performance, so as to guide policy makers. Our research lends further building blocks to the do called functional approach to innovation system dynamics, by pointing out specific conditions for developing countries. Analytically, our contribution lies in the realm of operationalizing internationalization of IS. The observations imply that some functions have improved in the Turkish system – knowledge development, entrepreneurial experimentation and market formation – while the functions resource mobilization, legitimation & influence of the direction of search have not reached a stable situation, and policy implications are discussed as based on these findings.

**Keywords:** Innovation system, Turkey, Biotechnology, Policy



## **TECHNOLOGY IMPORT AND MANUFACTURING PRODUCTIVITY IN INDIA: EVIDENCE FROM FIRM LEVEL DATA**

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### **Abstract**

The study examines the impact of import of technology on the productivity of India's organised manufacturing sector using the firm level data for the period 1995-2010. We use the Levinsohn and Petrin (2003) econometric technique to estimate the augmented Cobb-Douglas production function. We explicitly incorporate both embodied as well as disembodied form of technology imports into the analysis. The panel estimation suggests that both form of technology import have significant positive effect on manufacturing productivity. The sectoral estimation results based on technology intensive classification of firms reveals that the embodied technology purchase has relatively significant positive impact across sectors whereas the disembodied technology imports has positive effect on the productivity of medium technology intensive sectors.

**Keywords:** technology imports, embodied technology, disembodied technology, India, manufacturing, productivity, Levinsohn and Petrin, production function, prowess



## **HETEROGENEITY AND DIVERGENCE IN LOCAL INNOVATION SYSTEMS. SOME EMPIRICAL EVIDENCE FROM ARGENTINEAN SMES**

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### **Abstract**

Two of the most common characteristics of capitalist production structures are the heterogeneity of productive performance at the firm level and the divergence in the productive performance of local innovation systems. Inside an economy there are sectors, regions, and firms with well below average productivity and others that consistently perform better, relatively speaking. Surprisingly, low-productivity firms are not always driven out of the market by high-productivity ones (Bottazzi et al., 2010). From an evolutionary perspective, this heterogeneity is not simply a statistical regularity without theoretical interest (Nelson, 1981 and 1991), and it is not just a snapshot of a moment within a dynamic process of convergence. On the contrary, heterogeneity is persistent and has a central role in evolutionary dynamics. In this paper, I address this characteristic of productive systems by estimating the presence of externalities within reference groups that are made up of firms from the same sector and geographical area in a balanced panel of 1200 Argentinean SMEs. I propose a social interactions model (Glaeser and Sheikman, 2001) where the productivity of each firm will depend on that of the reference group discarding its own productive performance. Considering the presence of heterogeneity inside local systems, I estimate the different impact of these externalities on firms with different capabilities and linkages. On the other hand, taking into account divergence between local systems, I estimate the presence of a social multiplier (Glaeser, Sacerdote, and Sheikman, 2003), derived from systemic interactions which lead to an amplification of individual responses and therefore the divergence between systems.

**Keywords:** local innovation systems, heterogeneity, divergence, social interactions





## THE APPROACH OF COMPLEXITY AND EVOLUTIONARY ECONOMICS OF INNOVATION

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### Abstract

This paper attempts to be a contribution to the current debate on what direction the Neoschumpeterian evolutionary theory is taking; and in particular what role the complexity approach is playing in coordinating and integrating the various trends within. We depart from the idea that the trends adhere to overlapping sets of ontological assumptions, which differ in terms of the main question they address. Likewise, each trend finds within the history of economic thought different backgrounds that are consistent with their particular ontologies. The thesis of this paper is that different groups within evolutionism adhere to different sets of ontological assumptions as they address different but complementary aspects of the same reality. Therefore, they could be articulated if they were considered an integrated ontology. We propose that the ontology of complexity could fulfill this role. Awareness of this would allow the discipline to find better ways of articulation among different inside-groups and groups of authors, to identify vacant research areas, and to stand as a strongly articulated research program with coherent theoretical fundamentals and methodological tools.

**Keywords:** complexity, evolutionary economics, ontology



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SEPTEMBER 11-13, METU - ANKARA

## **THE EFFECT OF PUBLIC SUPPORT TO FIRMS' INNOVATIVE ACTIVITY ON FIRM GROWTH: THE CASE OF BRAZIL**

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### **Abstract**

In the last decade, Brazil has implemented a strong shift in innovation policies providing greater incentives to innovation and aiming at the reduction of the technological gap faced by the Brazilian National Innovation System. We can also observe the consolidation of an Innovation Policy based on the dissemination of programs that try to direct the public funding to innovative companies and to the formation of cooperation networks between enterprises, research institutes and universities. This paper aims to measure the effect of government support to firms' innovative activities on firm growth in Brazil, in the 2000-2010 period. The paper uses micro level data from the Brazilian Innovation Survey (PINTEC) and from the Brazilian Yearly Industrial Survey (PIA) to measure the effect of government support to innovative activities on firm growth. The paper has two main conclusions: (i) innovation policies are have been quite effective and on average firms that received governmental support grew their employment between 20 to 30 percentage points faster than those firms that did not receive the support; (ii) the paper suggests that the shift of direction in innovation policies was right but that however smaller businesses still have less access to governmental support. Some adaptations should still be made in order to overcome this shortcoming.

