

ANNUAL REPORT

2008

A polycentric world:
races for talent,
technology and capital

Crisis and transformation
in the global economy

[ABRIDGED VERSION]

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Foreword

This third edition of the Annual Report of the Observatory for International Markets (OIM) entitled; «A polycentric world: races for talent, technology and capital», focuses on the most relevant factors that go to make up the likely evolution of international markets worked upon in the previous two editions. This latest edition takes an in-depth look into the implications of competitive movements within territories and countries against the backdrop of the current change in cycle, approaching the world from a contoured viewpoint, where innovation, creativity, talent, technology and finance are becoming multi-polar and polycentric across the globe.

The first edition; «Future trends and new realities», focused on providing an all-round vision of the main trends to shape the world in the coming years. It examined preferences, demands and needs of societies undergoing important change. Some of these changes, were found to be linked to demographic factors such as the ageing of population, migratory flows and the emergence of a youth already adapted to its surroundings or indeed the role of women, changes with consequences on the distribution and shift of the parameters of international and inter-generational acquisitive potential. Trends in the social use of technology were also observed, whilst the foreseeable evolution of energy and environmental issues were also analysed. The report established developments and trends in a more specifically economic and financial context in aspects interrelated to production, trade and finance.

The second edition of the Annual Report, «*Mapping of markets and opportunities*», went over the analysis of the underlying trends in order to understand movements in the world economy, adding observations and new considerations. Global threats and fragilities putting the world financial system at risk were also highlighted. All in all, it described the process of *catch up* of emerging nations in detail and in terms of competition in a number of areas. It brought to light the increasing importance and role of emerging economies and their effect on the share of world economic activity, an aspect which essential to grasp, if we are to understand today's world, which has wide ranging effects not only for emerging nations, but for those considered more advanced, as the map of competition in business is being redrawn.

The first chapter of this third edition carries out an in-depth analysis of underlying trends and new developments which have led to the change in the cycle, where uncertainties are rising and where some risks and fragilities are surfacing, whilst new opportunities spring up. Against this backdrop, the strategic role of a more solid and broader competitive position adopted by a number of countries can be observed, leaving them better placed within what we have called the «the contours of the globalised world» where the role of different territories is totally different from the uniformity so often associated with the description of a «flat world». The key drivers behind this positioning are namely innovation, creativity, technology, talent, and finance, which are all examined closely in the second chapter of this report. Here the main trends of these drivers come under study, whilst a portrait is given of present and future economic geography. The report also discusses the role of logistics and reduction of «distances» and implications for the creation of advantages of location in different territories and countries. The third chapter turns its attention to recent results in a number of analytical approaches to developments across the planet in trade and output which are adding new value to the role of innovation and internationalisation to overcome inertias and shift axes and models of growth. It also looks into specific aspects behind international finance, whilst pondering a number of aspects of the world financial crisis that reared up in 2007.

This third edition of the Annual Report of the Observatory for International Markets, in tandem with the third edition of its forthcoming Forum, where the implications of these trends, scenarios and characteristics are analysed, represents one of the main building blocks of the Observatory's mission;

namely to diffuse relevant knowledge with the aim of improving the ability to explore the future, with a clear determination to contribute towards gaining anticipative capacity, to detect new opportunities and simultaneously foment a greater entrepreneurial dynamic.

This latest report is the result of teamwork from the entire unit of the Observatory for International Markets, which has used the most recent available data and sources to compile this edition, contrasting the views of renowned international experts, whilst counting on the interaction and application of enterprise and other agents to give greater substance to this study.

Maite Ardèvol

Director of the Observatory for International Markets.

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**A polycentric world: races for
talent, technology and capital**



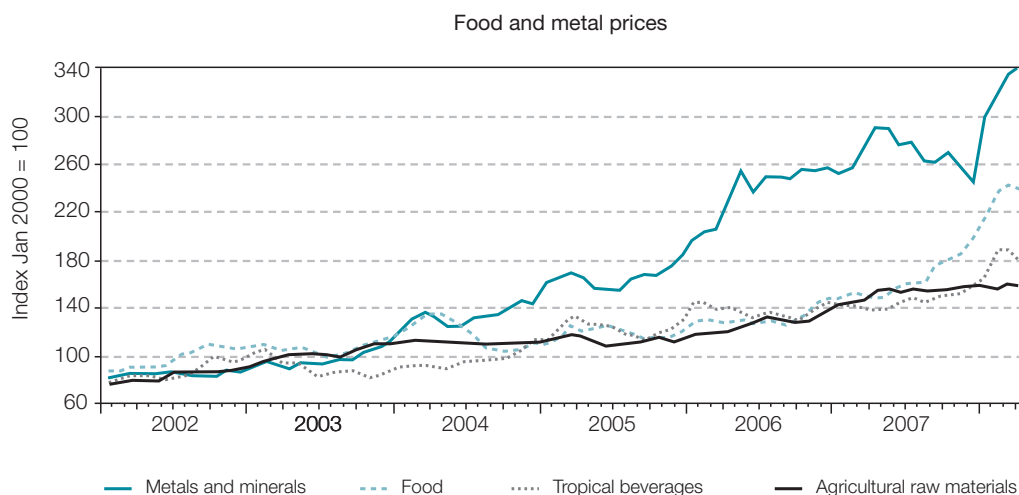
Present and future: Superimposing of underlying trends and change of cycle

Throughout the current year 2008, it has been observed that, on the one hand, major cyclic changes in the world economy are being superimposed on the underlying mid and long-term trends of recent years, leading to new uncertainties, risks and upheavals. However, on the other hand, just how widespread these (initially) financial difficulties may travel is open to debate, as is how long they may last, and how wide ranging their impact may prove on international output and trade. It also remains to be seen how this quadruple crisis of finance, property, energy and

food, will affect different geographical areas of the world economy according to the diversity of their particular characteristics.

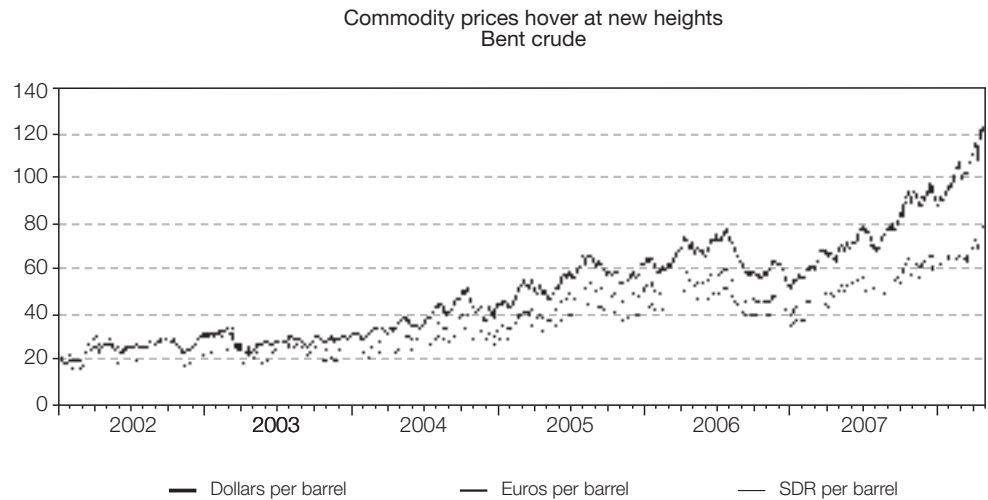
One of the most disturbing aspects of the current change in cycle is that it is occurring at the same time as important inflationist pressures that give rise to the threat —if not indeed the reality— of the dreaded *stagflation*. Recent inflationist pressures stem largely from the rise in the price of such raw materials as oil, gas, minerals, metals and of late, such basic foodstuffs as cereals.

Figure 1. Price rises in food, beverages, metals and minerals



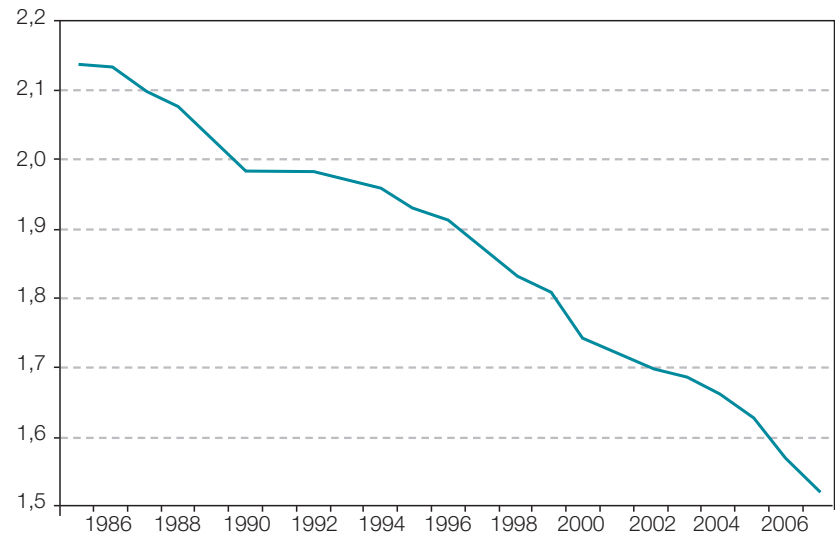
Source: OECD (2008)

Figure 2. Recent rises in oil prices (Brent crude)



Source: OECD (2008)

Figure 3. Ratio of oil use per GDP unit in the OECD economies (barrels per day per \$1 million of GDP-PPP adjusted)



Source: OECD (2008)

Simon Johnson (2008), the International Monetary Fund (IMF) chief economist has considered a number of disturbing new scenarios in the responses of the global economic system to the tensions arising from these increases in prices, which he refers to as «automatic destabilisers» —as opposed to traditional mechanisms known as «automatic stabilisers», which would, for example see a slump in the demand for oil and other raw materials in response to global economic downturns. Johnson

points out that there are now forces that could be altering these automatic adjustors, labelling the possible outcome of this situation as a «risky business» defined as when, on the one hand commodities are considered attractive investments, whilst on the other major question marks hang over future energy sources, which in turn hold back investment and responses to questions of supplies, thus shifting forces towards subsidised energy sources. He also mentions

that now this would mean there would be more countries willing and/or able to compensate to offset price rises affecting consumer habits, thereby weakening automatisms.

In a longer term, from the point of view of the impact on world inflation, it is postulated that the force of globalisation should have gone through a phase, that has provided such positive effects as a reduction in costs and prices, whilst helping to keep inflation worldwide under control in the first years of the 21st century. This has contributed to the creation of a virtuous circle of rapid growth and low inflation, which is now, at the worst moment as it turns into a vicious circle of stagflation, where the negative effects of inflation stemming from increased demand brought about from growth driven by globalisation itself are now coming into play.

In some cases, this change of cycle has led to a number of new developments; ranging from increased stability or fragility of some economies and their competitive position, to major changes in the distribution of economic and financial clout on a worldwide scale.

1. Divergence or decoupling?: multi-polarity

The differences in behaviour between advanced economies and above all emerging economies, (but also some developing ones too), is worth taking into serious consideration, not just for their respective cyclic evolution patterns, but also for the trend of emerging economies attaining an ever greater prominence in the world economy and indeed on the global political stage, which all things considered, may be leading us to an important watershed.

This development is becoming more acute as time goes by, as since the beginning of the century, emerging economies have attained a much more significant role. Most forecasts point out that the uneven impact of the current moment of the cycle on advanced and emerging economies will only serve to further underline the above-mentioned trends.

The major emerging economies are expedited to experience practically stable growth rates, little infected by the maladies of the advanced economies, largely due to the ability of these states to compensate a fall in demand from abroad with a rise in domestic demand. However, some provisos must be pointed out, such as growing inflationist pressures in these emerging economies, partly due to large internal demand. This factor also has to contend with such elements of risk as the state of the financial system, and from a broader perspective, social, environmental and political issues which all need to be carefully addressed.

The implications of the degree of convergence, divergence or eventual decoupling among these economic groups are indeed open to debate. Such recent variations in the evolution among the different economic groups has led to new approaches arising in contrast to the established mechanisms on convergence in economic integration associated with globalisation. One such concept is that of decoupling in which emerging economies would be greatly reducing their dependence on more developed economies.

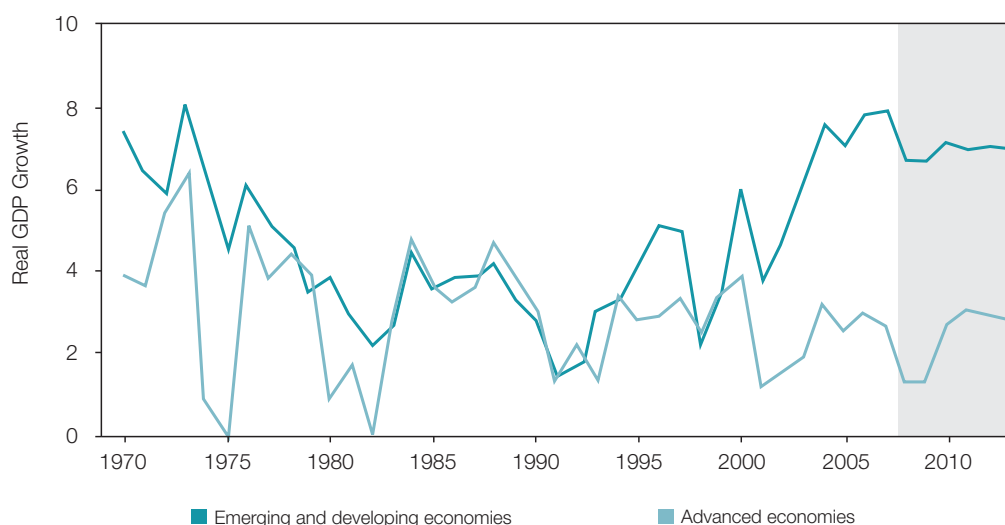
A recent work by Kose, Otrok and Prasad (2008)—that goes into more depth on the paper «Changing nature of North-South linkages» (Akin-Kose, 2007)—provides quantitative analysis for the issue under discussion. The authors

Table 1. Evolution of global economic importance expressed as a share of world GDP

	1700	1820	1913	1950	2007	2013
Europe/UE	22,5	23,6	33,5	26,3	22,7	20,2
USA	0,2	1,9	21,7	30,6	21,4	19,2
Japan	4,1	3,0	2,6	3,0	6,6	5,6
China	22,3	32,9	8,9	4,5	10,8	14,7
India	24,4	16,0	7,6	4,2	4,6	5,6

