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LSE Cities Next Urban Economy Series

Policy lessons
and opportunities from metros in the EU and Asia

Global Metro Summit,
The Next Urban Economy
Chicago, 7-8 December 2010
Conference Paper

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The LSE Cities Next Urban Economy series
Munich: staying ahead on innovation
Torino: reclaiming and diversifying local strengths
Barcelona: global repositioning of an emerging metro
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In the context of strong metropolitan growth, and the promotion of innovative approaches to urban and regional development policy at city, regional, national and European Union (EU) levels, over the past two decades, the *Next Urban Economy* project looks to three European cities for investigation and analysis. The three cities - Munich, Torino and Barcelona - have each overcome challenging crises in the past and shown significant economic progress and urban transformation in the recent past, especially in terms of promoting innovation, global repositioning and internationalisation, and the fostering of a greener economy. The *Next Urban Economy* series also includes one of the fastest growing cities in Asia, Seoul, as shifting patterns of urban growth increasingly require us to look beyond Europe and North America. Taken together, these city profiles provide city leaders, policymakers and practitioners with valuable resources as they respond to the challenges posed by the current global economic recession and develop their own next urban economy.

This document acts as a companion to the LSE Cities *Next Urban Economy* series, bringing out the main policy lessons emerging across all four metros. In producing this overview, we have simplified and condensed more complex and nuanced issues in order to bring out the main findings. This summary should therefore be read in conjunction with the four individual city profiles, which provide a much more detailed analysis and will be available at www.lse.ac.uk/lsecities and www.globalmetrosummit.net

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First published by LSE Cities, London School of Economics and Political Science, 2010.

1 Introduction

A number of European and Asian metros have demonstrated sustained growth over the past two decades. Breaking free from their historical dependencies, they have overcome challenging crises in the past and demonstrate significant progress in economic development across their metropolitan regions. Following a rigorous process of selection, LSE Cities carried out in-depth research of four metro regions in the EU and Asia to identify metro regions that have shown resilience in the face of economic hardship. The study settled on Munich (Germany), Torino (Italy), Barcelona (Spain) and Seoul (South Korea), and sought to identify the processes, governance arrangements and interventions through which progress has been achieved.

In their own way, each of these metros has had to deal with periods of profound economic decline or uncertainty – due to a range of economic and political factors - but have found ways to respond to these challenges in a proactive and effective way. Torino, for decades a one-company town, suffered from the decline of the auto-manufacturer Fiat; Munich had to cope with the collapse of the Berlin Wall; Barcelona had to deal with decades of dictatorship and isolation; while Seoul had to respond to the Asian Crisis of the late 1990s and loss of competitive edge. Each of our metros is at a different point in its re-development cycle: for example, Munich's re-development dates back to 1945, while Torino's present development cycle is much more recent.

The aim of the study has been to provide city leaders, policymakers and practitioners in the US with valuable resources as they respond to the challenges posed by the current global financial crisis and develop their own next urban economy. This report summarises the main policy lessons emerging from this detailed work, acting as a companion document to the four metro reports.

Munich, Torino, Barcelona and Seoul each offer a distinctive lens on the next urban economy; none have been perfectly successful, but each has made decisive progress, out-performing their peers, and building more opportunities for future growth, trade, and job creation. Many of the experiences of these metros also underpin and reinforce knowledge that US metros already possess and have taken a lead on. These include the primary importance of a good business climate and environment for investment; connectivity and productive infrastructure; the essential entrepreneurial spirit and corporate presence that is the backbone of a dynamic economy; and the depth and range of anchor institutions.

In addition to these 'lessons from America', we can also now observe some key insights from our four metros in the EU and Asia that can contribute to our shared knowledge of the required platform for the next urban economy. These are:

- Active, aligned and intentional government with private sector and institutional partnership;
- Internationalisation, global positioning and trade;
- Knowledge economy, innovation-based entrepreneurship and modernisation of manufacturing;
- Strong link between human capital and attractive, distinctive cities; and
- Green economy, resource efficiency and decarbonisation.

The following sections define these elements, which appear to be both common to the experience in our four case study metros, and, at the same time, appear to add additional dimensions to the common economic development practices of US metros.

2
Active, aligned and intentional government with private sector and institutional partnership

2.a Active, aligned and intentional government

Overview

Each of our metros demonstrates the essential role of local and regional government (the tier between municipal and national levels) in sustaining, and at times leading, economic development. In addition to the need to foster a good local business climate and environment for investment, three other fundamental roles are observable:

1. Local and regional governments must act together across a metro/regional economy, building a common economic agenda and pooling their roles and competences around a single and shared future-oriented economic development strategy.
2. There must be a mutual dialogue between these metro/regional future-oriented economic development strategies and federal programmes and strategies, vertically integrating to the national level in order to better progress metro, regional and national development.
3. Governments must lead the process of economic investment with sustained financing for the productive platform of metros, focusing on hard and soft economic assets including through innovative investment instruments and financial institutions that combine both private and public sectors.

More than any other observable feature, progress in Munich, Seoul, Barcelona and Torino has come from aligning 'tiers of government' and 'cycles of government' around a shared economic strategy, and substantially raising the rate of investment in the productive platform of these metros.

Shared intentionality and strategy has been developed by local and regional political leaders from different parties (including those 'in power' and those 'not in power' working together). This approach has enabled a 'consensus strategy' to be built that endures for a whole business cycle, or even several, and is not subject to major changes with electoral cycles, providing stability and enabling long-term agendas to be pursued.