**Keywords:** innovation policy, firm growth, Brazil



## **TECHNOLOGICAL OPPORTUNITY, CUMULATIVENESS, CATCHING-UP AND THE EVOLUTION OF TECHNOLOGICAL SPECIALIZATION PATTERNS IN ASIA AND LATIN AMERICA**

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### **Abstract**

This paper explores the role of technological opportunity and cumulateness in order to explain the paths of technological specialization patterns evolution relative to two groups of Asian and Latin American countries. The paper attempts to show that, alongside market integration processes, the role of technological opportunity was irrelevant, while cumulateness might have played an important role to explain some mobility (in Asia) and persistence patterns (in Latin America). Using patent applications in the European Patent Office between 1980 and 2010 for 6 Asian and 3 Latin-American countries, the paper concludes that: 1) all countries present elevated pace of catching-up along the integration process; 2) catching-up drove to a pattern of competences concentration in Asia and to a pattern of competences dispersion in Latin America; 3) despite an initial turbulence, countries trended to stabilize their specialization patterns; 4) specialization patterns were more stable in Asia, while des-specialization patterns were more stable in Latin America; 5) excluding some exceptions, countries trended to reduce their levels of positive and negative specializations.

**Keywords:** technological opportunity, cumulateness, technological specialization patterns, market integration



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **EMPIRICAL ANALYSIS OF THE RELATIONSHIP BETWEEN INDUSTRIAL-ACADEMIC JOINT RESEARCH AND COMPANY SIZE; TEST OF U-SHAPE HYPOTHESIS**

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### **Abstract**

This paper explains what companies research with academia, focused on size of employee. Concretely, we analyze relationship between company size and rate of joint research with academia. We obtained the survey data for companies by conducting an original questionnaire survey delegated to an investigation company. In this paper, we finally used data of about 5300 companies (response rate, 25%). We approached with probit model and distribution of rate of joint research with academia by point diagram. As a result, we found that big companies totally tend to conduct joint research with academia more than small companies although very small companies also tend to joint with academia as previous works point out.

**Keywords:** open innovation, industrial-academic joint research, company size



## **WHAT HINDERS LEARNING AND INNOVATION OF SERVICES FIRMS IN MEXICO?AN EXPLORATION**

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### **Abstract**

This paper draws and contributes to two strands of literature, namely innovation in Services, and studies on the barriers to innovation from a developing country perspective. Based on survey data about firms in Mexico, we used a methodology to analyze Services and manufacturing firms within the same framework; hence we explored the effects of two kinds of barriers to innovation, namely revealed and deterring obstacles. We documented that although manufacturing firms tend to be more innovative than Services, overall, both firms show a somewhat limited innovation behavior in Mexico. Such behavior is mainly explained by deterring effects associated with regulatory environments and the actual cost of innovation. Revealed or learning effects associated with cost, markets and regulation were reported mainly by firms not belonging to larger groups. Policy interventions intended to improve interactivity within Mexico's system of innovation and stronger internationalization, through exports for example, would help in addressing these problems. Our findings lend some support to the proposition that firms need to go beyond a certain threshold in their involvement in innovation in order to be able to identify and qualify the obstacles that hinder such activity.

**Keywords:** innovation, innovation barriers, services, Mexico



## **LEAD MARKET FOR MEMBRANE BIO-REACTOR (MBR) TECHNOLOGY – CHINA’S SECOND-MOVER STRATEGY FOR THE DEVELOPMENT AND EXPLOITATION OF ITS LEAD MARKET POTENTIAL**

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The membrane bio-reactor (MBR) is an advanced wastewater treatment technology which allows for reuse of water. The technology has been developed in traditional OECD-countries, but its diffusion has been recently predominantly strong in water scarce countries such as China. We draw on the lead market approach and distinguish 5 classes of factors to analyse the potential of China to become a successful second mover: market conditions on the demand side (demand and price advantage), market conditions on the supply side (transfer and export advantage), technological capabilities, regulatory advantages, and actors and network advantages. Our results show that China enjoys favourable conditions with regard to demand, price and export advantage. In order to improve the chances for success, improvements are necessary especially with regard to transfer advantage (quality improvements) and integrating into the leading international networks.



## **A PORTRAIT OF ECO-INNOVATIVE ACTIVITIES IN BRAZILIAN FIRMS: THEIR MAIN DETERMINANTS, PROCESSES AND RESULTS**

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### **Abstract**

Eco-innovations are fundamental to redefine the environmental impacts of productive activities towards a new paradigm of sustainable development. Yet, still little is known about how eco-innovations take place in firms, especially in emerging economies like Brazil. The purpose of this chapter is to portrait the landscape of eco-innovations in Brazilian firms, concerning the characteristics of eco-innovators, as well as the determinants, results, types of innovation, main environmental initiatives what cooperative arrangements take place for the development of eco-innovations. It presents the results of an unprecedented survey on ecoinnovative activities in Brazilian firms carried out in 2012. The methodology is quantitative, descriptive and explanatory, using precise measurement to provide a representative picture of eco-innovations in Brazil. The results show that firms are mostly driven by the opportunity to create new businesses with their eco-innovations. Moreover, it reveals that most ecoinnovative firms in our sample conduct systematic, in-house R&D activities; most ecoinnovative firms participate in cooperative arrangements for innovation especially with universities and research institutes; and most eco-innovations are organizational, with incremental impacts.