Sources: Historical data: Maddison: The World Economy: A Millennial Perspective (2001), see: www.ggdc.net/maddison; data 2007-2013: IMF and World Bank

Figure 4. Real GDP growth rates among advanced, emerging and developing economies 1970-2007 and IMF forecasts



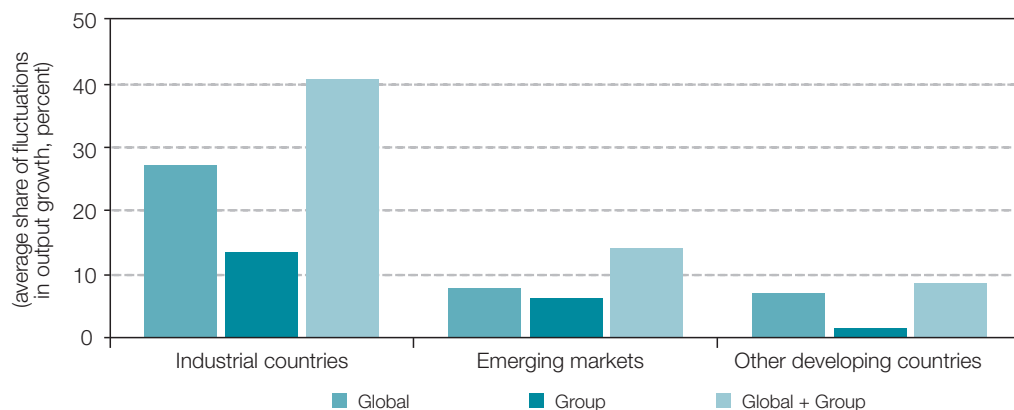
Source: IMF (2008 a)

conclude by acknowledging the coexistence of mechanisms and forces of integration, but on a scale that is both global as well as, and most importantly, highly specific to each group of countries. It is clear that this is by no means a situation of *disconnect*—a radical version of decoupling— but nevertheless a certain degree of potential divergence or a watered-down decoupling can be seen in the light of current events. Their data can be added to that which raises question marks on either naïve or maximalist interpretations on the meaning of globalisation, such as that of the *flat world*. It is also a wake up call as to the role of new developments such as the ever-increasing intra-regional economic ties in Asia (and most notably Asia Pacific), or the establishment of regional integration accords among

these states etc. That said, the role of «global production networks» as a form of linking the world economy on a global scale is undeniable and goes beyond that of business cycles.

Interdependence among different aspects of the difficulties being faced tend to further complicate understanding of the present situation, although they may allow us to catch fleeting glimpses of opportunities. Therefore, ensuing complications arising from increased energy and food prices can, to a large extent, be attributed to new demand from emerging economies, so that, what for one country by itself may be considered as «supply shock», would on a worldwide scale, turn out to be a «demand shock». Therefore, if in order to minimise the adverse effects on a given territo-

Figure 5. Differing degrees of integration and interdependence by country typology



Source: Kose-Otrok-Prasad (2008).

ry, the ability to satisfy an increasing part of these new demands is to be given an even greater priority, —as observed by Lippi (2008). These can be achieved via new forms of standards of specialisation in products, services and quality that match those being sought after by new markets, thereby representing opportunities for regions and firms capable of supplying products and services, which complement these economies and which are suitable to their new habits of consumption.

Nevertheless, the uncertainties here tend to complicate the responses. Despite the fact that it may be true that difficult times are also those in which opportunities tackle inefficiencies that hitherto no-one had dared to deal with, these uncertainties can hold back adaptation to new realities and opportunities due to reactive or defensive responses in some sectors.

These difficulties also oblige us to push ahead with new movements: e.g. the «emergencies» arising from financial difficulties have reduced some, (but not all) reluctance towards acquisitions by Sovereign Wealth Funds (largely owned by governments of emerging or oil producing countries), of assets and major stake holdings in financial entities and in other strategic sectors in the US and in other advanced economies.

The current malaise is not just about a downturn concerning important economic indicators, but also has to do with greater levels of uncertainty. This is why it is important to take into account the principal sources of risk and therefore make a tentative appraisal of their eventual extent when it comes to making modular interpretations of data and forecasts from international organisations.

The report on global risks of the World Economic Forum (2008) lists the following as the major sources of uncertainty: «systemic financial risk», «food security», and the «role of energy», as well as introducing the delicate issue in which cyclic dimensions and trends interact —referring to the vulnerability of supply chains or global production networks, coined by the phrase «hyper-optimisation» in so much as that they have allowed important strides to be made in efficiency, but that the risk of turbulence also comes into view with more far reaching consequences, such as those of protectionist responses, which can feed on problems of price, energy and food supply. The World Economic Forum sums up the situation with the epithet «*networked world, networked risks*».

Furthermore, Jagdish Bhagwati (2008) examines the risks of a breakdown in the world economy, especially due to what he refers as the termite concept, which could see a reinforcing of region-

Table 2. Risks for global growth according to the OECD: estimated impacts if risks materialise

	Weaker US houses prices ¹		Lower emerging market demand ²		Continued financial turmoil ³		Depreciation of the dollar ⁴		Further oil price shock ⁵	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
United States										
Output growth	-0,2	-0,3	-0,1	-0,1	-0,3	-0,4	0,4	0,3	-0,1	-0,2
Inflation	0,0	-0,1	0,0	0,0	0,0	-0,1	0,2	0,3	0,2	0,1
Japan										
Output growth	0,0	0,0	-0,1	-0,3	-0,2	-0,3	0,0	-0,2	-0,1	-0,2
Inflation	0,0	0,0	-0,1	-0,1	-0,1	-0,1	0,0	-0,2	0,2	0,1
Euro area										
Output growth	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,2	-0,1	-0,1	-0,1
Inflation	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	0,2	0,1
1. US house prices fall by 10% 2. Domestic demand in emerging markets falls by 1% 3. Risk premiums rise by 50 basis points in all countries 4. The US dollar falls by 10% against all currencies 5. The reported effects are for a 10% shock to oil prices relative to baseline; in the present case this is equivalent to an increase of \$12 per barrel relative to the baseline assumption of \$120 per barrel. These ready reckoner effects are approximately linear in percentage terms, although significantly larger shocks need to be re-evaluated on a specific basis.										

Source: OECD (2008).

al questions in prejudice to global ones, although he argues that it is global production networks themselves that represent the best counterweight to regressive «temptations» in globalisation.

Some examples of risks considered to be important show signs of a deep-seated interaction among the commercial, productive and financial questions of globalisation, which have been exacerbated by recent events. This edition of the Annual Report includes some of the debates concerning these; ranging from the role of the quality of the financial system as an instrument of comparative advantage, to how the financial crisis is influencing debates on complementarity of interests among such issues as the need for saving at low rates of interest in the US and the necessity the Chinese have for attaining a competitive exchange rate, whilst attracting foreign investment with ever increasing levels of sophistication.

2. The «dividends of globalisation»: economic and social repercussions

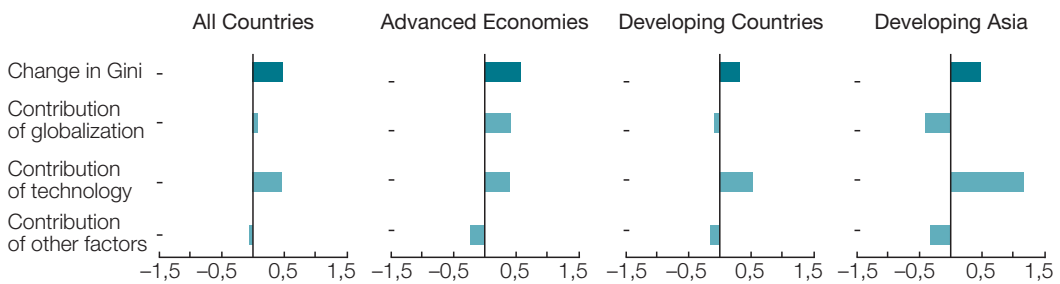
All the above developments have major social and political implications. They affect shares of income and living standards both internationally and domestically, producing global income distribution that in turn generates discussion on how the so-called «dividends of globalisation» are being shared out.

The importance of such questions was acknowledged by the IMF in 2007 when identifying a growing average trend in the increase of inequality, particularly on a domestic level. Once all possible causes had been isolated, it found the main

reason behind this was the varying degree to which innovations were absorbed by populations, most notably in ICTs, as well as the bias in favour of more qualified factors in foreign direct investment.

One reference which crystallises debates on globalisation and inequality is the «hypothesis of Kuznets», according to which, in times of rapid change there is an initial phase in which inequality rises, mainly due to variations in factors related to the ability and speed of response, and of adaptation to new developments and rules for a given set of people, enterprises or groups. Inequality acts as a mechanism to drive rapid adaptation, taking advantage of new opportunities, whilst dropping obsolete activities or initiatives. Nevertheless, according to Kuznets, in a second phase there is a more widespread adjustment to the new environment, as socio-political mechanisms of redistribution are set in motion, which allow for a certain reduction in initial inequalities. It thus appears clear enough that changes on a global scale, accentuated by current superimposed crises, can be considered as one of those deep-seated changes referred to by Kuznets and therefore, to a certain extent, the initial phase of increasing inequality could be anticipated as such. What is debateable however is whether mechanisms corresponding to the «second phase» are being put in place or indeed this time if they have been interrupted, among other reasons due to the absence of global socio-political mechanisms. Evidence for this can be interpreted in a number of ways. Some approaches point out to progress being made, such as; the rise of middle classes in emerging Asian and Latin American economies and the convergence of these emerging states with the advanced economies. Others insist inequality is

Figure 6. Breakdown of factors explaining increases in inequality



Source: IMF (2007), chap. 5

polarising, especially in terms of the concentration of income in the higher earning segments (the IMF study shows that the only group to improve their relative position was that of the highest fifth), whilst World Bank data note that this group represents 60% of world consumer potential at domestic level in many countries, coupled with the falling position of the middle classes in advanced societies, and the difficulties of many other states, above all in Africa, to board the train of global advancement.

Along similar lines, these social concerns related with forms wealth distribution have drawn the attention of a number of other outstanding analysts, who add their voice to echo this predicament, such as Alan Blinder and Paul Krugman. Blinder (2007) applies the ideas discussed in the 2007 Annual Report to establish indices of offshorability of different activities, which fall into line with that commented earlier in so much as that globalisation makes «tasks» into a more relevant unit than either products or traditional sectors. Krugman (2008) has updated the analyses that led him to the conclusion back in 1995 that international trade played a mere supporting role in changes in the distribution of incomes.

The ever larger role being played by fragmentation of production processes and subsequent trading in tasks only adds to the need to work from the basis of taking into account how vulnerable they are to offshorability, which is often found to intertwine with more traditional analyses based on skill levels.

Baldwin (2006) presents data on how, in a leading export economy such as Germany, task typology is undergoing change. The categories are those used in the classic work by Autor-Levy-Murnane mentioned in the 2007 Annual Report. The analyses bring out trends which are, to a great extent, common at different skill levels with increases most notable among percentages which correspond to analytical and interactive tasks, whilst dropping for those more focused on routine, regardless of the skill level, whilst non-routine manual skills hold their ground. Baldwin affirms that despite this growing fragmentation, new circumstances oblige greater detail to be sought out to explain trends that make devising strategies more complicated.

Becker *et al.* (2007) also distinguish between routine tasks and non-routine tasks (those lacking deductive rules and codifiable information) and furthermore, interactive tasks (which require a physical proximity) and non-interactive ones. They then classify them into three skill levels, comparing which types of tasks have remained or not at the headquarters of German multinationals. The data confirms that non-routine and interactive tasks are still more widely represented at headquarter locations rather than offshore, with the gap between these and their counterparts exhibiting a proportionally upward trend, most visibly portrayed by service sector companies (which is important given the growing tradability of services).

3. World economic contours, more polycentric

The main patterns of specialisation —based now more on tasks or activities rather than finished goods, whether manufactured products or indeed increasingly services— are now starting to have a profound effect on people, enterprise and territories alike, obliging strategies to be rethought and where management of these considerations of the dynamics of winners and losers faces socio-political challenges.

The combination of these new dimensions of tasks as a reference point for specialisation and appraisal represents a major potential, as both in production as well as in consumption the differences between added value and innovative content of different tasks will lead to notable differences being established as agglomeration economies emerge and interact among each other.

The globalisation of economic activity with increasingly complex and global production networks, growing offshorability of some tasks and activities, the spread of offshoring to high tech industries, and open innovation with its regional and global dimensions, are all acting to fragment and disperse activities and tasks, as advantages of location come more and more into play to concentrate economic activity in given regions, territories or countries, thereby generating an ever more apparent inequality.

Beyond these important variations within the contours of the globalised world that contradict the flat world concept, the alternative most likely to occupy the high ground in this system of economic contours will be clusters or agglomerations of economic potential that are being created, and most notably those associated with the ability to attract talent, innovation and creativity.

From one angle, it can be seen that the distance is still a major factor as several viewpoints confirm. A wide range of works, such as those undertaken in the framework of the OECD among others, Boulhol-de Serres (2008), Golub-Tomasik (2008), confirm that the «curse of distance» is being maintained when it comes to the role played by transport costs. Coe *et al.* (2007) back this by what they refer to as the «missing globalisation puzzle» which has to do with the ongoing importance of the role of distance in explanatory models on world trade, and efforts being made to reduce its prominence. Comparative growth studies also underline the major part played by the geographical factor, whilst analyses on world trade looking into the gravity equation highlight how far this goes to explaining the GDP of the countries involved and therefore the negative influence of distance. Matsuyama (2007) includes in his analysis the fact that transport activities and the management of foreign trade work on a different set of skill requirements to those of average production activities.

From another side, national peculiarities —the idiosyncratic singularities of each territory that go to make up the world economy— do indeed make a difference. They go beyond invisible barriers and «tacit rules» or indeed the specifics of integration into business networks in different territories and translate into important differentials in costs in comparison to national transactions. Ghemawat (2007) coins the term semi-globalisation to sum up the important divergences with respect to flat world theories and reminds us of the leading role that specificities and local and national linkages play. His «10% rule» shows how certain percentages, such as those of foreign investment etc. are, on average, closer to this modest figure than that which would come out, if there were to be a totally equal proportionality between the clout of foreign trade compared to a given national economy.