Multiple tiers of government have participated actively in such development strategies often including local, regional, national and supra-national entities (e.g. the EU), responding to an inter-institutional framework that incentivises collaboration and coordination between different tiers of government. Those metros and regions that have developed consensual and intentional strategy across their local and regional governments have been rewarded with more public investment than those that have not.

While this approach has been common to all four metros, each has pursued an integrated agenda in slightly different ways. These experiences offer US metros wishing to achieve greater institutional alignment a rich resource, and are thus set out in detail in the following pages, considering in turn setting up metropolitan and regional coalitions; achieving vertical and horizontal integration; delivering strategic planning; creating effective intermediary bodies; establishing innovative public finance vehicles; and introducing effective metropolitan level government.

Setting up metropolitan and regional coalitions of public, private and civic organisations

Munich's leaders have been able to build on a long tradition of close working across party lines, spatial levels and public and private sectors, from the City of Munich to the State of Bavaria. In turn, this builds on both a historic sense of Bavarian identity and the continuity of a politically unified State, and confidence in technologically-driven development.

Working across the public and private sectors has been a common theme in **Barcelona's** development throughout the past thirty years. Through joint ownership of consortia, Barcelona was able to effectively deliver major urban change programmes, combining private sector flexibility and financial freedoms with public sector resources and powers. By involving key private and public sector agencies in strategic planning processes, a broad coalition for change has been mobilised.

Achieving vertical and horizontal institutional integration

Torino city council and Piemonte regional government realised that they would need to work closely together in order to access substantial EU funding and investment: EU rules required proposals to be supported by both city and region. Civil servants rotated between the two organisations, facilitating knowledge transfer, and regional and city plans were aligned. Torino and Piemonte were highly successful in accessing these funds, both within Italy and within Europe as a whole: since 1989, the Piemonte region has received a total of over €2.5 billion funding for over 36,000 projects from the European Regional Development Fund and the European Social Fund (publicly co-funded locally). Most of this money was invested in strengthening the industrial production system and the regeneration of dismissed industrial areas, with significant amounts also spent on research, innovation and technology transfer and territorial assets.

Seoul has become much more effective at local implementation of national, centrally-led economic and urban policies. The Seoul municipal government, the Incheon municipal government and Gyeonggi provincial government had directly elected mayors and governors from 1995, who had their own visions and strategies for growth in the Seoul Metro Region (SMR). They effectively lobbied the national government of South Korea to lift restrictions on land development and foreign investment in Seoul, which were imposed to control excessive growth of Seoul at the expense of other regions. This allowed the development of industrial clusters in Seoul, such as the Guro Digital Complex and the Digital Media City.

Barcelona has become a model of collaborative and partnership working over the past thirty years, pioneering new approaches to governance by involving a wide range of actors in its strategic planning processes and in project delivery. The Strategic Plan Association, for example, was important as much for the way in which it was able to bring all relevant institutions together (including the Barcelona Chamber of Commerce, the Port of Barcelona and the University of Barcelona, in addition to the City Council), as it was for the plans that it actually delivered.

Delivering integrated strategic planning

Mayor Castellani realised early on that the transformation of **Torino** would require the involvement of a wide range of social, economic, political and cultural actors in the city. He recognised the potential of the strategic planning processes undertaken by cities such as Barcelona and Lyon (France), and called for an 'internal mobilisation' to inform a strategy for the economic revitalisation of Torino. Torino's first strategic plan was approved in 2000, and a new master plan was ratified in 1995. Both documents were highly influential in Torino's subsequent development, helping to create a climate and environment that enabled the region's innate entrepreneurial spirit to adapt to a changing global market.

Barcelona developed an overarching vision for the future of through collaborative and consensual strategic planning processes throughout the 1990s and 2000s. This includes a strong collaboration between the Autonomous Region of Catalonia which for decades has been controlled by the centre-right and regional nationalists, with the City of Barcelona has been solidly left-of-centre since the death of General Franco. Although specific objectives were adapted over the years, they continued to emphasise the need for Barcelona to occupy a strong strategic role in the Mediterranean region of Europe and to become a City of Knowledge, providing stability and clarity of vision. The shared vision and the links developed through the strategic planning process enabled Barcelona's transformation to be pursued through many different initiatives and by many different actors in an ambitious and experimental manner.

The Bavarian State and **Munich's** city leaders also developed a long-term vision for the city and wider region in the early 1990s – to raise innovative capacity, diversifying and greening the economy in the process. This vision has been implemented through a series of flexible, overlapping initiatives, and draws on the metro's historic economic and social strengths. The Bavarian State devised an economic development programme of unprecedented scale and duration, reinforcing the established political paradigm of fostering innovation.

Through a combination of industrial policy and spatial policy, the central government of South Korea successfully built the information and communication technology (ICT) sector in the **Seoul** Metro Region into a globally significant player. Supported by spatial planning acts such as the 1977 Industrial Placement Act and industrial policy acts such as the 1997 Special Measure for the Promotion of Venture Business and the Information and Communications Technology Industry Promotion Act, since the early 1990s, Seoul's tertiary sector has increased its contribution to the metro economy from 69.7% in 1990 to 83.5% in 2005.