**Keywords:** eco-innovation, sustainability, Brazilian firms, determinants, results



## **A ‘MORE EVOLUTIONARY’ APPROACH TO ECONOMICS: THE HOMO SAPIENS OECONOMICUS AND THE UTILITY MAXIMIZING MEME**

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### **Abstract**

“What is the driving force behind economic development and change?” This question has bothered a vast number of economists who have developed various concepts and theories often classified as evolutionary economics. Previous approaches to this topic have frequently drawn upon the works of Joseph Schumpeter who focused on economic change through innovation and entrepreneurship. In contrast, other scholars have tried to explain and predict economic processes by means of analytical or statistical models based on theories ranging from evolutionary biology to complex networks. This paper aims to contribute to this broad field by providing new insights and explanations for various economic aspects by drawing upon implications from cultural evolution and, particularly, the neo-Darwinian theory of memetics. Additionally, this investigation is supplemented with recent findings from behavioral and social sciences in a way that facilitates looking at economic development from a new angle. Starting from a synopsis of memetic terminology, it is argued that memes should be considered a key element of economic development. This hypothesis is set forth by reviewing concepts including utility maximization, innovation and the learning economy, leadership and entrepreneurship, and finally, the theory of the firm. The elucidation shows that memes and learning by imitation can indeed be seen as key elements of economic development and should thus be integrated more extensively into the construction of evolutionary economic theories.

**Keywords:** memetics, evolutionary economics, utility, learning by imitation, innovation, learning economy, entrepreneurship, theory of the firm





## **WHEN AN IMPORTER'S PROTECTION OF IPR INTERACTS WITH AN EXPORTER'S LEVEL OF TECHNOLOGY: COMPARING THE IMPACTS ON THE EXPORTS OF THE NORTH AND SOUTH**

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Using bilateral trade data of countries from 2000 to 2007, this paper contributes to the empirical literature on the role of intellectual property rights (IPRs) in global trade. The existing literature has focused on how IPRs in the destination country affect exports from a source country. In this paper, we add an additional dimension: the level of technology of the exporting country (LT). This is quite important for distinguishing the impact of IPRs on the exports of developed and developing countries, since the technology levels vary across countries at different stages of development and intellectual property rights better protect exports that are technologically advanced than exports that are imitative and potentially infringing. By factoring in the level of technology (LT), our empirical analysis makes the case that IPRs can act as barrier to exports from the South, especially the rapidly catching-up economies.

**Keywords:** bilateral trade, patenting, intellectual property rights, technological catch-up, innovative capacity



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **FUTURES OF ELECTRICAL POWER TECHNOLOGY IN INDIA: A DELPHI STUDY**

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The guiding concept of self-reliance calls a state to follow the path which can fulfil its needs and is in accordance with its basic resources and values. It was strongly felt by the Indian planners and policy makers that for attaining self-reliance, India has to come out of the yoke of dependence on other countries with regard to trade, investment and technology. Self-reliance is sought in the areas where normally the demand is fulfilled from the domestic sources, and only in acute cases the imports of few things from other countries is done on the basis of foreign exchange earned through exports. For India, the self-reliance was a vehicle to have relationship on equal footing with the outside nations and to bring reduction in pressures being exercised on the country for the purposes of depending much upon them. There have been several initiatives for self-reliance in the Public Sector since the dawn of independence, covering the vital socio-economic requirements like steel, power, capital goods, cement etc. (continues from the introduction)



## **EFFECTIVE GOVERNANCE OF UNIVERSITY-INDUSTRY KNOWLEDGE TRANSFER IN KAZAKHSTAN: A STUDY OF TELECOMMUNICATIONS SECTOR**

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### **Abstract**

The purpose of this paper is to report on an exploratory study conducted in Kazakhstan to explore the process of university-industry knowledge transfer in telecommunications sector. The data for the study was collected via questionnaires from 24 universities and 28 telecommunications companies. Statistical tests were run to measure whether the difference in the respondents' answers is significant. The results suggest there is a significant difference in the attitudes towards knowledge transfer between firms and universities. Knowledge transfer primarily occurs through traditional channels. Access to potential employees is the key benefit from university-industry interactions. The main obstacle to collaboration is the absence of any tax incentives. The major limitation of the study lies in the research method selected which was a survey. The presence of the researcher during face-to-face interviews as well as the use of the Likert scale in questionnaires might have influenced the interviewees' answers. The originality and value of this paper lies in its novelty. This is the first study which raised the issue of university-industry interactions in Kazakhstan. The results and recommendations provided by the study are found to be useful to universities and telecommunications companies – to learn the opinions of each other, for researchers – to build future research, and for policy makers – to develop policies and strategies in accordance with the recommendations.

**Keywords:** knowledge transfer, university-industry collaboration, telecommunications sector



## **INNOVATION SYSTEMS AND SOCIAL INCLUSION: PRELIMINARY EVIDENCES BASED ON EMPIRICAL WORK ON HEALTH LOCAL SYSTEMS**

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### **Abstract**

In the last years, the sharp social effects of globalization and technological change have placed the question of inequality back onto the political agenda, leading to increased support and political recognition of problems that affect the poor. Nevertheless, there is a lack of proper analytical and normative frameworks capable to improve the understanding of how to lead research and innovation to cope with social priorities. This paper is based on this background and motivation. It is sited on the results of the RISSI Project, which analyzed local innovation and production systems in health in five developing countries: Brazil, India, China, South Africa and Uruguay. Conceptually grounded on the LIPS methodological framework, the case studies aimed at understanding how social inclusion can be enhanced at the local level through improved innovation systems in health. The analysis includes innovative health systems that usually stay below the radar of public lenses, developed by the informal economy, micro and small enterprises and other local-scale actors, including 'living pharmacies', Ayurveda traditional medicine, rural health care systems, among other activities.