Despite certain forecasts on the impact of ICTs, agglomerations still maintain their importance. In 2007, urban population outstripped that of rural areas for the first time in history (Just-Thater, 2008), with 400 cities housing over 1 million inhabitants and 20 urban megalopoli with over 10 million, though it is important to distinguish between mega cities and global metropoli or cities. Such quantitative features give rise to a number of much more demanding qualitative parameters.

New foci of economic growth are popping up, which serve to illustrate the emergence of agglomeration factors, whilst highlighting the role proximity plays in driving greater productivity. In such scenarios, the dynamics of agglomeration come into play; scale economies, gains in efficiency of the labour supply, heightened competition which offers incentives to training and specialisation, exchange of knowledge and new ideas, all of which help foment the knowledge spillovers so crucial in innovation intensive activities.

These forces of clustering, of a concentric nature, are variable in terms of sector and space. Several analyses have highlighted the importance of specialisation in economic locations as well as the key role of diversity in urban economies that give impetus to cross-fertilisation of ideas, technology that drives innovation and ultimately economic growth itself. Some of these concepts of the fertilisation of ideas and other spillovers have the ability to permeate through a wide variety of activities or the so-called «*Jacobs externalities*» whilst others act on an intra-industrial scale or between similar activities, known as «*Marshall-Arrow-Romer externalities*».

Globalisation and international trade play a complex role in balancing the forces of dispersion and agglomeration.

Although some of the reasons behind the creation of clusters have diminished due to globalisation, a new impetus for increasing proximity to clients and competitors has been taking shape in the knowledge-based economy.

Several works have analysed which task typologies are less susceptible to offshoring and therefore subject to mobility and to dispersion. Non-routine tasks and interactive analyses clearly

linked to innovation, are less susceptible to offshoring as proximity plays a pivotal role as a force for agglomeration, and in turn encourages knowledge spillovers.

One substantial shift which has spread quickly is that of the transformation of productive structures in developed countries and regions, with clear implications for public policy, related with how to attract and retain investment in current locations and how to build up the advantages of a given location. Western economic regions have evolved from manufacturing output to knowledge intensive services, which fall in line with the concentration of a specific type of tasks associated with innovation and creativity. Such knowledge intensive services typically related to manufacturing and specialisation have been maintained despite waning physical industrial output.

Globalisation partly explains the trend towards services, but this has also been driven by internal factors: changes in consumer habits in these economies towards non-tradables in some cases, alongside growth in productivity in industry (Baldwin, 2006).

Against this background a rise can be seen in the strategic role of a more solid and broad-based competitive positioning of the Catalan economy, moving to become better placed within what we could refer to as the «contours of the globalised world» in which the role of different regions is far from the uniformity often linked to Friedman's «flat world.»

We are therefore at a critical moment, in so much as are that we are at a beginning of a potentially major crossroads, in which, despite major uncertainties and risks, we are afforded the chance to contribute a significant impetus to overcome inertia and to foment a model of economic and social progress in which internationalisation and innovation should play an even more important part.

The questions arising here refer to whether it is possible to take advantage of the variations within global movements. These have led to the current watersheds created by difficulties encountered in finance, energy, food prices and the redistribution of economic and financial clout etc. in order to reorientate the bases and models of growth to

exploit change in incentives, in relative prices, demand and preferences. They have homed in preferentially on the traded sector with patterns of specialisation more focused on tasks with a higher added value, innovation and creativity.

Such considerations, which are so pointedly focused on the role of innovation, creativity and talent as strategic factors and with their own relationship with the dynamics of the territorial share of activity, have given rise to systematic approaches that are potentially open to interpretation. What follows is a summary of, on the one hand what is known about «mega-regions», and on the other, some considerations which highlight the potential role of regional policy.

Richard Florida, author of the work on the «creative class», with gravitation to clusters in specific given locations, has now put forward his arguments in terms of the mega-regions of the world economy (Florida-Gulden-Mellander, 2007). The breaking down of barriers to communication and mobility of goods, people and ideas is not resulting in a flatter, more uniform world, rather the opposite is happening, with a firmer wave profiting from scale economies on a worldwide scale, giving rise to these mega-regions, a new version of the role of large cities where talent, output potential, innovation and markets are all concentrated. So, although globalisation dilutes the relevance of political borders in economic terms, enterprise will locate where skills, abilities and markets cluster. Capital flocks to where returns are higher and the most qualified professionals migrate to where opportunities lie, which all leads to an integrated global economy, though at the same time, where capital and talent are concentrated, and where the opportunity for greater gains in output and returns are higher, thus establishing these mega-regions as natural economic units due to their density of centres of innovation production and markets.

Those behind this study have used world nighttime light data, from which the LRP or light-based regional product has been derived to pinpoint 40 world mega-regions. The top ten account for «only» 6.5% of the planet's inhabitants, generate 42.8% of activity and 56% of patents and most eminent scientists. The top twenty (the mega-region Barcelona-Lyon comes 11th in the ranking), take in 10% of world population, but represent

56% of activity and 76% of patents and most eminent scientists. The authors conclude that geography and location therefore matter a lot in economic development. «...the reality is that both economic activity as well as innovation remain heavily concentrated and just add to the great paradox of our era, in which, just as technology now allows for greater dispersion of economic activity, it still continues to gravitate to mega-regional units».

Some works bring out the relevance of the global context in territorial development (ESPON, 2007) and the leading role of socio-economic and certain regional policy trends in the make up of different possible future scenarios (see figure 7 at 8).

To be precise, some analysts refer to what they call a «life cycle» of regions. Audretsch-Falck-Feld-

ma-Heblich (2008) apply a combination of some of the ideas developed in recent debates to Germany to look into the idea that, more than being a linear and/or deterministic sequence, the dynamic of territories can shift in several phases according to initiatives, responses and new challenges. They label these as: a) the initial entrepreneurial phase, where Jacobs externalities prevail among a number of industries (where there is more crossways and creative movement;); b) the «routinised phase» where innovation takes place in the top performing firms; c) a second entrepreneurial phase in which intra-industry start ups appear in niches, and d) a second phase of routinisation which brings stability rather than innovation and can last for a certain time but ends up producing the need to reinvent (combining prior experience with the state-of-the-art knowledge)...or alternatively



Source: ESPON (2007)

Figure 8. Cohesion-oriented Scenario: Spatial structure and urban hierarchy in 2030



Source: ESPON (2007)

decline. The authors underline the role of clear regional policy too, going on to say that «regional policymakers need to act as entrepreneurial designers of their own regional policy».

The approaches mentioned consider both public and private scenarios and dynamics that may offer interesting elements for reflection and appraisal.

As already mentioned, the drivers most highly regarded in the competitive positioning of countries and territories are those of innovation, creativity, technology, talent and finance; factors also at the heart of this report, which highlights the main trends of these drivers while outlining the present and the future of the globe in terms of these parameters.

Drivers: talent, technology and capital

4. Talent and creativity, trends and new contours

Numerous studies and articles have, for some time, been warning about the global challenge to business organisations posed by talent shortage both now and in the near future, (McKinsey, 2007; Guthridge *et al.*, 2008, The Economist, 2006 and 2007).

There are limits to human capital on a worldwide level due to current demographic dynamics, which affect advanced and emerging economies in different ways.

Demographic projections conclude that there is a decline of working-age population in advanced economies which threatens a possible fall in human capital leading to a loss of competitiveness, as in Germany, Spain, Korea, Taiwan and notably Japan, whilst the UK, France, Singapore, Canada and Sweden appear to be maintaining the same level. Only the US will see a significant rise.

As for emerging economies, Russia and the states of Central and Eastern Europe will suffer a major loss of working age population, whilst China will see this segment rise to 2015, though it is set to decline until 2020. The most outstanding contributions to population (with the ability to generate talent), from now until 2020 will come from India (172 million), ASEAN-6¹ (58 million) and China (30 million).

In terms of global competition and in comparison with those economies boasting the greatest human capital accumulation till 2020, it looks as if the advanced economies (except the US) will be unable to stretch their own demographic human capital limits unless they manage to attract talent from elsewhere.² The probable outcome is that advanced economies will end up having to make greater strides in wooing talent.

Worldwide, the number of foreign university students has risen from 1.3 million in 1995 to 2.7 million in 2007 (2.3 million of which are studying in the OECD), and it is foreseen that the figure will shoot up to 5.8 million by 2020, (OECD, 2008b).

The US leads the figures for intake of foreign students, although its relative share has declined in recent years (26% in 2000, 22% in 2005), followed by the UK (14%), France and Germany (9%), Australia and China (6%), with the latter growing over the world average, while Spain attracts some 2% of overseas students.

As to the origin of foreign students, as European OECD universities tend to come from other European OECD states, most students in non-OECD countries come from Asia. Signs show that this is not set to change much in the near future, which could mean that European OECD states could

1. Indonesia, the Philippines, Malaysia, Vietnam, Thailand and Singapore.
2. And neither the US, if we take into account that both the increase in the social gap as well as the age pyramid prevent it from realising its full potential for creation of talent, despite population growth.

start to lag behind in securing one of the main sources of future talent.

The balance of the inflow and outflow of students leans clearly in the favour of advanced nations such as the US, UK, Canada, Australia, Germany and France. This net balance represents 15% of all university students in the UK and 10% in Germany, therefore constituting a major source of attraction for outstanding talent.

International mobility of the highly skilled is also growing beyond the yearly rate of emigration itself as, while annual overall emigration for those with lesser skills stands at 0.9%, it rises to 1.6% for semi-skilled, but is more than trebled by the figure of 5.5% for the highly skilled (Docquier and Rapoport, 2004).

Year after year, Australia, Canada, Sweden Switzerland and the US gain a greater share of population with higher education due to the net migratory influx (from both other OECD states, as well as the rest of the world). Finland, Ireland and the UK are three states that have recently managed to take advantage of attracting university students from other OECD states, (with favourable net migration) in contrast to the past. The net losers of human capital in the OECD of late are those states of Central and Eastern Europe, namely the Czech Republic, Poland and Slovakia.

Emerging Asian economies will experience a bottleneck in coming years, at least until they manage to adjust their supply of training facilities and capabilities of labour, despite rapid growth in skilled worker levels in emerging countries of late. The number of graduates in these countries is rising by 5.5% per year in comparison to 1% in the countries with high-income levels, and moreover, working age population is also on the up. Furthermore, the pressures of the demand on labour markets in emerging states created by multinationals in the worldwide dispersion of their activities has also heated up competition for talent.

Until this bottleneck is unplugged, governments in these countries are considering whether to woo back emigrants to their homeland to bridge the gap. However, there are not enough returnees to solve the limits on available talent in Asia and the shortfall is set to continue at least until the

middle of the next decade, meaning firms operating in this continent will have to make a major effort not just to recruit, but also to hold on to new talent.

Labour costs of the most skilled with task typologies that are non-routine, interactive and analytical are tending to converge worldwide as the gap in their salaries diminishes at an ever-growing rate between emerging and advanced nations. Mercer forecast salary inflation for 2008 at 14% per year in India, 11% in Vietnam and Indonesia and 7.5% in China. If the trend continues, by 2025 the competitive edge of the wage bill in these countries will have practically vanished.

Alongside geographical expansion of this movement of talent and the greater mobility within this impetus, the overriding cultural atmosphere in the workplace is also another major factor that influences the performance of human capital in enterprise. One consideration to take into account in this context is that in the West, by 2020 three different cultural generations will be living side by side: the *baby boomers* and generations X and Y.

By 2020 aspects of corporate loyalty and social commitment (domain of more mature talent) will blend with the vision of enterprise as a transactional system to attain personal interests (talent of intermediate age) and with new talent, with a series of active entrepreneurial and business aspirations. In Catalonia the defining features of these generations are coming into being later than other areas in the West, while here another generation pre-dating the baby boomers must be added —those born before 1957, and which will still be active by 2020, along with their hierarchical and static organisational quirks.

The digital natives or generation Y will also play a major role, sometimes teaming up with the Xs, but otherwise will rely on their own initiative to challenge traditional business models. Digital natives are bound to have entrepreneurial ambitions, will passionately defend social and environmental causes and believe enterprise has to uphold them too, whilst looking to enjoy a greater balance between professional and private life. They are willing to exchange professional experience in order for their work to fit more closely with their aspirations in life.

Having different cultural generations under one roof can sometimes hinder finding common values, aims and end performance, though it also means there is a greater range of business models stemming from differentiated ideas and behavioural patterns.

Further to generational diversity, the fragmentation of activities into different and far-off locations has increased the complexity stemming from geographical cultural differences. That said, geographical multi-culture will become a factor of ever decreasing decisiveness, at least in relation to talent, which will speak a «common language» regardless of where it may be, if it is to achieve professional success. It has already been confirmed in some studies that the world is undergoing a double process of cultural convergence and a reduction in the number of differential traits due to the process of globalisation. (Maystre *et al.*, 2007). Yet other analysts point out that it is this trend itself that brings out the need to differentiate and settle where values and attributes linked to a given territory become more important (Annual Report OME, 2006).

Knowledge will continue to be valued, but it will have creativity and collaboration tacked on, as the coming decade witnesses an even greater economic expansion based on knowledge, driven mainly by two recent factors: hyper-competition and the incorporation of digital natives into the workforce.

The surge of the emerging economies and new technologies is driving this environment of hyper-competition. As a result, many western companies will have to take apart their current business models and rebuild them around activities and tasks based on key, well trained human teams, who are orientated to the ongoing development of innovation via knowledge underwired by creativity.

Digital natives are bursting onto the labour market with their major contribution seen as collaborative culture. This generation has grown up with a series of new technologies that allow for virtual collaboration, and this is now affecting their interaction with the market and their interpretation of relationships in a working environment. Indeed collaborative work carried out among communities of experts is called to play a leading role in the creation of value in the knowledge economy.

Creativity will become an ever-greater element in establishing differences. As technology advances and moves within reach of a greater number of competitors, suppliers of consumer goods and services will find it more difficult to compete purely on terms of price and quality. The trend is shifting towards differentiation through the creation of cultural values, which include how a company can address both clients and its own workers, who are increasingly aware of the emotional responsibility of their working lives. Culture is being transformed into an economic resource, an intangible asset enterprise has to deal with, as it is difficult to copy, comes charged with information, individual and social meanings.