Creating effective intermediary bodies, including public-private partnerships

Barcelona has made extensive use of municipal companies and public-private consortia to deliver its various programmes of urban change, from the delivery of the 1992 Olympic Games infrastructure, to the development of metropolitan strategic plans and the delivery of programmes to support Barcelona's economic transformation. This model has been effective in bringing different parts of municipal, regional and national government together in one body, resolving disagreements and avoiding problems of poor coordination, as well as involving key private sector actors, mobilising Barcelona's entrepreneurial, ambitious and cohesive business community to drive the development of the city and broader region together with state actors. For example, the local economic development agency Barcelona Activa, has been described by the OECD as a 'leader amongst its international peers' (2009, p.5). Its creation in 1986 marked a step-change in Barcelona's approach to employment and economic development, positioning new entrepreneurship at its heart. Barcelona Activa launched one of the first business incubators and seed capital funds in Spain, and later Europe's first online business incubator.

Munich has benefited from being the home of a number of leading public research bodies, such as the Max Planck, Helmholtz and Fraunhofer Institutes. The Fraunhofer Institute is an early example of the Bavarian State's proactive policy approach: established after the war as an initiative by the Bavarian Economic State Secretary, and predominantly active in Bavaria, it later grew into a national institution. Set up to drive applied research and innovation, it also serves as an important tool to leverage substantial private investment in R&D. These groups have helped deliver the vision, through R&D and public-private collaborations. Munich has also set up new agencies such as Bayern Innovativ, designed to foster technology transfer between researchers and SMEs.

In order to respond to the new strategic plan, the governments of **Torino** city and the Piemonte region restructured previously existing agencies and created new agencies to foster economic development, internationalise and modernise the local productive base. These include for example 'Invest in Turin and Piedmont', and 'Turismo Torino' (Torino Tourism), which have promoted a series of ad hoc initiatives to attract foreign direct investment and stimulate tourism in Torino and Piemonte, and which later merged with the international branch of the Piemonte Chamber of Commerce to form 'Centro Estero Internazionalizzazione Piemonte' (the Piemonte Agency for Investments, Exports and Tourism).

Establishing innovative public finance vehicles

As noted above, **Torino** and the wider Piemonte region received a significant level of public funding from EU Structural Funds, including the European Regional Development Fund, since 1989. In 2007, the financial activities of the Piemonte Region were restructured. Finpiemonte, the regional financial institute set up in the 1970s, was split into two companies: Finpiemonte and Finpiemonte Partecipazioni, the former being a development agency offering grants for economic growth and the latter a mixed capital venture, where the majority is owned by the regional government. Finpiemonte Partecipazioni now boasts a portfolio of 33 joint ventures, including 'Torino Nuova Economia' (Torino New Economy) involving regional, provincial and city governments and Fiat, which is responsible for re-developing part of a Fiat plant for the new economy, including a design centre linked to the Politecnico di Torino, Italy's leading technical university.

In **Barcelona**, land values have been successfully leveraged to provide the finance for urban change programmes. In the case of the 22@Barcelona innovation district, for example, two new land use classifications were created connected with the knowledge economy, and density restrictions were raised in order to incentivise development and to subsidise infrastructure investment.

Munich is the capital of the region of Bavaria. The LfA Foerderbank Bayern is Bavaria's State Bank, founded in 1951 to finance the post-war economic rebuilding, has played an important role in the restructuring process towards an innovation-driven high-tech economy, in Bavaria in general and in Munich in particular. Bavaria's most prominent public financial instrument, BayernKapital, is a 100% subsidiary of LfA. Founded in 1995, it provides venture capital for high-tech start-ups and is a pioneering instrument in the German context, since replicated by several other States.

Introducing effective metropolitan-level government

In the four case study metros, although directly elected metropolitan governments have not always been the norm, there have been many productive examples of effective metropolitan partnership and strategic planning (as described in Section 2.a), as well as effective collaboration between local and regional governments. Barcelona, Munich, and Torino have wider regional governments (Catalonia, Bavaria, and Piemonte) that have important micro-economic instruments at their disposal. In the case of the Seoul Metropolitan Region (SMR) it consists of the Seoul Metropolitan Government, Incheon Metropolitan City Government and Gyeonggi Provincial Government, all of whom have equal powers. The combination of regional governments, with strong economic instruments and resources acting in concert with local governments that have place-making powers and objectives lies at the heart of the European case studies.

Although tensions between Catalonia and **Barcelona** led to the abolition of a Barcelona metropolitan authority in 1987, public actors have displayed willingness and capability to work collaboratively on strategic projects, achieving horizontal and vertical integration on individual projects. The city and the region are now in agreement about the need for an integrated metropolitan body again, in order to address infrastructure deficits at a metro scale and to realise the competitive potential of the metro internationally.

In **Munich**, formal metro governance institutions do not exist. Rather, strategy has been led from above by the Bavarian state (regional) government and below from local city government. A clear sense of common purpose has driven policy forward, which in turn derives from close networks between public and private sectors; strong and stable public institutions; and, political leaders (of all parties) committed to investing in technology and innovative capacity.

The formalisation of the **Torino** Metropolitan Area is not yet apparent. A National Law for the creation of the Metropolitan Area of Torino, was approved in 2000, but a metro government is not yet operational. Nonetheless, economic transformation was achieved through close cooperation between the municipalities and regional authorities. Political consultation, consensus building and aligned interventions between these two tiers of government have generated a stable political environment, which was a key success factor in the winning of the Winter Olympics in 2006.

Focusing on the longer-term to achieve lasting change and transformation

Barcelona has consistently looked beyond its immediate challenges and opportunities. Mayor Pasquall Maragall was instrumental in realising that the 1992 Olympic Games alone would not be sufficient to secure Barcelona's long term economic future, and in initiating one of Europe's first strategic planning processes. Backed by a strong political mandate for change, Barcelona's leaders have been able to pursue long-term projects such as the upgrading of crucial connectivity infrastructure, providing the stability, consistency and commitment needed to deliver them.