The studies evidenced the need of addressing social inclusion in the broader scope of innovation and development policies, showing how a systemic approach to policy can generate a more virtuous dynamic innovation system geared towards inclusiveness. The State must play a core coordinating role also providing diverse policy mechanisms in order to help making viable the evolution of the innovation system in an inclusive path. They also showed that the interaction between welfare systems and innovation systems in developing countries can generate extremely positive synergies in terms of growth, efficiency and equity, thus constituting a significant link



in a proactive strategy for inclusive development. In addition, the findings highlight that a more holistic and hybrid health innovation systems, which blends traditional knowledge with new technologies should be encouraged in developing countries as they are more suited to their characteristics and needs. The study also emphasizes, amongst other aspects, that public health approach (common well-being) should prevail over business models directed by private agents (profit oriented) if the aim is inclusive health innovation systems. As social inclusion is a broad and complex issue, it is clear that the case studies have not shed light in all aspects on how social inclusion can be enhanced at the local level through improved health systems. However, the results open up the possibility to assist policy makers to develop a sound understanding of the potential of health systems to social inclusion, as well as main requirements to fulfill this potential.

**Keywords:** innovation systems; social inclusion; health innovation system; local production and innovation systems; inclusive innovation



## **PROMOTING LOW-BUDGET INNOVATION AGENDAS FOR SMES: A MEXICAN CASE**

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### **Abstract**

Mexico is one of the largest economies in the world but its competitive level has declined over the last ten years. Different efforts have been undertaken to promote industry's competitiveness based on knowledge and innovation.

Authors of this paper have been involved in an initiative to foster innovation in Mexican SMEs sponsored by the Inter-American Development Bank, COMECYT and CONACYT. Target firms belong to priority manufacturing and service sectors and they are supported through providing technical assistance to generating technology-development projects and innovation-based networks as well as matching funds for those projects.

Over 150 Mexican SMEs have participated in this effort in the period 2011-2013 to build and implement innovation agendas with the assistance of a team of innovation managers specialized in 9 industrial sectors. The type of problems and obstacles to develop a portfolio of relevant and feasible projects reveals the degree of immaturity of such firms and the urgent need of capacity building in technology planning and project management at the firm level.

This paper includes an analysis of participating firms, their perceived technological needs, and their openness to collaborate with different actors of the innovation system and their abilities to identify goals, develop strategies, formulate proposals and implement specific projects. A very frequent problem has been the firm's lack of knowledge on its technological and market environment. It became apparent that many firms are interested in getting financial support just to acquire new equipment without analyzing critical needs or opportunities to generate greater value. Many



firms do not have internal capacities to conduct R&D projects but they are reluctant to collaborate with other firms because they fear losing confidential information. Willingness to invest in technology improvement is difficult to find and most firms want governments to be the only risk taker. This makes program management a very difficult and frustrating task.

Based on that analysis we conclude that success of innovation policies in developing countries is highly dependent on previous experience and learning abilities of firms. Finally, we draw some recommendations for building capacities at the firm level as well as for strengthening innovation policies aimed at involving and technologically upgrading SMEs.

**Keywords:** Mexico, innovation agendas, SMEs



## **CORPORATE SOCIAL RESPONSIBILITY AMONG SMALL AND MEDIUM SIZE ENTERPRISES IN CAMEROON: ENTRENCHING ENVIRONMENTAL CONSERVATION WITHIN SMALL BUSINESS**

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### **Abstract**

This paper aims to evaluate the practice of corporate social responsibility (CSR) by managers of small and medium size enterprises (SMEs) in Cameroon. More specifically it aims to analyze the ecological behaviour of managers of SMEs in Cameroon, to identify the determinants of the adoption of environmental dimension of CSR (e-CSR) measures in SMEs and to identify the determinants of the intensity of SMEs involvement in e-CSR. From a global perspective, evidence from our analyses points that the environmental protection is not yet a priority for managers of SMEs in Cameroon. However, the acquisition of “clean equipment”, the presence within the SMEs of a department in charge of environmental issues and the fact that SMEs make studies in order to protect the environment, increase the interest of their managers to become more involved in the practice of the environmental CSR.

Keywords: CSR, SMEs, manager, adoption





## **CROSSROADS: WHEN PATH-DEPENDENCE TURNS INTO PATH-CREATION INNOVATIVE STRATEGIES IN THE ARGENTINEAN MANUFACTURING SECTOR**

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### **Abstract**

This paper proposes a dynamic analysis of the firm's innovative strategy in order to understand how firms change their innovative behaviors as a response to changes in the environment. The methodology is based on a cluster analysis over 800 Argentinean manufacturing firms that participated in four rounds of the National Innovation Surveys (1998-2006). Results show that a set of continuous innovative firms remained with the same high-profile innovative strategy while the environment radically changed. Similarly, a group of non-innovative firms also remained with the same low-profile innovative strategy. Between these extreme groups, a set of new innovative firms changed their strategy and caught up in efforts based on pre-existent high levels of capabilities; and a set of sporadic innovative firms show an erratic behavior, which includes changes from a non-innovative to an innovative strategy, and vice versa. These findings allow us to preliminary conclude that any approach to the firm's behavior has to include firm's reactions to both the changes in the incentives from the environment and the increase (or decrease) in its own resources and capabilities.