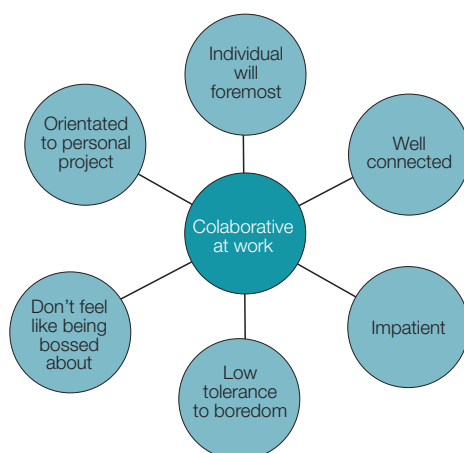
The risk of alternative thinking will be more highly valued than now, both due to the need to differentiate as dictated by the movement of hyper-competition, but also due to the fact that the millennium generation is joining the labour supply and that they have different values to those of the last two decades.

With the coming of age of the millennium generation or digital natives, as mentioned above, a new form of talent coming to the fore is that of collaborative talent. This generation has cut its teeth on Internet and with digital artefacts at their side. Unlike their parents, digital natives have learnt through play and enjoyment of these new tools and are able to process vast amounts of information at high speed (Prensky, 2006).

The combination of ICTs with the millennium generation will allow cognitive abilities to spread beyond individual talent: indeed with the 2.0 revolution there is talk of crowd wisdom; collective intelligence derived from the dynamics of collaborative work which internet and other mobile technologies make both easier and more accessible (Tasaka, 2007).

This new form of talent is thought to make up some 12% of the US labour force (Guthridge, Komm and Lawson, 2008). As it joins the labour market it is foreseen that it will be more difficult to manage than the talent formerly known to most organisations. In fact the US Department of Labour calculates that a digital native will have changed jobs an average 12 times by the time they are 38. (Prensky, 2006).

Figure 9. Collaborative characteristics in the workplace



Source: OME based on IOR Consulting (2008)

From the viewpoint of corporate culture, a series of clear consequences come out of the presence of creative and collaborative forces in the workplace.

Organisations must make themselves more flexible, open and transparent in the way they operate. New talent will search for spaces with greater freedom of movement —to exchange ideas, to change the organisation and to change alliances between companies.

In traditional firms and especially in those based on knowledge, traditional management and control models will be left behind and hierarchical levels will be halved, whilst manager numbers are set to drop 30%.

These major cultural changes will most likely go hand in hand with the changes in business models. On the one hand, large corporations will want to take a greater role in society, while on the other, minimal business units in terms of personnel will proliferate, linked by collaborative networks.

This does not mean the world will split into a rivalry between the large corporations and small units, but rather they will collaborate. The value chain is transforming into a value network: a web of relationships that generate economic or social value through the exchange of tangible and intangible goods both within and outside an organisation (Venezia and Allee, 2007).

Parallel to advances that may be reaped in relation to open innovation based on participative platforms, and although it might seem that information technology should render the location of business activity less relevant, some authors consider that location will be actually more important than before. In fact they see it as a critical competitive factor, given that the differentiation will materialise due to the people; in other words, due to their talent. (Hagel, 2008).

The way talent can come to update itself or grow in a rapidly changing environment is through contact among people. This is especially true for the case of tacit knowledge and even more so when it is so innovative that it is difficult to analyse and codify. It is better to base business strategy on tacit rather than explicit knowledge, as the latter can be more easily copied, whilst at the same time being part of a talent cluster becomes even more of an edge.

Talent clusters tend to link up with other centres of tacit knowledge centres worldwide, due partly to the return of ex-pats to their homelands. One example is that Silicon Valley firms are managing to connect up at a personal and institutional level with talent clusters in Israel, Taiwan, China and India (Saxenian, 2006). Nevertheless, although Silicon Valley firms are involved in global tacit knowledge networks, it appears that the private sector in Asia is at the forefront of building more effective ways of collaboration among talent with these poles, all of which could lead to a greater competitive edge in the future (Hagel, 2008). Technology can help, but the challenge is to manage to define new work models, which drive «productive friction» among talent clusters on a global scale.

Present and future of global talent contours

The knowledge economy will be strengthened by the injection of creative assets and digital talent over the coming decade, to form clusters in some of the world's metropolitan areas. These areas, despite economic uncertainties, will continue to be dynamic, creative and to expand due to such common traits as vitality, social, cultural and commercial diversity along with their own specific characteristics. These cities and mega cities are

already attracting more talent due to their existing clusters. Indeed, some of these locations have recently established the virtuous circle, which allows an agglomeration of tasks that require proximity, making them able to feed off interaction, whilst being less subject to offshorability. Other elements of attraction will also come to the fore, such as a tolerance of differences, and higher quality of life, often related, but not always, with the possibility of higher incomes as a result of the same movement that generates advantages of location.

London stands out as the world's leading city for 2008 in terms of talent and creativity. After the City, creative industry generates most employment, and with one third of its population born outside the UK. It has one of the highest urban GDP growth rates, being the first choice location for multinationals. In 2012 it will hold the Olympics and has a considerable proportion of land given over to green spaces. Chicago is the city in the US with the brightest future with its move to increasing both parkland and musical venues, for its architectural tradition and its rate of economic growth that has now overtaken that of New York and Los Angeles. (Fast Company, 2008).

Outside the US a number of cities are mentioned, such as: Dublin for the combination of fiscal advantages for enterprise coupled with affordable housing, proximity to continental Europe and an English speaking workforce possessing technological skills and easy-going personal relations, as well as being the European base for some big IT firms such as Dell and Intel; Helsinki combines tidiness and design, scoring highly in the tolerance stakes, whilst housing the headquarters of the mobile telephone giant, Nokia; Montreal is multicultural, tolerant, and combines European tradition with modernity and orientation towards technology and a cinema and sound culture offering one of the greatest «creative clusters» anywhere; Sydney is one of the world's most cosmopolitan cities, Australia's financial heart and a growing choice as a base for Asian Pacific multinationals hosting a plethora of biotech firms, as well as being an outstanding water sports centre; lastly, Vancouver is a major hub for the video-game industry, with a third of its workforce associated to creative production, added to a high level of tolerance.

Other cities can be added to the above, broadening the talent map with its distinguishing features as summarised in the table below.

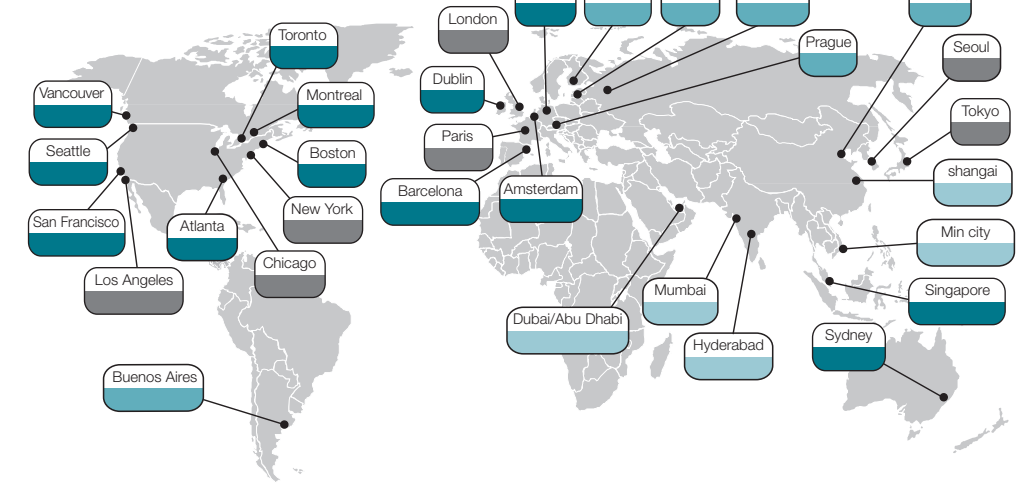
Table 3. Talent map

Creative Class Meccas Shanghai, Buenos Aires, New York, San Francisco, Atlanta, Los Angeles and Mumbai	Global Villages Toronto, Johannesburg, Sydney, Amsterdam and Berlin	R&D Clusters Raleigh-Durham (North Carolina), Fort Collins (Colorado), Seoul, Boston, Rochester (Minnesota) and Tokyo
Green Leaders Chicago, Stockholm, Portland and Vancouver	High-Tech Hot Spots Ho Chi Min City (Vietnam), Singapore, Chandigarh (India), Boise (Idaho), Des Moines (Iowa), San Diego (California), Dublin, Helsinki and Tallinn (Estonia)	Urban Innovators Curitiba (Brazil), Salt Lake City (Utah) and Philadelphia (Pennsylvania)
Culture Centers Barcelona , Miami, Montreal, Kassel (Germany) and Dakar	Unexpected Oases Dubai, Istanbul and St. Petersburg	Start-up Hubs London, Austin (Texas), Madison (Wisconsin), Tucson (Arizona), Ann Arbor (Michigan), Bozeman (Montana) and Beijing

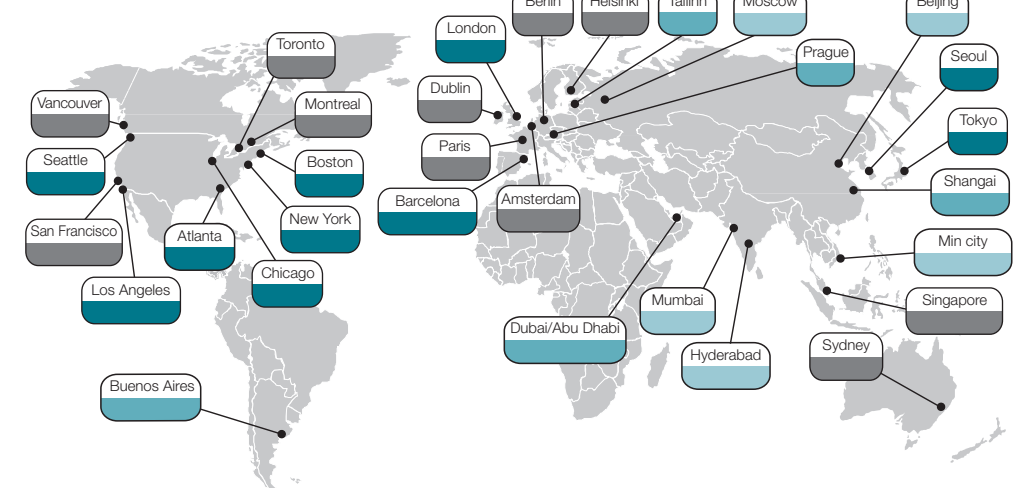
Source: OME based on Fast Company (2008)

Figure 10. Winner creative cities

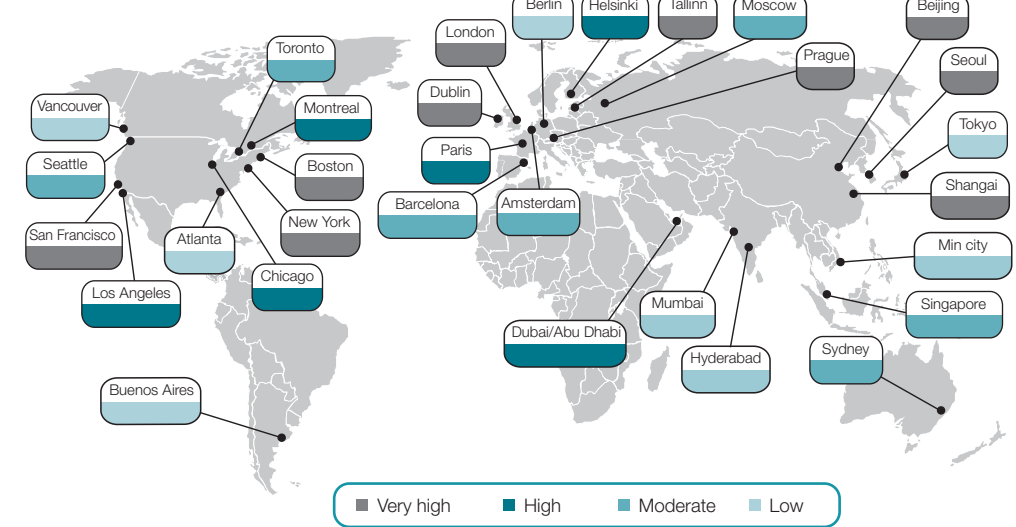
Knowledge and information



Quality of life



Fluctuations of the GDP per capita



Source: OME based on Mastercard (2008), Mercer (2008) and City Mayors

12 cities are classified as current or future nodes of creativity and innovation, namely; Beijing (Olympics, economic growth and performing arts), Hyderabad (IT hub, poly-pharmaceutical and aeronautical), Mexico city (aeronautics and cultural capital of Latin America), Kigali (plans to become the technological and scientific hub of Africa), Seattle (high density of engineers and risk capital), Orlando (interactive games and biotechnology), Calgary (oil, gas, banking and technology), Moscow (greatest cluster of nouveaux riches), Barcelona (the European city doing most to attract new businesses; Bread & Butter, 22@...), Kansas City (downtown revamp and life sciences), Doha (investment in culture and knowledge) and Abu Dhabi (architecture and culture).

Along the same lines, other parameters and indices linked to attractiveness of other territories and cities to talent also appear to confirm the consolidation of some centres and the rise of others in the coming years. London, New York, Tokyo, Paris, Seoul, Zurich, Chicago, Geneva, Stockholm and Los Angeles are the main locations of knowledge creation and information flows (Mastercard, 2008). Barcelona has a similar status than that of Brussels, Munich, Frankfurt and Dublin. Bengaluru and Beijing are not so far away from this last group. Whilst London is called to stand out in terms of per capita GDP, by 2020, the performance of several major central and east European cities such as Prague will rise, tending to converge with Madrid and Vienna. Notable growth will also take place in Asia's emerging metropoli, especially Guangzhou, Shanghai, and Beijing. Meanwhile, the standard of living in Latin America by 2020 will match that of Prague at today's levels. As for quality of life or *liveability*—a broader concept including basic services, security, health, personal freedoms, etc.—Western Europe's cities are at the top, headed by the Germans. The top emerging cities are Singapore, Hong Kong and Prague, just below Barcelona, even if overall, differences remain. In terms of the role of cities as international nodes for the movement of people, the above mentioned metropoli figure heavily too.