In **Munich** there was a clear sense that economic transformation was a long term process. Programmes were future-focused, and even now aim to stimulate investment in 'future technologies' such as high-speed fibre optic networks and infrastructure for electric cars. Public leaders have been committed to technological investments even when these have been politically unpopular (for example, aspects of biotech and nuclear power).

In **Seoul**, the emergence of the ICT sector in the Seoul Metropolitan Region (SMR) has been closely related to the central government's long-term strategic plan to promote the semiconductor industry, which dates back to the late 1960s. There were three major involvements of the central government in promoting the semiconductor industry: (a) the first was the Electronics Industry Promotion Law enacted by the Ministry of Commerce and Industry (MCI) in 1969; (b) in 1976, the central government supported the creation of the Korea Institute of Electronics Technology (KIET), which conducted research into semiconductor design, processes, and systems; (c) the central government spearheaded the 'Very Large Scale Integration' (VLSI) research consortium in the mid-1980s when the overlapping investments of three Korean major semiconductor producers were reinforcing inefficiency in the sector.

Overall impact of active, aligned and intentional government

The overall impact of having active, aligned and intentional government for our metros in the EU and Asian metros has included:

- Increased attention to, and knowledge of, the external environment and market for the metro amongst public officials;
- A clear and consistent story about the future, even when the present is tough;
- Increased public investment from multiple governmental sources, and through public financial intermediaries;
- More effective leveraging of partnerships with businesses and institutions, with business leadership groups within the region playing a critical role as guardians of an ambitious future vision and as key informers of the contents of strategy;

• Enhanced coordination acting to improve the business climate, despite fragmented jurisdiction; and

• Longer-term thinking through political cycles and between tiers of government.

By pursuing active, aligned, and intentional government, our metros have avoided problems of coordination failure, excessive path dependency and a low investment/low return equilibrium.

2.b Private sector and institutional partnership

Overview

The second aspect of this lesson from our metros in the EU and Asia is the character of private sector and institutional partnership developed in each context. As mentioned above, an important benefit of active, aligned and international government is that it can effectively leverage greater partnerships arrangements from non-governmental players including business, institutions, and civic organisations.

Each of the four case study metros demonstrates the importance of effective private sector leadership and partnership. Three fundamental roles are observable:

1. Business leaders, industrial unions and research institutions must be empowered and facilitated to play leadership roles in metros' transformation processes, driving innovation within and between their institutions and sectors.
2. Public sector agencies and governments must work together with private sector actors, engaging them in collaborative planning processes, involving them in formal institutions, and pursuing individual strategic alliances and innovations.
3. Private investment and innovative financing models must be used to accelerate metro development, working in partnership with universities and public agencies to combine public and private sector strengths.

This active business and institutional partnership has worked in a variety of ways in each of the four metros, as demonstrated below, creating powerful coalitions for change.

Sustaining collaborative governance and the reinforcement of a productive business climate

In **Torino**, former Fiat automotive suppliers led processes of transformation by seeking out new international clients and diversifying into new sectors, with highly positive results for the industrial sector These processes were supported and enhanced by other local actors, including the local Union of Industrialists, the Politecnico di Torino and bank foundations, as well as the city and regional governments. City and regional governments went on to play an important role in developing the environment – and in some cases providing the financial resources - for the changes pursued by other economic actors to accelerate, flourish and spread.

The Paju LCD cluster in **Seoul** has successfully emerged as the result of the continued strategic cooperation of global firms, central government, and local governments (Lee and Huh, 2009). It is clear that the strategic requirements of each key stakeholder can only be met when a healthy state of cooperation is maintained. As a result, the needs of the transnational corporation (such as LG Philips), which aims to extend its production sites and increasing its business markets, the central government's interests in enhancing national competitiveness, and the local governments' interest in boosting regional economy have led to successful strategic cooperation among them.

Fostering institutional leadership

The Polytechnic University of **Torino** has emerged as a key anchor institution in the advancement of the urban economy of Torino. With an estimated economic impact of €636 million linked to its activities, this institution has been a crucial player in: (a) attracting global foreign firms such as General Motors, JAG (China's second biggest car manufacturer), Microsoft and Oracle to the 'University City', a new 170,000 square metre university campus developed in a centrally located dismissed industrial area; (b) brokering between foreign firms and the municipality of Torino; (c) offering tailored educational courses to upgrade local skills and human capital; (d) promoting business incubator programmes, for example IP3, which has facilitated the start-up of 122 companies since 1999; and (e) increasing the number of foreign students, especially from China, who establish strong links with the city's economic base and develop bi-lateral business opportunities.

The Unione Industriali di **Torino** has also played an important leadership role in driving forward Torino's economic diversification and internationalisation. It is a voluntary association of companies in Piemonte, made up of around 2,000 companies with a total of some 200,000 employees, with 30 subsidiaries in particular sectors (Associazione di categoria), for example, automotives and steel manufacturing. It promotes the interests of local industries, works together with other public and private organisations to encourage Torino's development, and provides a range of services and opportunities for local businesses. Its activities have included international trade missions, which enable its mainly SME membership (85% are small and 13% are medium-sized) to access international markets and foreign investors, and a Mechatronics Pole to develop local mechatronics capabilities to operate in international research programmes and in international markets, by funding R&D projects and facilitating networking and collaboration between different mechatronics clusters.