**Keywords:** innovative strategies, micro-heterogeneity, path-creation



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **THE ROLE OF INNOVATION POLICY INCENTIVES ON THE REPRODUCTION OF ASYMMETRIES WITHIN NANOTECHNOLOGY KNOWLEDGE NETWORKS IN MEXICO**

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### **Abstract**

We explore new perspectives for analysing knowledge networks, arguing that knowledge networks can no longer be referred to as egalitarian, non-hierarchical, and neutral forms of social organisation. Instead, networks produce tensions, asymmetries, and hierarchies linked to Science, Technology, and Innovation Policy (STIP) incentives and incorporate dynamic and multisituated nodes of power.

This paper draws on evidence gathered from a case study on transnational and trans-local knowledge networks in nanotechnology, which have central nodes at a public research centre located in Chihuahua (Chihuahua) and its auxiliary branch in Monterrey (Nuevo Leon) in Northern Mexico. We propose that, in order to understand the production of asymmetries in knowledge networks, an incentive policy element must be added to the equation. The latter refer to monetary, symbolic, and material incentives stemming from all arenas where networks interact.



## **HAVE R&D LAG AND KNOWLEDGE DEPRECIATION VARIED OVER TIME? -EMPIRICAL STUDY BASED ON A QUESTIONNAIRE SURVEY AND PATENT DATA FOR JAPANESE FIRMS-**

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### **Abstract**

The R&D lag consists of several kinds of time periods each of which might have different characteristics and distribution. Based on the RIETI Inventor Survey data, we have analyzed on a continuous stretch of time terms in the R&D process, i.e., from the beginning of the R&D project to the application for the patent, and from the patent application to the beginning of the commercial use of the technology. The data shows that each lag has a very much skewed distribution in terms of length. 2-step regression analysis shows that the factors related to the decision for commercial use of the technology are largely independent of the factors related to the duration of the lead time to the beginning of use. We have not found tangible evidence to support the general trends to shorten or accelerate the R&D projects. As for the knowledge depreciation rate, we have figured out the differences among technical fields and years using Japanese patent inventor citation data. The results suggest that longevity knowledge dominates in chemical and bio-pharm fields while ephemeral knowledge dominates in telecom and automobile fields. Also, no sign for recent acceleration in knowledge depreciation was observed.

**Keywords:** R&D, patent, commercial use, time lag, inventor survey, knowledge depreciation



## **THE TELECOMMUNICATIONS SYSTEM OF INNOVATION IN BRAZIL TEN YEARS LATER**

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### **Abstract**

During the 1970s and 1980s, Brazil has developed important industrial and technological capabilities in the telecommunications area, which was the result of the consolidation of the Brazilian telecom innovation system. Nevertheless, and similarly to what happened in other countries, the Brazilian telecommunications sector went through significant changes in latter decades (liberalization and privatization). The restructuring process had significant impacts on the telecommunications innovation system, in terms of reduction of innovative efforts and expenditure, denationalization of the equipment industry and increase in the trade deficit, among others. This paper aims at addressing some of the key features about the Brazilian telecommunications innovation system raised in the paper presented in the 2003 Globelics Conference and attempts to update them.

**Keywords:** innovation system, innovation expenditure, telecommunications, innovation policy, industrial policy.



## **A COMPARATIVE STUDY OF TECHNOLOGY BUSINESS INCUBATORS IN CHINA AND IN INDIA IN NATIONAL INNOVATION SYSTEM PERSPECTIVE**

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### **Abstract**

We compare Technology Business Incubators (TBIs) in China and India using a modified TBI integrative framework and national system of innovation (NSI) perspective. We examine two research questions: (1) What are the management policies & practices of, and incubation services offered by the TBIs in China and India? (2) How successful are the TBI's in China and India? We use 'triangulation' technique to analyze data gathered through interview and questionnaire survey and from secondary sources. We found that there are a number of similarities (including objectives, selection criteria for tenants, funding of new ventures, and various basic services provided) and differences (including ownership/ legal status, nature of structure and governance, funding, value-added and specialists services provided to the tenants, incubation period, and number of TBIs, tenants, employees, and revenues) between the TBIs of China and India. Our findings suggest that both TBI systems evolved in a particular path way due to specific national context (NSI), which led to most of the differences. Contribution of our study is that it provides comparative insights into TBI systems fostering entrepreneurship development in two fast growing emerging economies, and policy lessons for not only China and India but also for other countries.

**Keywords:** technology business incubator, high-tech incubator, TBI tenants, start-up, national innovation system.



**GLOBELICS '13**

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SEPTEMBER 11-13, METU - ANKARA

## **THE BNDES INNOVATION POLICY AND IDEAS ON FINANCING OF INNOVATION: A CRITICAL INVESTIGATION**

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### **Abstract**

The present paper investigates the institutional and theoretical framework in which the Brazilian National Development Bank (BNDES, under the Portuguese acronym) operates its innovation policy. We focus our analysis in how the bank intends to reach a given goal and the theoretical debate around the theme. From the analysis, we infer two important conclusions. First, that BNDES and the theoretical convention towards the theme have a specific kind of linear approach to the theme, mostly sustained on an utilitaristic and marginalistic conception of the economical agents behavior. Second that this utilitaristic approach is incompatible with well-established conceptions in some heterodox academicals circles, like the “bounded rationality” and the modern approaches of firms. The conclusions are not extensive to some of the most recents of BNDES movements, like the “PAISS”, the “Inova Petro” and the “Inova Energia”. They all operate in a very different logic and proved to be an interesting case of study to future researches.