In terms of higher education, the most important business schools are based in some of the main US cities, in London and its hinterland of influence, Singapore, Paris, Moscow, Madrid, Barcelona and

some northern European cities (Financial Times, 2008). As well as Moscow, other emerging cities have their own universities or branches of some of the most important world's business schools. Anglo-saxon countries gather the bulk of the most important prestigious arts and humanities universities, an indicator for talent combining with creativity.

5. Emerging technologies and new players

As observed in previous editions of this report, convergence between info, bio and nano technologies is highlighted as one of the principal driving forces of change in society and in economic development. The relationships among bio- and nano-technologies and ICTs have continued to flourish and have become technologies of common interest to both the public and private sectors due to the fact they cross through so many areas, whilst helping solve many of the challenges faced by global society.

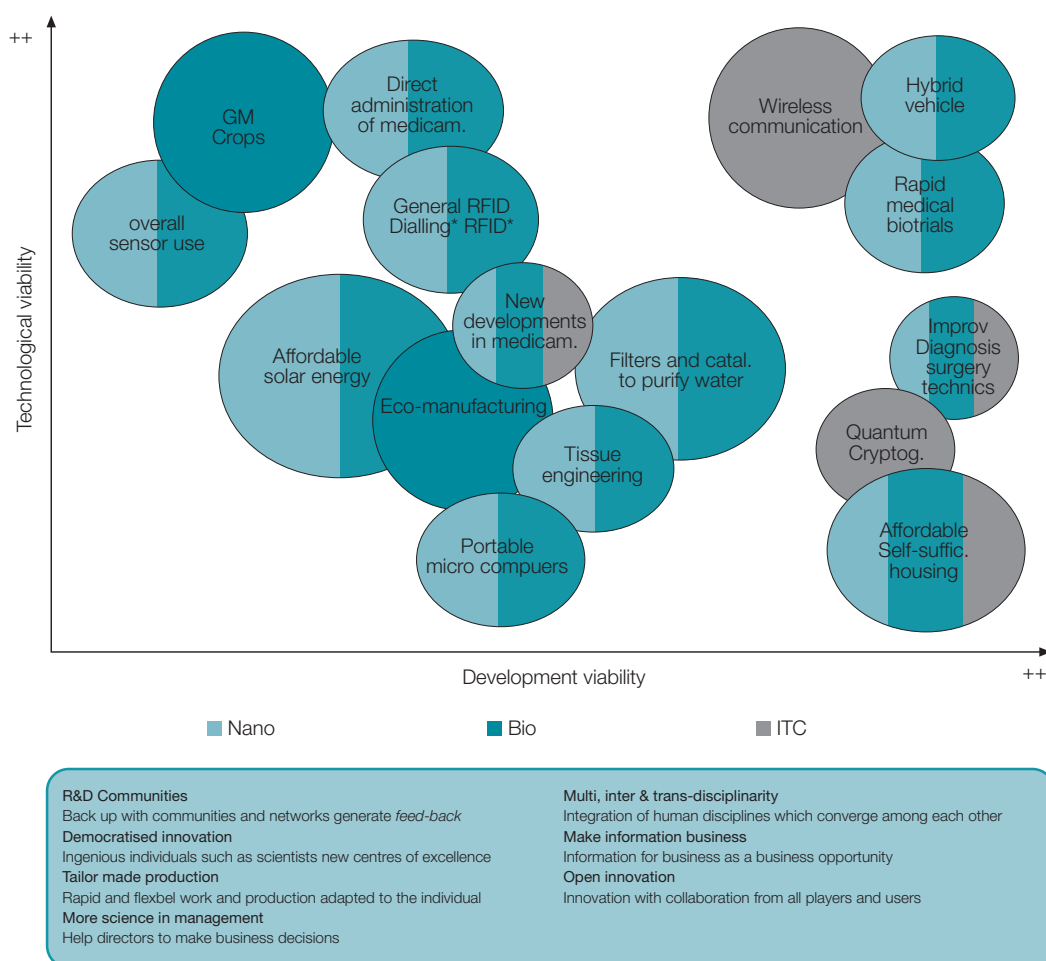
The following figure highlights the 16 major technological applications that should emerge by 2020 taking into account their possible worldwide presence and relevance in the problems of society (Siberglitt *et al.*, 2006). The growing interrelationship between the three phenomena is very significant.

Hybrid vehicles, bio-trials for early diagnosis and wireless rural communications all figure as areas set to enjoy a greater viability from the applications of new technology by 2020.

Furthermore, affordable solar energy, GM crops, filters and catalysers for purifying water along with wireless rural communications are all examples of applied technology which will have the impact on the greatest number of sectors by 2020.

Many technological applications, which are both highly feasible and with major social repercussions, will benefit emerging nations, which will be able to develop both the economic and technological level of their rural areas leading to a drop in existing inequalities. Indeed, further along, the implications of the development and spread of

Figure 11. Science and technology in 2020



The size of the circle denotes the impact of the technology in all twelve sectors of society, (water, food, land, population, government, social structure, health, economic development, education, defence and conflict and environment and pollution). For example, cheaper solar energy has repercussions in 10 of the 12 sectors.

OME based on Silbergliet *et al.* (2006) and the Institute for The Future (2008)

technology to such economies will eventually lead to the emergence of a more polycentric map.

Other advances, such as affordable, sustainable housing, micro-notebook computers, or omnipresent sensors are more consistent with the demands of developed economies and the furthering of their citizens' welfare. In some case though, these advances are running up against major economic and social hurdles, leading to a high degree of uncertainty as to their viability in the coming decade.

In the year 2000, the National Science Foundation reckoned that the markets for nanotechnological products would be in the region of \$1 trillion by 2015, employing some 200 million

workers. Eight years on, and although many of the forecast revolutionary technologies have yet to materialise, the total appears to be exceeding that foreseen. If we exclude semiconductors, the market for products using nanotechnology generated a total net worth of \$83 billion in 2007, set to rise to \$263 billion by 2012 and to \$1.5 trillion by 2015, (Cientifica, 2007).

The challenges faced by nanotechnology for the future go hand in hand with environmental problems, shortages of energy and natural resources, (Foresight Nanotech Institute, 2008).

Biotechnology will change beyond recognition in the coming 10-20 years. Indeed it is one of the

sectors currently undergoing highest growth rates. The major trends in biotechnology are centred on a) from repair to regeneration, b) from converting «large scale and low value» to «low scale and high value», c) from non-renewable raw materials to renewable ones and d) applications for health centred on prevention of disease, and improvements in agriculture and the environment.

The salient trends in ICTs include concepts such as super web portals, web 2.0, overall wireless mobility, business intelligence in real time and knowledge engineering, among others (Institute for Global Futures, 2008).

Another matter to be considered is that of the future of the system of intellectual property, which are at the heart of the shaping and evolution of technology and which now face a situation where innovation systems are becoming increasingly open and more complex. Such aspects as the positive role of patents as a mechanism for providing an incentive to drive innovation is being questioned more and more due to possible negative effects as it reduces competition and the spread of technology.

The international system of intellectual property being redrawn with a view to getting rid of the vision of «one size fits all», —in other words one where all economic sectors use the system of patents in the same way. What lies ahead is a mixed usage of the intellectual property system, reliant both on the sector as on business strategy concerning such alternatives as: patent pools, secrecy, open source, patents and trademarks.

The different rhythms and distinct technologies growing up will then determine whether to use the intellectual property system or not. Computer hardware is set to see a rise in the use of patent pools, whilst software and internet are expected to make even greater use of open source. Biotech and the pharmaceutical industry are headed for a mixed usage of traditional intellectual property systems (especially patents) and collaborative systems (whether via compulsory licences or public finance), whilst traditional industries such as the engineering and electronic sectors are expected to maintain traditional intellectual property systems, with a complementary usage of open source.

At the same time, «ecosystems» are growing in so much as that product or service development via a community of external programmers and external business by a company can increase their value. Ecosystems are lending, and will continue to lend, an economic rationality to the philosophy of open source. Some authors have coined the term commons-based peer production to describe these collaborative efforts, based on the sharing of information (Yochay Benkler, 2006). In another level, the open source system is called to spread to hardware activities in a complementary way with such traditional systems as patents.

Nevertheless, patents will still play a major role in innovation worldwide, and indeed an ever more important one for companies that spring from a technological base and for whom intellectual property systems are a key factor, which still makes sense, especially for patents, although growing opposition to them will eventually break down the «one size fits all» mentality. The growing importance of alternative patent forms and their relative muscle is particularly evident in sectors such as those of medical technology, telecommunications, electronic devices, environmental and nanotechnologies.

Thus, it is necessary to restructure existing patent offices, above all to gather the experience required to prepare for the new technological fronts of biotech, nanotech and ICTs. These institutions must be armed with the necessary tools to handle the growing load of information they have to deal with, while clarifying criteria to concede or reject patent applications.

It is unlikely that the near future will see a single international patent register, but it is hoped agreements among regional blocks (such as NAFTA and the EU) and a more widespread intro-regional harmony, within the blocks themselves such as the EU, ASEAN, NAFTA, MERCOSUR, etc.

Worth mentioning at this juncture is the increased degree of internationalisation of international patents: technological activities and transnational companies are becoming increasingly internationalised as they research into new technological capabilities, greater adaptation to new markets, and fight for more competitive R&D costs. Another element which goes to pinpoint global busi-

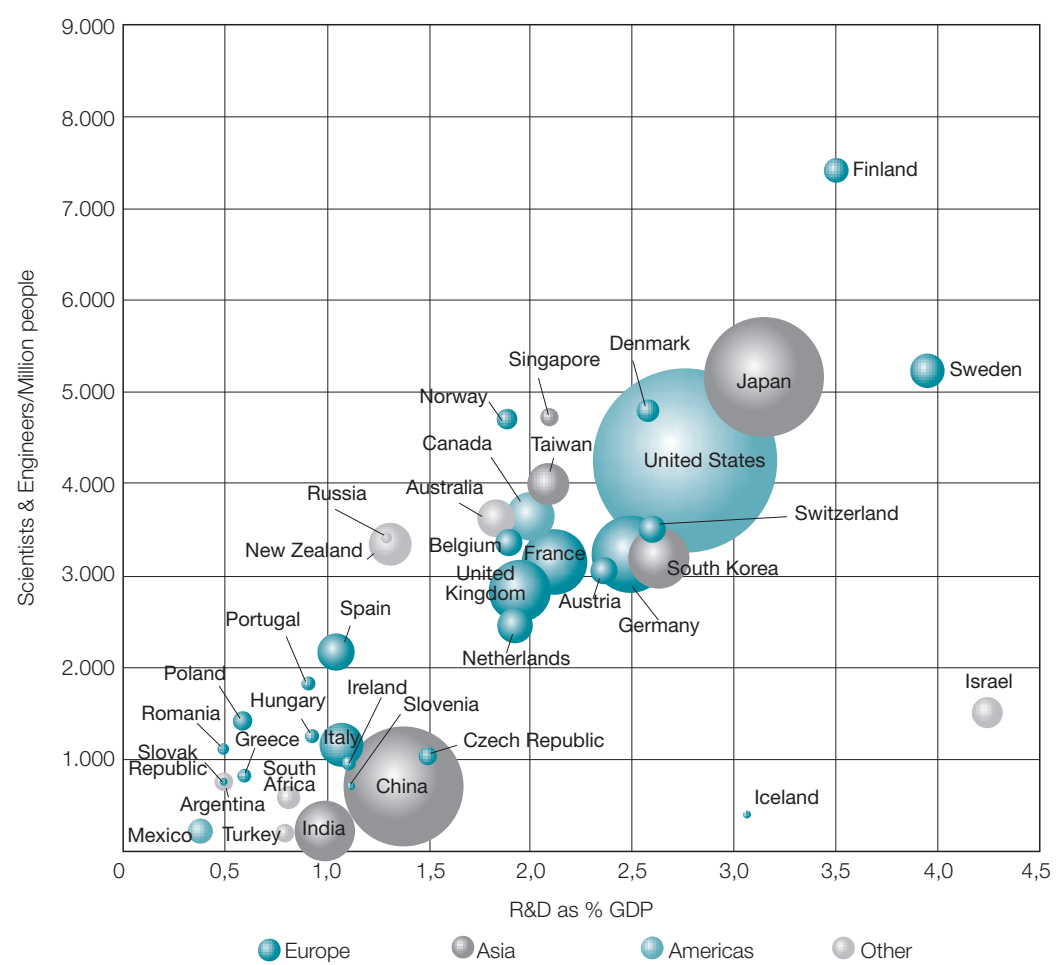
ness expansion is the fact that 30% of patents issued in 2006 in the 5 major patent offices of the world (JPO, USPTO, EPO, KIPO and SIPO) came from the other 4 offices, illustrating that the duplication of patents in two or more patent offices is a growing trend that also marks the globalisation of business.

This level of internationalisation of patents varies according to the technological area involved, with ICTs at the top which represent the strategic building blocks of global competition. To be exact, 17.5% of all ICT patents involve transnational ownership. Non-OECD states like India, Russia, Brazil and China hold a high percentage of ownership of overseas patents in this field, and of this group, particularly India and China, which perhaps mirrors their capacity for invention.

The following figure shows a number of variables, such as annual R&D, R&D/GDP spending, numbers of engineers and scientists/million inhabitants, and indicators of R&D capacity in 2006 for a number of countries. Despite the arrival of new emerging economies on the international scene for R&D, the reality is that the US is currently leading the way, along with Japan and the states of the EU.

RAND points to the US, Canada, Germany, Australia, Japan, Korea and Israel as countries that boast the highest levels of science and technology, all furnished with a notable presence of factors that contribute to the skills necessary to develop and apply the 16 areas of technological application identified as having a major future potential.

Figure 12. R&D in 2006



Note: The size of the circles denotes relative R&D importance

Source: R&D Magazine, (2007)

The US still leads in ICTs, bio and nanotechnology worldwide, followed by Europe and Japan, although some emerging nations, regions and territories are scaling positions fast.

According to EITO (2007), Europe and Japan have been losing importance in the world IT and ICT market since 2005, whilst the US has been slowly strengthening its position. The positive evolution of some Asian states is also worth mentioning, with countries like China, India, South Korea and Singapore having made great strides forwards in these sectors in recent times.

The US, Europe and Japan, currently lead public spending in nanotechnology. Since 2004-5, with the exception of Japan, state investment has really taken off. However, despite the great public support from European institutions for nanotechnology, private investment in R&D is still thin on the ground compared to the EU's main competitors. Thus, private funding accounts for a mere third of all investment, far below the 52% of the US and that of nearly 66% in Japan.