Sustaining levels of private investment and increasing financial innovation

The Future Bavaria Initiative in **Munich** has three overlapping activities: (a) investments in 'knowledge' infrastructure; (b) knowledge transfer, and a 'public venture capital'; and (c) high-tech firm formation. Funded through the sale of government-owned shares in a range of enterprises such as the region's energy company, this €2.9 billion initiative ran over 80 individual projects including the construction of eight new polytechnic colleges and seed funding to over 450 innovative (but risky) start-ups through subsidies and low interest loans.

As noted above, **Munich** is also home to Bayern Kapital, a pioneering instrument in the German context, since replicated by several other States. It attempts to fill in the gap in the financing of newly founded high-tech companies

whose products have not yet reached a sufficiently marketable stage to have access to much needed seed-capital in the private market

Torino's bank foundations, especially Compagnia di San Paolo and Fondazione Cassa di Risparmio di Torino, have played a crucial intermediary role between Torino's university system, businesses and private capital, thus facilitating investment, innovation and effective marketisation in sectors such as sustainable mobility and ICT. Between 2001 and 2005, they invested a total of €380 million in Torino, sponsoring new research and innovation institutes.

Fostering a shared innovation system and productive business environment

At a city level, Barcelona Activa has played an important role in **Barcelona's** transformation by creating spaces and networks through which entrepreneurs can gain advice, information, make contacts and access start-up funding and other resources. In 2007, it supported the creation of 700 companies (generating 1,500 new jobs per year) and provided advice and monitoring to almost 1200 businesses. Four years after entering Barcelona Activa's business incubator, businesses have a 84% survival rate, employ 9.8 staff on average and have an average turnover of €980,000. According to the OECD, Barcelona Activa is no longer seen as an institution to 'help entrepreneurs', but rather as a 'facilitator for growth' (2009, p.50).

In **Munich**, an active, enabling state has coordinated economic development, with significant assistance from public research agencies like the Fraunhofer Institutes. Within this framework, a number of leading private companies have played important business leadership roles, in particular BMW and Siemens. Evidence shows these firms have a 'halo effect' on the metro's smaller R&D intensive firms, engaging them in collaborative R&D activity and via supply chain relationships, both as customer and as client.

Institutions such as **Munich's** Chamber of Commerce and Industry (CCI) play an important role in informing public policy and providing a platform through which the business sector and government communicate. These are statutory in the German context – that is, every business has to be a member of its local CCI. In Munich, unlike several other regions in Germany, the boundaries of the association coincide with political boundaries, thus facilitating communication and allowing the chamber to bring its full weight into play. The Munich CCI is the biggest in Germany and the second biggest in Europe, just behind Paris. One of the policy matters it seeks to influence is the strategic direction taken at the universities, such as the modernisation of the curriculum or the establishment of new faculties. Overall one might say that the CCIs are trying to strengthen commercial awareness and a job-world focused education in a traditionally more aloof academic environment.

Overall impact of business and institutional partnership

With active, aligned and intentional government in place our four metros have been able to leverage effective business and institutional partnerships. The overall impact of this has included:

- Non-governmental reinforcement of inter-governmental working and consensus;
- Clarity about sector opportunities and priorities;
- Shared investment and joint venture between public and private sector;
- Attraction and retention of business partners;
- Rapid and close diffusion of intelligence, knowledge and know-how between public and private sectors on competitive environment, innovation, and next economy agendas; and
- Improved advocacy for external investment.

By pursuing private and institutional partnership these metros have been able to maintain inter-governmental consensus, set appropriate sector and cluster priorities and understand the competitive environment effectively.

3
Internationalisation, global positioning and trade

Overview

Each of our metros demonstrates the value of embracing and enhancing internationalisation, in order to compete effectively in international markets. Three fundamental roles are observable:

1. Metros must take advantage of opportunities to reposition themselves towards emerging economies through adapting their strategic connectivity infrastructure for a changing international market and building new relationships with key players in these markets.
2. Public institutions and industrial bodies must work together with firms and research centres to adapt to changing international conditions, diversifying into new sectors and expanding into new markets by acting together at scale and building productive connections between business, research institutes and public agencies.
3. Local and regional governments must make use of effective institutions, promotional platforms and international events to build their reputation abroad, in order to attract tourists, international entrepreneurs, foreign investment and international institutions to their metros.

The dynamic process of political and economic change in both Europe and Asia since the end of World War Two has accelerated rapidly in the past 20 years. The emergence, growth, and enlargement of the EU has paralleled the evolution of the Asian 'growth spurt' and development of ASEAN and substantial cross-border economic development activity in Asia. These phenomena have reduced barriers to trade, and increased both labour mobility and capital flows, between countries within both Europe and Asia.

They have offered substantial opportunities for metros to redefine their 'offer' and their 'advantages' in a rapidly internationalising environment, breaking free from older established roles within domestic economies. As mobility has increased, former 'national urban hierarchies' have been dissolved, as capital has been more free to cluster in some places rather than others and metros have been more free to compete for investment, population, visitors and knowledge. This has created a great spur for intentional metro economic development activity.

Each of the four metros - Seoul, Munich, Barcelona and Torino - has undertaken programmes of accelerated internationalisation of their economies over the past 30 years, reinforced both by policy cycles and by market investment, preparing them very well to succeed in the more open global era in which all metros now find themselves. In effect, European and Asian continental economic integration has prepared these metros for a more global system by requiring them to embrace internationalisation much sooner, and seek opportunities in emerging markets within their own continent. This has enabled them to be globally oriented in their economic strategies and to know how to navigate growth patterns in other markets.