**Keywords:** BNDES, innovation, finance, theory, utilitarianism, marginalism



## **GLOBALIZATION, RISE OF BIOTECHNOLOGY AND KNOWLEDGE DYNAMICS IN AGRICULTURAL INNOVATION: THE CASE OF BT TECHNOLOGY IN INDIA**

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### **Abstract**

Much of the recent research on global-local knowledge flow in innovation and catching up process had been focused on cases from manufacturing sector. In this paper, we focus on innovation process in agriculture sector under the purview of globalization. Agricultural sector has played an important role in the development process through provision of food, sustainable energy and foreign exchange to many emerging countries. This sector, however, has never been considered as the 'driving force' of innovation and technical change in developing countries. We consider that the above condition is changing due to following reasons: globalization, rise of biotechnology and peculiarity of agriculture that requires location specific knowledge. In this paper we therefore present a conceptual framework that elaborates the nature and characteristics of knowledge dynamics essential for agricultural innovation in the evolving context of globalization. We analyze the case of Bt technology in India to illustrate the dynamics of knowledge interactions between global and local firms under the framework. Our analysis reveal the latent comparative advantage of local firms with respect to the in-situ knowledge component and how this advantage can be translated into a 'window of opportunity' for catching-up with the global knowledge frontier. It also shows that the absorptive capacity of the local firms (as evident by their performance in non-Bt hybrid markets) and the flow of global scientific knowledge via licensing played an indispensable role in the catching-up story. Also the complementarity between the upstream and downstream knowledge components impose that the knowledge flow is bi-directional (or circular) with global-local interactions occurring between leaders of the global scientific knowledge and in-situ knowledge as seen in the case of Monsanto-Mahyco.



**GLOBELICS '13**

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SEPTEMBER 11-13, METU - ANKARA

## **SOCIAL MISSION OF THE UNIVERSITY: A CASE STUDY IN THE HEALTH SECTOR IN MEXICO**

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### **Abstract**

This research aims to identify the factors that have promoted or limited the use of knowledge generated in the university by the Health Care Public Institutions in Mexico. We analyze the case of the University Research Program in Health (PUIS)<sup>1</sup>, created by the National Autonomous University of Mexico (UNAM) to link this institution with the needs of health services established as priorities for the country. The study is based on semi-structured interviews with key informants from these institution; data were validated and complemented with documentary information. The results suggest that compliance with the social role of the university is not only dependent on the establishment of programs like PUIS, but of other factors closely linked to the academic and extra-academic activities in which researchers are engaged.

**Keywords:** university, social mission, scientific research, health sector





## **BARRIERS FOR BORN GLOBALS AND OPEN INNOVATION IN CATCHING-UP ECONOMIES: EVIDENCE FROM ESTONIA'S CLEAN TECHNOLOGY DEVELOPERS**

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### **Abstract**

'Born globals' and 'open innovation' have become important concepts in the research on innovation and entrepreneurship in an era of increased globalization. However, the logics of open innovation have been introduced to policy making without much critique. This paper analyses the validity and relevance of these concepts for R&D and knowledge-intensive actors from a Central and Eastern European (CEE) country –for the Estonian clean technology (clean tech) sector based on interviews with the representatives of 20 companies and research teams and secondary data analysis. The study concludes, contrary to what is generally expected, that the emergence of born globals and the application of open innovation is discouraged in the catching-up economies by many limiting framework conditions. The main challenges are linked to the lack of finances and the limited supply of high quality managers of international business who also have profound understandings in the technologies. This indicates a need for improvements in the public support systems but also upgrading the knowledge base and overall education. Public procurement for innovation is another key aspect to advance the development of the clean-tech developers in Estonia.

**Keywords:** born globals, open innovation, clean technology, research and development, barriers for growth, Estonia



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SEPTEMBER 11-13, METU - ANKARA

## **STRATEGIES AND GOVERNANCE OF THE MEXICAN NATIONAL INNOVATION SYSTEM: CHALLENGES FOR AN INCLUSIVE DEVELOPMENT**

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### **Abstract**

It is widely accepted that knowledge and innovation are strategic components for comprehensive growth and social welfare, as well as for sustainable development. The present paper claims that knowledge and innovation are fundamental resources for the construction of a new model of development that will promote inclusive development. One of the main gaps is the identification of how to orient production, interchange and diffusion of knowledge and innovation in order to achieve a greater social inclusion and have an impact in the improvement of the population's standard of living in terms of food, health, housing, energy and to contribute to reduce social inequality. This paper seeks to answer the questions of how the Mexican Innovation System can contribute to solving the problems of poverty, marginalization and social exclusion, and how these problems can be met with scientific, technological and innovation capabilities built in our country. One of the main contributions of this work is the identification of some necessary measures in order to re-orient the capabilities of the Mexican Innovation System and build new ones that will set social problems as a fundamental objective. We emphasize the need to achieve the articulation between innovation policies and other national, regional and local policies, whose objective must be to respond to social needs.