In the field of biotechnology, Japan has been observed as lagging behind the US and EU in terms of publications and patents, especially the latter, whilst private initiatives are at best sluggish.

Europe is not far behind the US on publications and patents applied for, matched by a solid

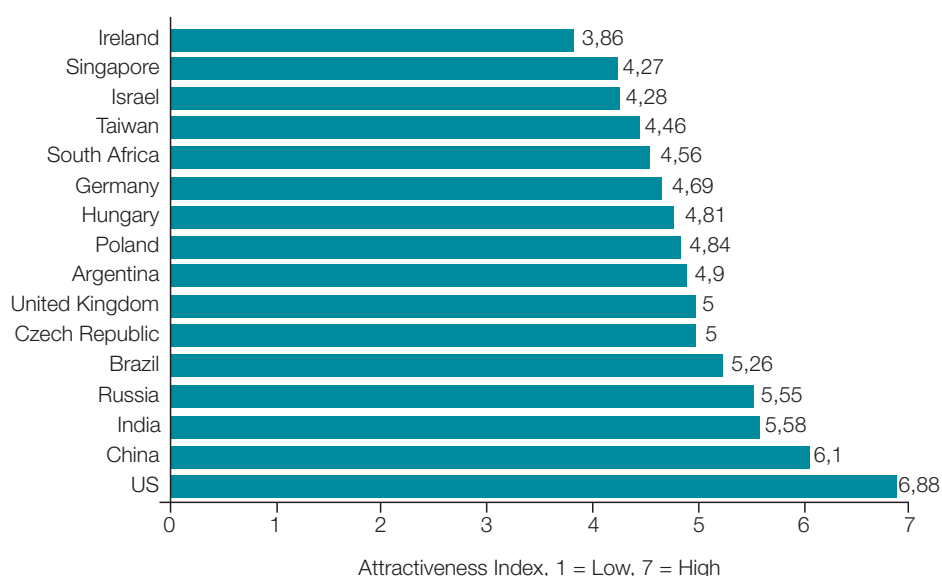
growth in the creation of biotech companies that, despite lacking the performance of their average American rivals, are holding their own. The UK, Germany and some East European states such as the Czech Republic, Hungary and Poland currently represent the most attractive markets for the biotech industry, (see figure 13).

The US is at the forefront of private biotech initiatives and is still the country with the best potential sector prospects. It is more mature than in the EU and it is expected that the average performance of its enterprises and the large specialised workforce in this sector will continue to drive it forward to keep leading the world biotech market in the coming years, even despite the emergence of new economies.

At this juncture, it is only fair to acknowledge the steps achieved by a number of developing economies in the process of technological *catch up*. Nevertheless, this is not an integral phenomenon, in so much as that there are differences, both among this group of developing countries as well as within each of them.

Technological progress for developing economies is seen to be determined by the speed in which they take on existing technologies and at the same time successfully adapt them locally, throughout the entire economy and not just in given hubs, such as cities or urban clusters.

Figure 13. Most attractive biotech markets



Source: Burrill & Co, A.T. Keaney

According to the World Bank report «Global economic prospects 2008», there are several factors that determine the development of this process: on the one hand are those that determine the degree of exposure to external technologies and on the other, those that help absorb technology within a country.

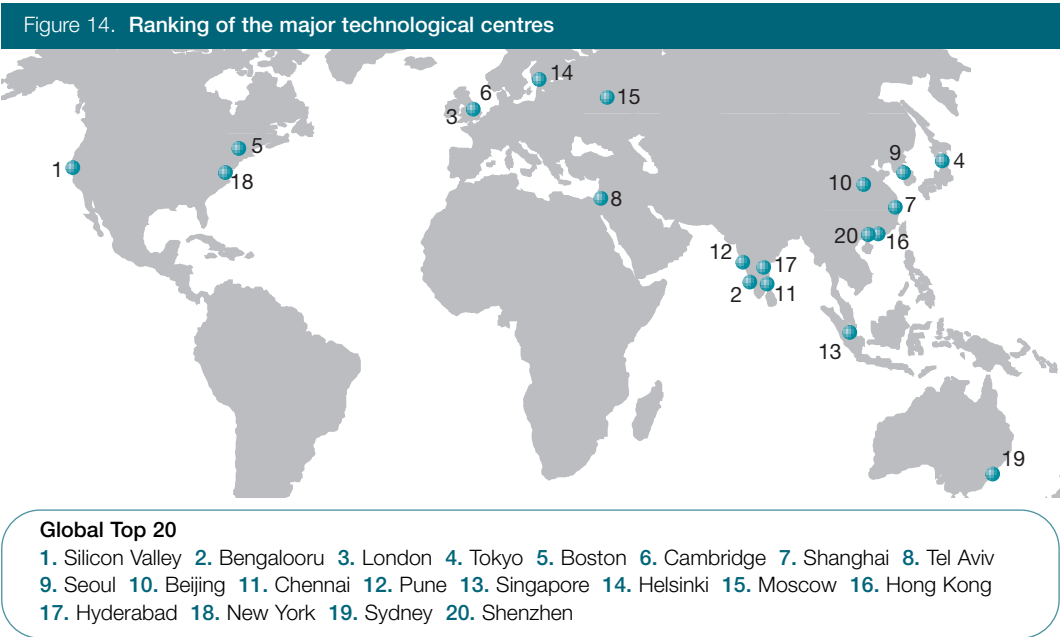
In the last 15 years, the channels for spreading technology throughout developing countries have grown and it is foreseen that they will continue to do so even more in the future.

Basic building blocks of technological absorption, such as literacy rates, macro-economic stability, the rise in FDI, availability of domestic investment etc., have improved overall in developing countries as a whole to a varied extent. It must be pointed out that even in the most advanced countries within the middle income group, use of current technologies and those on the horizon is no by no means easy, given such shortcomings in infrastructures (as energy, communications etc.), in their human capital and the lack of a critical mass of scientists and engineers with the skill required to take advantage of the technology in some cases. Cases that typify both factors analysed and indicators of advancement are to be found in both Asia and Eastern Europe.

There is a flourishing export industry for high-tech products from developing nations with a 70% rise

registered for countries in the middle to high income bracket. Whilst for those in the middle to low group, high tech exports have risen by a proportion of 137% of the worldwide total, from a share of 6.7% to 15.7%, largely due to China's bursting onto the world goods and services market. Middle to high income countries have seen their share rise by nearly 50% of the market, hitting almost 10% of total high-tech exports, and where a special mention must be given to states such as: Mexico, Brazil, Hungary, South Africa, Slovakia and Chile. There have also been notable rises in exports of goods with a high technology content from the Asian Pacific, East, South East Asia, as well as from Eastern Europe and Central Asia.

Another indicator of technological advancement of developing nations is that of the takeover of high-tech enterprises by companies located in developing countries. Mergers and acquisitions of foreign companies by firms from these states topped \$400m in 1987, (less than 1% of the world total), but by 2006 had hit \$100 billion (already some 9% the world total), (World Bank, 2008). Although many acquisitions can be put down to policies of enterprise looking for markets, brands and distribution channels, there is an appreciable amount of business aimed at getting hold of technological or R&D know-how by developing world companies. A classic example is that of the takeover of the Korean Sangyong group by



Source: Silicon.com (2008)

the Chinese, Shanghai Automotive Industry Corporation in order to improve its R&D capacity for sports models or indeed the creation of R&D centres in Sweden of the Chinese companies Huawei Technologies and ZTE. Other shining examples are the takeover of the IBM PC division by the Lenovo group of China or indeed the recent purchase of Jaguar and Land Rover by the Indian Tata Motors.

Another important parameter is that of R&D investment levels in activities with a technological content. Here there is an upward trend, especially in the South East Asian and Pacific zones, where the percentage of private R&D—the most productive in terms of results—is similar to that of developed nations at 62%. The major relative importance of private R&D in South East Asia is in stark contrast to that of Latin America and the Caribbean with a mere 29%, with Europe and Central Asia on 43%, which goes a long way to explaining the technological strides made by the first of the regions cited, (World Bank, 2008).

Likewise, the geographical dispersion being experienced by patents worldwide is also worthy of comment. Although the US and Japan still dominate this terrain, new players such as South Korea, are already in the first division worldwide, whilst other emerging countries such as China, Russia and India are scaling positions. In this area of technological specialisation, it is possible to glimpse a growing leadership of South Korea in ICTs and an increasingly important role for China in chemical engineering and telecommunications. China and South Korea have increased their domestic and overseas patent applications by 800% and 100% respectively, a figure far above the world average.

Economic and industrial development in some zones and congestion in others will lead technology to disperse throughout these lands and therefore bring with it a greater level of competition, not just between, but also within countries themselves.

It is likely that new innovative zones emerge around cities in rapidly developing countries such as China, India, Korea, Brazil or Russia. Due to government policy and investment in R&D, new syner-

gies are already arising among universities, large firms, entrepreneurs and the urban workforce.

These technological and innovative zones are present worldwide and are concentrated in industrialised countries and regions. Nevertheless, the greatest rise in science parks and innovative zones is taking place in Asian countries like China, India, South Korea and Singapore, among others. As observed by Global Tech Hotspots 2008,³ research in technology is becoming a worldwide domain, illustrated by the fact that 11 of the top 20 technological regions are in Asia.

Nevertheless, (as reflects the next figure) with the exception of Bengalooru, the regions North America, Europe and Japan still lead the way, although some territories of emerging nations are jostling for position at the highest level worldwide. Such areas include regions in India and China with such hotspots as Shanghai, Beijing, Hong Kong and Shenzhen in China or Bengalooru, Chennai, Pune and Hyderabad in India have experienced meteoric growth in the last 10 years. Bengalooru is still in the second position however, current congestion in the city has and continues to spur the rise of alternative centres such as Pune, Hyderabad or Chennai. In China, the creation of zones like the highly populated Shenzhen, which has enjoyed a huge injection of R&D money, has led it to compete with Beijing and Shanghai in terms of current investment. In short, the zones of the new technological geography are growing fast.

6. Finance, trends and new centres

The current process of financial globalisation and the emergence of economies which are increasingly becoming integrated into the world economy is having a great effect in capital flows, both in terms of volume, which is increasingly large, as well as its origin and where it ends up. This is affecting international financial markets and the main financial hubs where, despite an outwardly decentralised nature of technological advances such as those of ICTs, the competitive edge of a given location is still relevant. That said, signs are being glimpsed of a shift in positions within the spheres of financial clout as new

3. Created by the firm Silicon.com, using 14 international experts and a group of 75 international locations which 20 were recognised for their creativity and business flair as well as the innovation and quality of their technological development.

hubs emerge, which are, to a large extent linked to the changes taking place on the economic stage, thereby underling the trend of a world, which is increasingly headed towards a multi-polar system.

In its 2007 Annual Report, the Observatory for International Markets, (OME 2007) made an initial approach to the financial side of globalisation, identifying several novelties, as well as something not seen before, namely that since the beginning of the 21st century, countries which are net capital exporters (with a current account surplus), have, on average, relative income levels noticeably lower than those net receivers of investment. The paradigm of this phenomenon is the US with its foreign trade deficit being largely financed by China and the oil exporting states. In the same vein, the rise in prominence of Sovereign Wealth Funds has been observed, which serve to channel part of the accumulated reserves in these emerging countries, with all this has to infer on a political and geostrategic level. Meanwhile, the report also highlighted the fragility of the global banking system, stemming from the low perception of existing risk, and new instruments to avoid falling foul of this, in addition to the excessive burden of debt of some segments. The outcome of this fragility is now well known and surfaced shortly after the publication of the last edition with a financial crisis of the first order, which is having serious repercussions on both the stability and evolution of the world economy.

Worth mentioning here too is the prolific growth experienced by the global capital market since 1980, rising from a stock value of \$12 trillion to the current figure of \$167 trillion. Growth in the global capital market has been progressive, speeding up just in recent years. However the expansion seen of late may come to an end and the reality is that global capital stock may even shrink due to an overall loss in the value of financial assets and a cooling off in the rate of credit growth.

That said, capital at world level will continue to rise, but will flock increasingly to emerging zones, so that its participation in global stocks will grow progressively in the future. Of the 10 main emerging financial markets, which account for 84% of

capital stock for emerging and developing countries, five are in Asia, namely in China, South Korea, India, Malaysia and Thailand.

China has risen to be the 5th largest world market in terms of net asset value, with a volume to rival that of France, (\$8 trillion) and is due to draw in a third of all financial assets of emerging markets, some 5% of global stocks. Only Japan has a higher value of assets in Asia today, and in recent years the People Republic of China has proved to be one of the top contributors to world financial asset growth. In 2006 some 92 Initial Public Offerings (IPO) were launched to the tune of \$42 billion, making it into the world's second issuer of shares just behind the US, which topped the league with \$47 billion. Last year saw China consolidate this position, with \$65 billion issued, nearly a fifth of all new stock on the planet and just \$23 billion short of the US at \$88 billion.

Meanwhile, the Euro zone has also been on the up with ongoing integration of its banking markets, whereas the US and Japan have undergone relative decline in a worldwide context, although the former still dominates global capital markets. These changes are now being felt in the main international financial hubs. New York is starting to lose ground to London, while both face sterner competition from other, mainly Asian markets, where the main surge of world growth is focused.

A major change in the international financial system is that of the growing trend in banking disintermediation. Moreover, since 2000, other hitherto little exploited, non-bank financial options have gained ground, such as; hedge funds, private equity funds or Sovereign Wealth Funds (SWFs). Mid-term forecasts point to much higher growth in the above in comparison to other funds, as they continue to grow into a position of strength within the international financial system.

Meanwhile, the importance of bank deposits has dropped to 27% share of total financial assets, just one point above that represented by private debt securities, whose share has nearly doubled since 1980, whilst equity securities have risen to lead capital concentration with nearly a third of the total.