The metros have developed specific activities to make the most of new global opportunities, as detailed below. These experiences offer metros in the US and elsewhere valuable insights as they seek to adapt to the ever-evolving international markets.

Global repositioning towards emerging markets

The development of connectivity infrastructure has been a fundamental part of plans to secure **Barcelona's** place in Europe and the world and to become a City of Knowledge since the late 1980s. Successive strategic plans have continually emphasised the importance of investing in the metro's port, airport, roads and rail network in order to increase the capacity of its firms to compete in international markets, and to secure Barcelona's international position. For example, the changes proposed in the 1994 'Plan Delta' will enable the Port of Barcelona to double in size, and are estimated to have an impact on the wider Catalan economy equivalent to 1.7% of Catalan GDP when complete. By joining up this expansion with much improved connectivity and logistics services, as well as a growing network of inland terminals, the Port of Barcelona is seeking to challenge some of the better-established ports of Northern Europe such as Rotterdam and Hamburg, and to capture an increasing proportion of traffic between Europe and Asia. Likewise, high speed rail is seen as a critical element in establishing Barcelona's position as the capital of the Mediterranean and an internationally competitive economic centre. A high-speed rail link to Madrid has been in operation since 2008, cutting travel time between the two cities to just two hours and 38 minutes. The forthcoming link to the French high-speed rail network will bring several south-western European cities within four hours of Barcelona, such as Lyon, Marseille and Bordeaux in France, Genova in Italy and Geneva in Switzerland.

The new **Munich** Airport, which opened in 1992, had been in the making for several decades, while the cold war was still in full swing and no-one expected the fall of the Iron Curtain. It was thus a lucky accident that its completion coincided with the opening of the markets of Eastern Europe and the rising economic giants in Asia. It certainly came at the right time for Munich, which found its location in the global political and economic geography being repositioned. In the competition for the most important 'gateway city' to the East, the airport provided an important advantage for the city, which now serves as a prime East-West node, outperforming both Vienna and Berlin.

Trade and export promotion

Exports have been a key ingredient of **Torino's** economic transformation and recovery. Both public and private institutions have been important in helping firms expand into new markets, especially the Unione Industriali, Torino Chamber of Commerce, and 'Centro Estero Internazionalizzazione Piemonte' (the Piemonte Agency for Investments, Exports and Tourism, or CEI). The Unione Industriali has organised trade missions, enabling its mainly SME membership (85% are small and 13% are medium-sized) to access international markets and foreign investors, and provided useful services to individual companies, such as disseminating studies and analysis of foreign markets and providing information to assist members in accessing regional, national and European research and investment opportunities. CEI and the Chamber of Commerce have also developed a range of programmes, including From Concept to Car (initiated in 2003 to strengthen innovation and

internationalisation amongst 152 selected local automotive suppliers), Think Up ICT (initiated in 2007 to promote Torino's expertise in ICT abroad, involving approximately 80 ICT firms) and Torino Piemonte Aerospace (initiated in 2007 to promote the Aerospace district in an international context, involving approximately 70 aerospace firms). Each of these programmes has generated important international orders for Torinese firms: in the case of From Concept to Car, for example, an investment of €4.8 million generated €41.8 million in export sales for the companies involved. While the total turnover of new business generated is relatively modest, the initiative established a new culture in the industry which has had widespread benefits in securing new work.

Overall, Torino's exports increased continuously in the 2000s, reaching almost €19 million in 2008. The EU still represents the main destination of Torino's production and services. However, exports towards Brazil, China and other emerging economies have been increasing steadily in percentage terms over the past few years. For example, Chinese imports from Torino increased by 3.8% in 2009 despite the current economic climate.

Barcelona's ambition and foresight in maritime trade is complemented by the export policies of agencies such as ACC1Ó, the Catalan innovation and internationalisation agency, and the Barcelona Chamber of Commerce. ACC1Ó runs a network of 35 business promotion centres and 19 business platforms, which offer services to exporting firms, including market analysis, identifying contacts, logistical and practical support, and quick and inexpensive overseas office space, enabling SMEs to more effectively access international markets. Barcelona Chamber of Commerce has, for example, signed collaboration agreements with MIT and Silicon Valley's Plug and Play Tech Centre, providing opportunities for Barcelona researchers and innovators in the US, as well as developing strategic relationships in emerging economies and sectors through programmes such as China Correspondent and Business Bridges.

Catalonia is Spain's leading export region, responsible for an average of 23.4% of the country's exports over the last ten years, and growing at an annual rate of 5.5% between 2000 and 2008. Exports represent one third of Catalan GDP and 16% of Catalan firms are regular exporters (Chamber of Commerce of Barcelona, 2010). Medium-high technology exports increased significantly during the late 1990s, while high technology goods also increased throughout the 1990s and 2000s, albeit from a lower base.

Attracting foreign investment and international institutions

The promotion of **Barcelona** to international investors and international businesses has been a key task of the City Council and the Government of Catalonia, through platforms such as 'Do it in Barcelona' and 'Invest in Catalonia'. Today, Barcelona has an enviable international reputation and brand. It is the fourth European destination for international investments and for business and has been the top European city for quality of life since 1998 (European Investment Monitor, 2008; European Cities Monitor).

In 1998, the South Korean government lifted the restrictions on foreign investment in Korean venture capital partnerships and adopted various measures to increase tax benefits for venture capital. This gave foreign investors the opportunity to support the growth of new firms in **Seoul**, particularly in the ICT sector.