## **STYLIZED FACTS OF GOVERNANCE, INSTITUTIONS AND ECONOMIC DEVELOPMENT. EXPLORING THE INSTITUTIONAL PROFILES DATABASE**

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### **Abstract**

The empirical literature on economic growth agrees that institutions and governance are important determinants of long-run economic growth rates. As a stylized fact, this literature points to a strong correlation between the level of GDP per capita and the general development level of institutions and governance. However, the growth rate of GDP per capita itself, as well as other indicators that are broadly associated with the level of economic development, are generally much less strongly correlated with the level of institutional development. We document these correlations, and argue that there is a need for a broader set of stylized facts about institutions, governance and economic development, covering the broader set of economic indicators, including the growth rate itself. To find such stylized facts, we use canonical correlation analysis. We use a database on institutions and governance that has a very large number of indicators, and our analysis produces a number of aggregated measurements of institutions and governance that broadly correlate with patterns of economic development. The analysis confirms the correlation between the general level of economic development on the one hand, and institutional development on the other hand, which is the core stylized fact identified in the literature. In addition to this, our analysis points to the general attitude towards markets, and the level of financial development as specific dimensions of the institutional and governance characteristics of a country that correlate highly with specific development patterns. In particular, we find that a positive attitude towards markets combined with a low level of financial development goes together with growth rates, based on catching-up. We also find that a tendency towards market steering combined with strong financial development goes together with a high involvement in international trade (openness), combined with a low investment rate.

**Keywords:** institutions, governance, economic development



**GLOBELICS '13**

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SEPTEMBER 11-13, METU - ANKARA

## **OUTWARD FOREIGN DIRECT INVESTMENT AND REVERSE TECHNOLOGY SPILLOVERS: THE EFFECT ON TOTAL FACTOR PRODUCTIVITY**

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### **Abstract**

The study aims to look at the 'Feedback Effect' of Foreign Direct Investment (FDI) on the Growth of Total Factor Productivity (TFP) via Technology Spillovers across borders. The effect is studied by looking at the R&D Spillovers resulting from Outward FDI flows from 18 Emerging Economies into 34 OECD Countries over the 1990-2010 period, and then comparing the impact with that of R&D Spillovers resulting from Inward FDI flows into 18 Emerging Markets from 34 OECD Nations. The paper thus investigates whether a country's productivity is increased not only when R&D intensive countries invest in it, but also when it invests in R&D intensive foreign countries. In addition, the study also examines the role of 'Human Capital' and 'Number of Patent Applications filed by Residents' as catalysts for the international diffusion of technology. The results provide evidence for the productivity enhancing effect of FDI, inconsistent with the notion that FDI diverts resources away from domestic output and growth. However, the impact is much larger when R&D intensive Developed Countries invest in the Emerging Economies than the other way round.

**Keywords:** outward FDI, inward FDI, reverse technology spillover, total factor productivity, absorptive capacity



## **HOW DO LCD INNOVATION DIFFER: SPECIFICITIES OF LOW CARBON TECHNOLOGIES AND ENERGY SYSTEMS**

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### **Abstract**

Innovations which foster both inclusive development in the South and a low carbon future have to account for the specificities of low carbon innovations. This paper addresses different specificities, which might have an impact on the pattern of the innovation system for low carbon innovation. The following specificities are identified: Access to energy services as part of basic needs, capital intensity and high lifetime of energy and low carbon technologies, technological and institutional aspects of co-evolution, high importance of regulation, structure of actors and role of public ownership, and resulting impacts on political economy. Some of these features are very specific to low carbon development (LCD) and similar innovations, others can also be seen at other innovations, and it is the extent and combination with each other which make them a specific feature of LCD.



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **HOW DOES UNIVERSITY-INDUSTRY COLLABORATION INFLUENCE INDUSTRY UPGRADING IN REGIONAL LEVEL: EVIDENCE FROM CHINA**

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### **Abstract**

The University-Industry Collaboration is playing a more and more important role in the process of Industry upgrading in China. What the paper is interested on, from a public policy perspective, is whether the higher University-Industry Collaboration efficiency simulates industry upgrading, and whether this impact has regional characteristic. Using an authoritative regional dataset of Chinese the national Statistical Yearbook including 30 provinces from 2005-2009, this paper aims to undertake a systematic empirical analysis on the U-I collaboration efficiency, by Data Envelopment Analysis (DEA for short) Method ranking with an ideal DMU. Then the paper will verify the correlation between U-I collaboration and regional industry upgrading performance. The result show that in national level, U-I collaboration has significant positive relationship with industry upgrading both in industry restructuring and value chain upgrading. But this kind of influence has very visible regional characteristic. U-I collaboration efficiency tend to more impact on value chain upgrading in relative developed region, while more impact on industry structure adjustment in developing region. The policy makers might better use the result to develop realistic regional incentives in order to enhance U-I collaboration.

**Keywords:** industry upgrading, university-industry collaboration, data envelopment analysis, ideal DMU



## **TECHNOLOGICAL REGIMES, FIRMS' VERTICAL BOUNDARIES, AND INDUSTRY'S INNOVATION PATTERNS: THE EVOLUTION OF THE IC INDUSTRY**

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### **Abstract**

This paper is an attempt to expound the evolution of the IC industry by mapping the relationships between technological regimes, forces driving organizations' choices on vertical boundaries, industry's patterns of innovations, and organizational feedback on technological regimes. The evidence shows that lower technological interrelatedness, lower cumulateness and higher opportunities induce firms to vertically disintegrate. Higher technological interrelatedness, higher cumulateness, lower opportunities among smaller firms and higher appropriability among larger firms drive the leading firm to partially vertically integrate. This framework has also taken into account firms' reactions towards industry's patterns of innovations, of which their actions in turn feedback on the industry's future technological regimes.