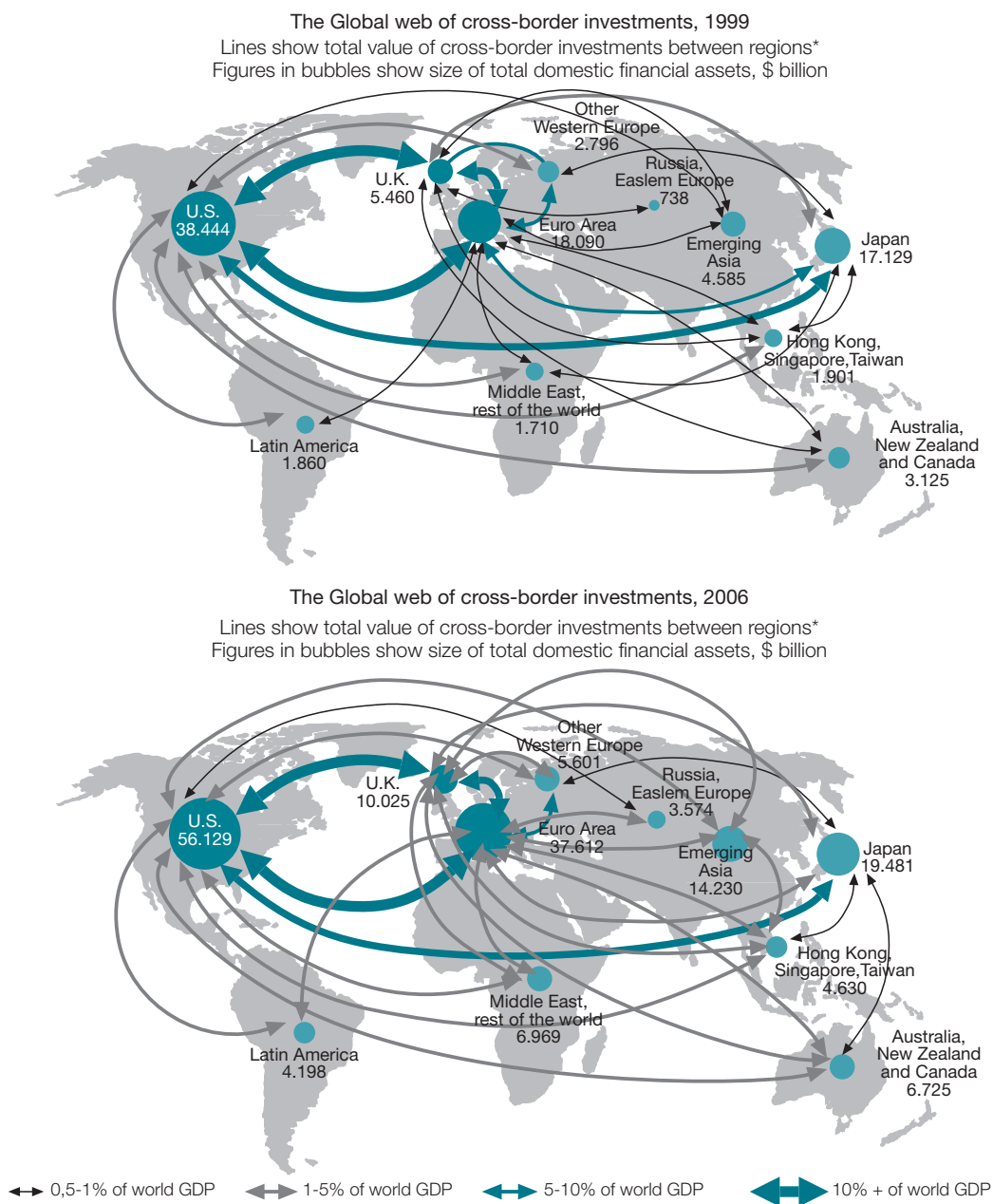
This evolution is by no means evenly spread across the globe, as most of the above movements have taken place in advanced economies, whilst as a whole, bank deposits in emerging markets are at a stable 40% of the total financial assets, a true reflection that their financial systems are still somewhat greener.

Financial systems in Asia and the Middle East are still banking centred, while China tops the bill with

half of all savings tucked away in bank accounts. Nevertheless, a large part of this money has been inefficiently allocated with a clear bias in favour of large state companies with local private enterprise losing out.

In contrast to China, India, with its colonial past has a more developed stock market with 70% of capital trading in private companies, which have sped to the top of the financial markets in recent

Figure 15. A comparison of the global web of cross border investments 1999/2006



Source: McKinsey Global Institute Cross-Border Investments Database (2008)

times. That said, the Indian financial system still lacks efficiency as most trade credit is still channelled to the public sector and many domestic savings head to «informal services» impossible to put into investments, which means that available investment fails to meet potential in India.

As for the rest of Asia, South Korea and other South East Asian states such as Malaysia and Thailand, once recovered from the crisis of '97 are now enjoying the most advanced and balanced financial systems in the Asian region along with Hong Kong, Singapore and Taiwan.

On the downside, Eastern Europe, Russia and Africa are the areas where least development has taken place in private debt security markets.

World growth in investment flow over the last 25 years has experienced a marked upward trend, especially since the mid-nineties when a watershed was reached with two events —one which coincided with the 97' Asian crisis, and another deeper one arising from the dot com crash shortly before 9/11. These crises illustrate the volatility of capital and the trend to pull back into home markets at times of global instability. It is thus expected that the current financial crisis will truncate the rising spiral of international capital flows, although as mentioned earlier, this step back should not alter the underlying upward movement.

The notable growth in capital flows since the nineties has been driven by a major force; the Eurozone which has been behind nearly half the rise worldwide and has become the first choice and major source of investment across the globe, drawing in some 40% of world flow. The expansion of the Eurozone is based on two pillars; firstly, cross-border movements between member states, that account for about half the growth and highlight the importance of integration of European financial markets as a dynamo for capital flows, and secondly ongoing integration with the rest of the world, which justifies the other 50% of the expansion in capital flow.

There is a growing link between the UK and the Eurozone, which draws a third of all external capital flows from the common area, which once again highlights the fact that London is the true

financial hub of Europe, despite initial perspectives that hoped to see the rise of Frankfurt as an alternative, with the advent of the single currency. Worthy of note too here is the rapid expansion of financial links with emerging markets that has diluted the pre-eminence of the US, which once held a privileged position as the only state to boast large cross border investments in emerging economies. All in all, the US and UK, along with the Eurozone are still the main contributors to capital movements across the globe.

A relative loss can be observed for the remaining advanced economies, largely accounted for by Japan, which has lost steam by failing to strengthen links with emerging nations, especially in its own backyard, seeing cross border investments even losing influence, going against the grain of an upward trend typified by Hong Kong and Singapore, all of which have led to Tokyo losing ground as a regional and global financial hub.

The volume of investment in emerging countries has grown five-fold since the start of the millennium, although despite this increase, in real terms, these economies only continue to receive a mere 10% of world flows. Therefore, the growth of investment in these markets is invariably linked to global growth in capital flows, and not a diversion of capital from west to east as so often argued. Asia and Eastern Europe have, in recent times, begun to stand out as the main regions in terms of attracting investment.

In terms of capital outflows, the Eurozone has become the world's largest investor, whilst in terms of individual states, the UK has surpassed the US as the major source of world investment, although the latter still remains the country with the greatest holding of overseas assets with some \$12.5 trillion, some 17% of all assets worldwide held by non-residents of the issuing country. Behind America come the UK (14%), France (8.2%) and Germany (7.8%), although as a block, the Eurozone accounts for 40% of assets in foreign hands, of which half are intra-zonal assets.

The most significant event commented on earlier is the rise of some emerging economies as investors on the world stage, such as; China, the South East Asian nations and oil rich states such

as Russia and the Gulf Cooperation Council (GCC), made up of Saudi Arabia, the UAE, Bahrain, Kuwait, Oman and Qatar). In 2006, capital outflows from emerging countries topped \$1 trillion; some 13% of world share and not far off US overseas investment, and all lead us to believe this movement will only grow stronger in the future.

Loans and deposits have lost ground since the nineties, dropping to just a third of the total, when they made up nearly half of overseas investments in 1990. Direct investment and portfolio investment⁴ have proved to be the rising stars of late, attaining such values as 43% of the cake of overseas asset investment, a change that has major implications as in principle, direct investment leads to a much deeper bonding of ties between countries.

Even though international capital flows to direct investment and portfolio investment have been growing beyond those of loans and deposits, the latter still play a leading role in advanced nations, such as the UK where loans and deposits account for two thirds of incoming investments and nearly 60% of outflow.

Emerging countries are bringing in capital mainly through direct investment (through both green field investment as well as mergers and acquisitions) and stocks and shares investment, with FDI taking the lion's share with nearly 50% of the total.

A sector by sector breakdown of movement reveals that services, with over half the total head cross-border investment, particularly the financial, transport and communications, trade and business services segments. The primary sector has regained ground of late, drawing investment to hydrocarbons and mining, which represent 12% share of FDI. Mid to high and high technology level industries are attracting the largest investments in the manufacturing sector, whilst in the chemical sector the stars are the pharmaceutical and biotech segments along with those manufacturing electronic devices and precision instruments. Furthermore, both the food and beverage as well as the iron and steel sectors are moving important amounts of cross border investment purchases.

Capital will tend to focus increasingly on sectors of the new generation; the so-called «life sciences» (pharmaceuticals, biotech and health etc.) and «clean technology» related to the environment and renewable energy sources, which are called to generate significant business opportunities. Indeed, private investment funds and risk capital are already taking an active role as forms of investment in these sectors, and the future for private equity funds and hedge funds looks rosy as they are forecast to double investment by 2012.

The gradual decline of the dollar as the international benchmark currency

There has been a meteoric growth in currency markets throughout the current decade, especially 2004-2007. The principal drivers behind this growth are firstly, the rising influence of currency transactions undertaken by non-bank financial institutions, and secondly the rise in currency movements in emerging markets (Galati and Health, 2007), whilst the US dollar and above all the Yen have lost influence. Since 1998, when emerging nations occupied a humble position at the table of world currency markets, their currencies have now risen to take a 10% share in all transactions taking place today. The growth in the volume of business of emerging currencies is on the whole directly linked to their economic growth and increased participation in international trade, coupled with the broadening of their own financial markets, especially in Asia. In addition, and to a lesser extent, the rise in international securities issued in their local currencies has also lent a hand to this growth.

A further area of lively debate in recent years centres on the decline of the US dollar as an international currency and its increased rivalry with the Euro, a newcomer, gaining ground on the world stage as a reference currency, with many indicators backing this assertion. Since its introduction, the Euro has gained two percentage points in terms of daily trading volume on the currency markets, whilst the dollar has lost 3 points. In 2003, the Euro overtook the dollar as the benchmark currency in bond issue. In 2007, there were already more Euros in circulation than dollars worldwide. Companies are increasingly opting to issue international IPOs through European mar-

4. The difference between direct investments and portfolio ones depends on the number of shares acquired.

5. Source: Dealogic
(www.dealogic.com)

kets, notably London and Luxembourg in prejudice to New York. Although the dollar is holding its ground as the major reserve currency, accounting for two thirds of world central bank reserves valued in dollars, since 2003 the Euro has grown to become the second choice reserve currency, with a 25% share, some 7% above 1999 levels.

Other factors are dragging down the dollar too, such as major US foreign debt and the need for overseas financing. Some authors have observed clear parallels between the decline of Sterling at the beginning of the last century and the current slump of the greenback, and indeed a number of analysts reckon that in 15 years the Euro may overtake the dollar as the international benchmark currency. That said, the emergence of new currencies worldwide, above all in Asia may lead to a more heterogeneous environment where influence is shared among the major financial centres.

New international financial centres

Financial activity is now both internationalising and dispersing, which means the web of international financial centres is expanding with the emergence of new potential hubs, something that is adding to competition on a worldwide scale. However, despite this apparent decentralisation, a greater spread and complexity of financial transactions also demands workers who are highly versed in finance and specialised services such as; technology, accounting, audits, legal affairs, analysis and drafting of forecasts and predictions. Even if new ICTs allow for coordination between agents and markets, and can offer real time global access to data and updates, there are other types of information which are far more difficult to analyse and interpret such as market intelligence, all of which are not easily transferable, as they spring from talent clusters at a given hub. This explains why London and New York are still leaders in terms of concentration of financial trading, skilled workforce and associated services, which, at the same time furnish them with a high capacity for innovation. Such strong competitive advantages are difficult to grapple with in the mid term, and although these centres are losing relative power worldwide, London has now taken the lead as the world's premier financial centre —an elo-

quent example of the current power such centres still hold.

New York is losing international influence to London too, which now heads most international financial areas. The City is now the main international interbank market in the world, the leading marketplace for currency dealings globally, and tops rankings of bond and managed asset funds as well as having the greatest number of overseas banks and branches. London has also overtaken New York in terms of IPOs issued by foreign companies and is accruing more overseas SWFs in bank deposits.⁵ Even excluding those in commercial banking, the financial sector in the City employs some 300,000 workers, (Cassis, 2006), similar to New York, though if the relative economic might of the UK and the US is taken into the equation. Although, both the country and its financial hub are losing international clout, Wall Street remains leader in stock market investment due to North America's vast home market, and still holds second spot for many of the abovementioned indicators. Furthermore, its financial muscle overseas is still closely linked to specialisation in investment banking, financial engineering and in non-bank financial institutions.

In the coming years, no great change is expected in world financial leadership, although the situation is more fluid in Asia, where economic expansion and the influx of investment have led to the birth of new centres set to jostle heavily for supremacy in the future.

Tokyo, now dominated by the home market has been overtaken by Hong Kong as an international centre, as the former's economic rut and sluggish recovery from the decade before have severely damaged the international position of Japan's capital. Even if it is the second major stock market worldwide, the number of overseas companies listed is dwindling. Furthermore, it dropped from third to fourth in terms of the volume world currency dealings in 2007 and, although the Yen is still the third most traded currency, it has lost part of its charm as an international currency, (BIS, 2007). In Addition, overseas loans, despite being bulky, cannot be considered wholly international anyway, as most are credits going to subsidiaries of Japanese enterprises.

Hong Kong plays with its advantage of being host to a plethora of major international financial institutions that afford it an outstanding expertise in financial services, whilst it offers favourable regulations and a modern financial infrastructure. The big plus of being a vital link between world investment markets and China may end up declining, should the Chinese authorities decide to bolster home markets, especially Shanghai. Chinese economic growth in the coming years is bound to have an effect, but it is impossible to say whether, in the long term Shanghai will substitute Hong Kong or whether both markets will be complementary. A number of works, such as that of Karremant and van der Knaap (2007), reckon that such considerations are too premature to devise, and that Shanghai is still far from being able to rally to rival the edge Hong Kong currently enjoys in terms of expertise and services, a reality illustrated by the fact that so many Chinese firms choose to go public on Hong Kong's market first.