In the case of **Munich** it is the Regional State Government that plays the major role in promoting FDI as well as the export orientation of local businesses. Beginning in the 1990s, the Bavarian government established more than 20 representation offices all over the world advising native businesses on export opportunities abroad as well as networking with investors abroad and advertising the location Bavaria.

The Piemonte Agency for Investments, Exports and Tourism was the first Italian agency dedicated to strategic internationalisation. Together with the Politecnico di Torino it played a crucial role in the internationalisation process of local economy clusters in **Torino** and the wider Piemonte region. Over 660 foreign companies have invested in Piemonte, the second highest rate of FDI inflows in Italy.

Using international events to spur new international interest

Barcelona's use of major events to shine an international spotlight on the city and to drive its economic development dates back way beyond the 1992 Olympic Games – in 1929, for example, it hosted the World Exhibition. The 1992 Games achieved unprecedented success in attracting private investment, securing the basis for Barcelona's transformation.

Since hosting the Winter Olympics in 2006 **Torino** has consistently invested in mega event infrastructure and the city's branding capacity. In 2006 Torino became World Capital of the Book and in 2008 World Design Capital. Moreover, the city leveraged on its leadership position within the design sector, and in 2004 was chosen to host the offices of the ICSID (The World Industrial Design Association) and ICOGRADA (the World Graphic Design Association). The re-discovery of Piemonte's culinary traditions through the 'slow food' movement has now become a global phenomenon and a trademark of Piemonte, especially through its major international fairs, Salone del Gusto (Taste Fair) and Terra Madre (Mother Earch). The most recent Salone del Gusto in October 2010 attracted an estimated 200,000 visitors.

In **Seoul**, there has been a recent trend of delivering large-scale exhibitions and hosting major international events in order to raise the global profile of the Metro Region and stimulate tourism and investment interest. Seoul has hosted two FIFA World Cups and the Olympic Games since 1985, as well as hosting the Ceramic Biennale, the International Sky Leisure EXPO and the Korea International Boat Show.

Encouraging international tourism to create jobs and build identity, and celebrating cultural and linguistic diversity to be visible as an open and 'international' city

Tourism has proved to be not just an industry but also a mechanism for opening up a metro to international talent, events, and investors, and building a visible brand and identity in international markets.

The Olympic Games in 1992 delivered a big boost to **Barcelona's** international reputation and to its appeal as a tourism destination, not only through the international exposure that accompanied the Games, but also the significant investments that were made in its natural, cultural and infrastructural assets, particularly the reclamation of the waterfront and 4.5km of beach. This success was sustained through the creation of the consortium, Barcelona Tourism, which developed and delivered Barcelona's tourism programmes, and through the sustained investment in infrastructure, especially hotels and airport capacity. From attracting less than 700,000 tourists in 1981 and 1.8 million in 1992, in 2008 Barcelona attracted over 6.7 million visitors. Barcelona earned the title of European city with the highest tourism growth rate, with tourism growing by more than 100% between 1990 and 2001.

Tourism has long been an important part of **Munich** life and a significant contribution to the city's as well as the region's economic success. With around seven million overnight stays annually (Stadt Muenchen, 2004), in equal parts made of business and tourist visits, the city uses its natural as well as cultural assets strongly to tout its position in the world. The popular motto of 'Laptop and Lederhosen' often used by politicians in the context of Bavaria also sums up the Munich city-marketing strategy as being both a location of serious business as well as one of rustic charm. The city's soft location factors play an important role in attracting and maintaining highly skilled people, as confirmed by local business representatives and public officials. In addition, the (in)famous Oktoberfest has to be one of the city's most successful marketing assets, drawing visitors from around the globe and rendering Munich one of the best-known German cities in the world.

These days **Munich** presents itself as an internationally-oriented city with a diverse population, welcoming visitors and new citizens from all over the world alike, combining a strong Bavarian identity with a global outlook. Only a few decades ago, however, the picture was a very different one, with the city maintaining a much more localised orientation. According to Prof. Thalgott, retired head of planning of Munich, hosting the Olympic Games in 1972 had a strong impact on opening up the city to the world as well as inducing a positive attitude of the population towards 'modernisation'.

Local actors in **Torino** have focused their efforts in improving the city's international image, and fostering tourism. Sviluppo Piemonte Turismo for example, is an agency set up to market the international image of Torino, especially within the mega-events hosting. The number of tourists visiting Torino increased significantly in past years, from 1,050,047 per year in 2002 to 1,482,822 in 2008. Nonetheless foreign tourists decreased steadily from 2005 onwards, and there is no evidence, at least in Torino's case, of a significant impact on jobs.

As a means to foster new businesses and create employment within the Province of Gyeonggi in Seoul, the government is providing targeted support to the tourism sector. Amongst other interventions, tours of the de-militarised zone and agricultural villages are being promoted.

Addressing the international dimensions of the knowledge economy

Major local development projects such as the creation of new facilities in IT, Science, Culture, Medicine, Media have had a distinctive international orientation, designed to attract international audiences, or users, and appeal to international markets.

Barcelona and Catalonia have long made use of cluster initiatives to drive the development of priority growth sectors, such as energy, logistics, media, biotechnology and ICT. These cluster policies have made explicit use of the Barcelona brand, leveraging this to attract international investors, businesses and workers. The 22@Barcelona innovation district is a good example of this, with housing and work spaces being intermingled in a highly walkable district, attractively located near the waterfront and the new high-speed train links, in order to appeal to a young, mobile and international workforce. Most recently, the Barcelona Economic Triangle has been used to provide a single promotion platform for three of the most strategic clusters in the metropolitan region. Together, these three areas provide seven million m2 of land with the potential to generate more than 200,000 new jobs. The Barcelona Economic Triangle brings together the relevant municipalities and regional government with other players, and makes effective use of the Barcelona brand to attract international investment and businesses.