**Keywords:** technological regime, vertical boundary, innovation pattern, foundry, integrated circuit, TSMC



## **GENDER DIFFERENCES IN INFORMATION TECHNOLOGY USE AND IMPLICATIONS FOR INCLUSIVE INNOVATION IN PUBLIC TRANSPORTATION**

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### **Abstract**

Technological innovations available to public agencies in the delivery of public services have been increasing, including the information technologies used by individuals in public transportation service. On the other hand, the extent to which citizens equally embrace these technologies used in the delivery of public services continues to have important social equity implications. While women riders comprise a majority in the public transit market, prior studies have shown that their attitudes towards information technology and patterns of use tend to differ from men, but the reasons for the differences have not been well understood. This paper aims to explore and explain variations in the information technology usage between men and women related to the use of public transit service, and discuss their implications for inclusive innovation in transit environment. It begins with a review of the literature on technology adoption and information technology use by males and females. The study then uses data from 2008 Chicago Transit Authority Customer Satisfaction Survey to compare public transit agency website use and bus tracker use among male and female users of public transportation service and to explain the variations. Conclusions discuss policy implications of the findings for inclusive innovation in public transportation.

**Keywords:** information technology, gender, public transportation, inclusive innovation





## **R&D ACTIVITIES DISPERSION AND INNOVATION: IMPLICATIONS FOR FIRMS OF HIGH-TECH INDUSTRIES IN THE TRANSITION ECONOMY OF CHINA**

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### **Abstract**

Facing the popular phenomenon that firms place increasing focus on building global innovation network, this paper attempts to study the issues that how distributed R&D strategy will influence innovation from developing economy (China) to developed economy, taking China's shifting competitive and regulatory environments into consideration. Based on the sample includes all the listed companies from three R&D intensive industries (i.e. pharmaceutical industry, ICT and electronic industry) in China, our empirical analysis finds that dispersed R&D organizational structure but relatively not geographically dispersed R&D activities of a firm have a positive influence on innovation because it maximizes the benefit of various knowledge sources and minimizes the cost of multi-location coordination. Moreover, institutional transition level will positively moderate the relationship between dispersion of R&D activities and innovation performance.

**Keywords:** R&D dispersion, innovation, transition economy, high-tech industries, China



**GLOBELICS '13**

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SEPTEMBER 11-13, METU - ANKARA

## **THE NEW CO-INNOVATION SYSTEM IN CHINA: FUNCTIONS AND DIFFERENT PATTERNS OF NATIONAL COLLABORATIVE INNOVATION CENTERS**

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### **Abstract**

The attempt to the new co-innovation paradigm which is much more open and collaborative and targeted to special areas in innovation was raised up after the speech on Tsinghua University's 100th anniversary. The government made several policies for collaboration in four patterns, to promote the full play to the advantages of enterprises, universities and research institutes and integration of complementary resource through guidance and mechanism design from a macroscopic view. Based on the national layout, four types of collaborative innovation centers are set up, which are separately focused on: (1) critical issues for frontiers of science and technology and development of society; (2) core common problems in the economic development for industry; (3) significant demands for regional development; (4) pressing needs for construction of socialistic culture. They differ from respective goal, organization structure, scientific research organization mode, and evaluation mechanism, which would be represented in detail.

**Keywords:** collaborative innovation center, organization, evaluation, R&D



## **PATENTS AND OTHER APPROPRIABILITY METHODS: AN OVERVIEW OF BRAZILIAN INDUSTRY**

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### **Abstract**

This study aims to present the main characteristics of Brazilian firms according to their innovative behavior, focusing specially on their use of technological appropriability methods. The statistical analysis is mainly based on PINTECs database, a survey performed biennially by the Brazilian Geography and Statistics Institute (IBGE), which presents information about appropriability methods used by firms engaged in innovative activities. Invention patents, utility models, industrial designs and trademarks are classified as formal appropriability mechanisms, while industrial secrets, design complexity and lead time over competitors are named “strategic methods”. The paper compares the use of strategic and formal methods of appropriation by Brazilian firms, and also characterizes them by origin of capital, foreign trade participation, workers’ skills and expenditures on innovative activities. Besides, it maps the cooperation between firms and their access to public support for innovation. It also evaluates the relation between technological appropriability and export performance of Brazilian firms.

**Keywords:** appropriability methods, exports, Brazilian industry



**GLOBELICS '13**

11<sup>TH</sup> GLOBELICS INTERNATIONAL CONFERENCE  
SEPTEMBER 11-13, METU - ANKARA

## **THE RELATIONSHIP BETWEEN REGIONAL CONTEXT AND FIRM HETEROGENEITY ON THE INNOVATION PERFORMANCE OF FIRMS. A MULTILEVEL ANALYSIS**

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### **Abstract**

The objective of this paper is to study the effects of regional context on the innovative performance of industrial firms. In contrast with previous research on this topic, the author adopts an empirical analysis with multilevel regression to the test of these effects, taking into account the hierarchical structure of the data. The innovative performance of a firm depends on its own attributes and on the regional context and the knowledge spillovers between regions. I estimate a multilevel model of innovation at the firm level, where variables of both the firm and regional levels intervene. The conclusion is that both levels have a direct and significant influence on the innovative performance. A new database of 6,670 Colombian firms operating in 26 regions is used in the analysis. The main result is that innovation spillovers from neighboring regions have a negative influence over the firm's innovative performance. The relationship is mediated by the number of inhabitants in the region with graduate degrees. These results have implications for regional innovation policies.

**Keywords:** regional context, firm heterogeneity, knowledge spillovers, multilevel analysis.



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