In this second division of international financial centres we can now find such cities as Frankfurt, Paris, Zurich, Chicago, Sidney, Luxemburg and Dublin coming to the fore.

In terms of the Eurozone, all points to a continued movement of market integration in search of boosting overseas and scale economies through accords and concentrations. The fight between Paris and Frankfurt has yet to see a clear winner as both cities keep striving to strengthen their positions.

Paris has adopted a strategy of alliances with other centres to reinforce its financial muscle, via such initiatives as Euronext —a merger of the stock exchanges of Paris, Amsterdam, Brussels and Lisbon— whilst agreements with Wall Street and a merger with the London Commodities Market are assets which add to an attractive city with a high living standard, thereby altogether bolstering its potential as an international finance hub.

As a result of largely favourable regulatory conditions, coupled with a clear vocation to specialise, Dublin and Luxemburg have risen to become the main centres of financial intermediation and management of collective funds in the Eurozone.

Apart from its know-how in private banking, Zurich takes third place in the world gold and currency markets, as the Swiss Franc continues to enjoy its status as one of the main refuge currencies. Chicago has also found its niche in international finance markets, specialising in derivatives, which has led it to the global top spot in options and futures. Sydney on the other hand has set its sights on being a regional reference for the Asian Pacific, but although it has gained ground, it will struggle to overtake the resources of Tokyo or know-how of Hong Kong.

Other new centres are also springing up in emerging regions and it remains to be seen if these new hubs, such as Mumbai or Dubai are destined to succeed as true international centres. This will depend on their ability to attract the financial industry and above all, talent.

7. Global logistics and advantages of location: the dawning of new logistic hubs

One element that illustrates the role of globalisation (in terms of trade, output and finance) in the reconfiguration of the world's contours is that of logistics (defined as the management, control of movements and storage of goods in the supply chain...). Advances in this field brought about by new technology may reduce «distance» while giving rise to a series of implications when it comes to locating economic activity. It is therefore an instrument of strategic differentiation and organisations have to increase flexibility given the growing uncertainties and movements within the context of the world economy.

The puzzle of 21st century logistics is not bound simply by the exponential growth of trade, but also in the variety of functions that are not longer centralised. The fact that supply chains are now leaner and less integrated makes them more vulnerable. The emphasis being put on designing minimum inventories and giving priority to rolling inventories (in transit) means that just one element can affect the entire global supply chain. Such interruptions have an internal effect on the chain, (transport strikes, miscellaneous operational problems etc.) or indeed can be external,

- 6. 3PL: «third party logistics provider.»
- 7. 4PL: «fourth party logistics provider.»

obliging logistics operators to set up systems of risk detection and management.

Thus, disintegration brings with it new, hitherto unknown challenges, which range from the management of a large number of supplier-client relationships to assigning resources to a wide range of entities. This is why governance and management of the supply chain is an increasingly critical factor in many cases and determines if a 3PL⁶ model becomes a 4PL⁷ model, which aims to completely integrate the supply chain with the emergence of suppliers worldwide. The rise in the resource of intermodality goes hand in hand with the consolidation of companies that are able to embrace all possible aspects of road, rail, sea or air transport. The main driver here is cost reduction, coming from the ability to best juggle the available alternatives along with the increased know-how to coordinate operations afforded by ICTs.

Further to this, recent rises in oil prices together with the risk of cuts in the supply chain represent two of the main factors, which may lead to a rethink and possible change in logistical strategies, and the design of networks in the short/mid term. This draws attention to the trend towards so called pre-mixing or outsourcing of distribution centres in low cost countries near to end destinations, where products are grouped by their end point, (regions, cities or establishments) and not by company or product type. This method reduces both transit time and costs.

In the same vein, the disappearance of some warehousing facilities heralded by some, will not happen either in the short or mid term. The fact that risks of sea transport congestion remain so high, along with the fact that the solutions are only due to arrive in the mid term (building of road and port infrastructures that require 5-10 years), means that warehousing is the only solution companies have in case the supply chain fails or is interrupted. Add to this the rise in fuel prices and this obliges firms to exploit freight charges to the full.

Another associated trend observed is that of applying a policy of near-sourcing, which brings market supply locations nearer to their origin. The wave of outsourcing of supplies to markets such as those of Asia that started up at the beginning

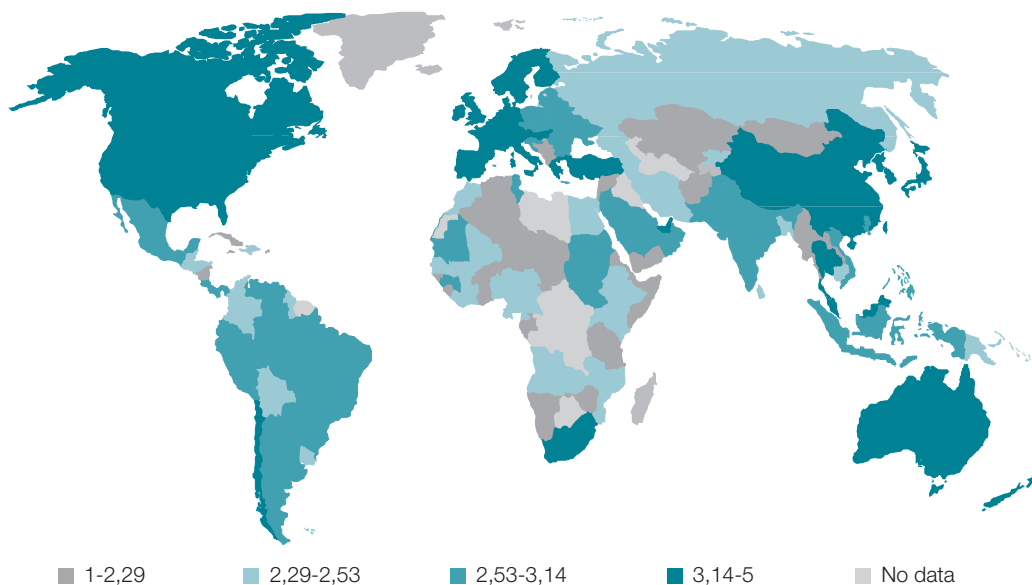
of the century is therefore varied and at times reshaped by policies which take into account total transport costs and where, for example the rise in fuel prices or the interruption in supply chains play a key part. Hence, part of the regionalist spiral of the world economy would doubtless be derived from this movement of near-sourcing, thereby comprising of three major regional trading blocks; Asia, with the high added value zones of Japan, South Korea and Taiwan and low-cost zones to which production is outsourced, (Indonesia, Vietnam, Thailand, China and India, etc.); Europe, with Eastern Europe and North Africa as zones of delocalisation; and thirdly America, with Mexico and Central America as the low cost zones.

A recent World Bank study has drawn up a map of the current state of play of logistics across the planet, (see figure 16 and table 4). The results are as expected in so much. In the OECD, where high performance is evenly spread, three countries stand out: Singapore, the Netherlands and Germany, where logistics services clearly benefit from scale economies, often resulting in sources of innovation and technological change.

At the bottom of the league we find African and Central Asian states, due partly to a geographical drawback —that of being far from major sea routes— as well as struggling to generate competitive markets for logistical activity. Mexico, Brazil and Russia all return weak performances, although logistics should be playing a bigger role in these countries. Indeed the heterogeneity of results among developing countries with similar income levels comes out clearly, just as the fact that the emerging economies of Asia, (basically Indonesia, Vietnam and Thailand) are better positioned than most Latin American economies. Likewise, there is a notable difference in levels in Eastern Europe, with Slovenia, the Czech Republic, Latvia, Estonia and Slovakia, comfortably above, while Lithuania, Bulgaria, Croatia, Bosnia, Ukraine and Belarus which are lagging a long way behind.

The low performance of oil producing nations also stands out in these figures, doubtless due to lack of incentives or pressure from the private sector to introduce reforms to improve trade and transport. This is the opposite in the case where

Figure 16. Logistics performance index (LPI)



Source: World Bank, 2007

Asian states, which stand out for their productive economies, launched on a path of overseas trade and where the private sector (aided by active public policy) has been the major driving force behind the reforms in transport and logistics.

The conclusion the work derives from this, is that further to costs and time employed in managing transport, what really matters to those using logistical services most is reliability and predictability, in other words that they can be sure a shipment will be where they need it at the right time and place. Moreover, another thing to take into account is that a country's performance is largely determined by its weakest supply link; so that if say, customs formalities are sluggish, this will hold back the entire chain regardless of how efficient the other links are.

The study goes on to highlight that the differences in performance in logistics between one country and another determining their ability to exploit positive movements in globalisation boils down to having better processes, services and overall quality as well as their operational context. Problems stemming from such handicaps as poor government, security issues and backward infrastructure all represent major hurdles to improving logistics in many developing nations. Therefore, work on a variety of factors, such as

infrastructure, customs reform, border control management and transport regulations would go a long way to boosting the synergies needed to drive many low performing logistics networks in developing countries.

Asia harbours a variety of logistics scenarios, ranging from places like Singapore, Hong-Kong, South Korea and Japan with a first rate logistical set up, to others such as Indonesia, Vietnam, China and India which fall way short in terms of basic infrastructures such as roads, rail networks and ports, which are the bread and butter of logistics systems.

The main hurdles China and India must overcome to put their logistical houses in order, apart from cultural and language barriers, are essentially those of a murky bureaucracy and regulations, which combine with the services available and the state of their infrastructures, above all in India. In China the problem of infrastructures is less acute, as a key factor to improvement has doubtless been the role of the manufacturing sector focused on exports, which have dragged up the level of communications locally, at least in coastal areas. India, where efforts have been centred on exporting services, has lacked that impulse to improve communication links and therefore there has been no adequate force to drive such a movement until now.

Table 4. Logistics Performance Index

Country	Rank	Score
Singapore	1	4,19
Netherlands	2	4,18
Germany	3	4,10
Sweden	4	4,08
Austria	5	4,06
Japan	6	4,02
Switzerland	7	4,02
Hong Kong, China	8	4,00
United Kingdom	9	3,99
Canada	10	3,92
Ireland	11	3,91
Belgium	12	3,89
Denmark	13	3,86
United States	14	3,84
Finland	15	3,82
Norway	16	3,81
Australia	17	3,79
France	18	3,76
New Zealand	19	3,75
United Arab Emirates	20	3,73
Taiwan, China	21	3,64
Italy	22	3,58
Luxembourg	23	3,54
South Africa	24	3,53
Korea, Rep.	25	3,52
Spain	26	3,52
Malaysia	27	3,48
Portugal	28	3,38
Greece	29	3,36
China	30	3,32

Source: World Bank, 2007

China is, in fact, one of the countries doing most to reduce the structural limitations of its logistics network. It has planned to invest some \$64 billion in the long term (2020) to improve its all round transport capacity, to meet the requirements of air transport, including the building of 97 new airports and the updating of existing ones, thus creating a cluster of airport hubs. Air transport is vital to link China to the outside world as both road, rail and river transport are still highly limited. Thus, the Chinese Government in its 11th five-year plan aims to liberalise transport, conceding more licences to 3PL operators and constructing 30 logistics hubs throughout the country.

The role of Hong Kong as an export hub and the Guandong province (Pearl River Delta) as a manufacturing base is losing ground on one front to the central area of Shanghai and the Yangtze delta, and on the other to the North, (Beijing-Tian-

jin/Bohai). Shanghai, above all, is currently enjoying a boom as it fills the boots of the country's productive hub, whilst taking advantage of a privileged location and roots as a trading centre, all of which have helped develop a logistics infrastructure in a short time. Moreover, as mentioned above, government policy to establish a network of logistics centres across the country will only serve heighten Shanghai's position as a key trading hub. In fact, the port of Shanghai is already the world's largest by tonnage and third largest in container traffic after Hong Kong and Singapore. With such returns and future perspectives, it is hardly surprising that private investors put some \$6 billion into the city between 1992-2002, and much more is headed in the same direction.

Meanwhile in India, in the short/mid term, logistic operators are bound to continue limited to road transport, as neither air nor rail connections inspire enough confidence. This shortage of infrastructures will not help the country to undertake the diversification required to boost industrial output. In order to address this predicament and shackle on the economy of the country, government and private investors are currently kicking off projects to improve existing infrastructures and building of new facilities and transport infrastructures, (airports, ports, railway lines and road). Indeed, one of key projects of recent years is that of the construction known as the «Golden quadrilateral», a motorway network which aims to connect the major metropoli of Delhi, Bengaluru, Mumbai, Chennai and Kolkata, which will act as a spur for the laying of other routes to the North, North East, East, South and Centre of the country.

Singapore has been logistic hub of the first order and one of the globe's leading nodes for some years in terms both of moving goods as well as management of information. Nevertheless, the clear dis-economies generated by the sheer size of its logistical space, (in comparison to its limited dimensions), added to Chinese competition, are factors to bear in mind in the future, although the growth of South East Asia's economies coupled with the specialisation of Singapore as a point of consolidation and manufacturing hub of high tech products has provided its logistics industry with new business to grow and further stamp its regional authority.

As for Latin America, Brazil, which has benefited most from the rise in raw material prices, being a major exporter of ethanol, iron, sugar and coffee, plans to expand its ports. Meanwhile, Mexico hopes to establish a port to rival those of the American West Coast, although the project has yet to materialise. What is being considered from a North American viewpoint is the delocalisation of logistics centres and low cost production as well to Central America and Mexico to act as a bulwark against possible cuts in the supply chain from products made in the Far East.

As for Europe, Russia, due to its vast domestic market, offers a huge potential, but it is being

pinned back by major logistical shortcomings and government regulations, which represent the main hurdles to trade there. As for Europe's transport connections to Asia, one of the most interesting projects afoot of late is that of joining both continents by train, with an agreement signed at the start of 2008 among the governments of China, Mongolia, Russia, Belarus, Poland and Germany to improve goods traffic between each continent. The accord is set to materialise at the start of 2009 with a train that will cover 9,780kms, running from Beijing to Hamburg, thereby creating a Eurasian corridor which, compared to the journey by sea, will cut down the time of goods in movement by 20 days and by 10,000 kilometres.

Annexe

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Annual Report Observatory for International Markets

*A polycentric world: races for talent, technology
and capital*

Crisis and transformation in the world economy

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