In **Munich**, economic development strategies for the past two decades have sought to develop a strong presence in life sciences, and then to help growing firms embed themselves in global markets. Initial investments focused on R&D in universities and public research bodies, then on technology transfer, then on marketing and promotion assistance. A number of policy instruments focus on promoting the internationalisation and export-orientation of SMEs in particular by reducing the barriers to entry in the international market. 'Low-key' interventions such as establishing a joint presence at trade fairs are effectively used and continuously refined in close collaboration with the businesses targeted. More recently, Munich firms are embarking on a similar internationalisation process in 'cleantech' goods and services, particularly green energy and electric vehicles.

Overall impact of internationalisation, global positioning and trade

The overall impact has been that these metros have all seen substantial increases in the numbers of foreign tourists, students, and convention visitors, the numbers of high and medium skilled immigrants arriving, and the numbers of foreign owned companies locating within the metros.

As well as these 'inward investment' effects, our four metros have also seen international markets for their products grow and exports increase, and in addition their roles as ports, gateways, and hubs (at varying geographical scales) emerging and increasing. Equally, many have engaged in international R&D and innovation oriented collaborations. Export growth has been an important aspect of how these metros have internationalised but has not been the sole factor: the combined effect of the different elements

has been mutually reinforcing.

Encouraged by continental economic integration, our case study metros have orientated their strategies to be attractive for international firms, talent, and investors. They have become more global in their orientation, multi-lingual, and open to flows of people, capital, goods, and ideas. The four metros have seen the need to be attractive and competitive, in order to win shares on international markets, recognising their underlying assets and opportunities. They have succeeded in building distinctive images and offerings, designed to appeal to multiple global audiences, rather than remaining stuck in historical positions within national urban systems and hierarchies.

4
Knowledge economy, innovation-based entrepreneurship and modernisation of manufacturing

Overview

Each of our metros demonstrates the value of pursuing the transition to a knowledge and innovation based economy. Three fundamental roles are observable:

1. Metro governments must make use of strategic planning processes to establish the need for economic transformation, to identify priority growth sectors, and to provide a vision around which specific interventions can be pursued.
2. Public institutions, working together with key industrial actors and anchor institutions, must support and enhance the efforts of economic actors to modernise and innovate, investing in R&D and start-ups, promoting entrepreneurship and creating inter-institutional networks and programmes that facilitate joint learning and innovative partnerships.
3. Governments at all levels must play a role in creating the environment from which new industries can evolve and emerge, by investing in new facilities and infrastructure and re-modelling out-dated industrial land.

The framework for economic development in the EU and Asia has emphasised the transition to a 'knowledge-based' or 'knowledge-led' economy for over a decade now. This has focused on the modernisation of traditional industries with innovation in processes and products, as well as the growth of new knowledge-intensive sectors. Metros and regions have been encouraged to recognise that, in the new integrated global economy, they could not compete on price with rapidly emerging markets and nations, and must, instead, compete on the basis of modernisation, skills, science, creativity and innovation. This policy message has been backed up by substantial public investment, and has also been reinforced consistently by private sector players in their interactions with metro governance representatives.

For example, the creation of innovative regions has been a key priority in Europe as part of a decade-long move towards an 'information society', supported by EU regional programmes and the European Investment Bank. It has also been actively supported by national policies in Germany, Spain, and Italy, and by regional governments such as Bavaria, Catalonia, and Piemonte. In South Korea, the foundation of national economic development strategy has been technology and innovation-led investment in electronics, digital media and clean-tech industries.

These national and supra-national frameworks have helped to drive context-specific programmes and initiatives in each of our four metros, some of which are illustrated in the following discussion.

Delivering a knowledge-led economy through strategic planning

The strategic planning processes of the 1990s and 2000s were critical in establishing the need for economic transformation in **Barcelona** towards the knowledge economy. Sectors such as design, biotechnology, logistics, media and aerospace have been promoted through the Barcelona brand and incentivised through strategic cluster initiatives. Most recently, the platform, Barcelona Economic Triangle, has been used to provide a common promotion platform for such initiatives at three strategic clusters in the metropolitan region.

In **Torino's** Strategic Plan of 2000 design was identified as one of the clusters to be developed and promoted. Now the design-related economy in Piemonte has acquired the status of an economic sector on its own referring to producers and users of design content and services, directly generated or acquired from third parties (B2B); it includes the traditional activities relating to production of services or objects and more innovative activities of experience design or cultural design with reference to the tourism, cultural and food and wine sectors. A set of institutions, education facilities and professional bodies such as the Politecnico, the IAAD (Institute of Applied Arts and Design) the IED (European Institute of Design) and the University of Gastronomic Sciences, are part of a network of actors that has a constant and fruitful relationship with the local SMEs and large firms.

Through its Creative Industry Promotion Program, the **Seoul** city government has pursued an industrial policy that promotes creative industries as the new engine in the knowledge-based economy. In 2007, the city government designated six creative industries as the new growth engines: tourism; design and fashion; digital content; conventions; research and development (R&D) in information technology (IT), nanotechnology (NT), and biotechnology (BT); and financial and business services.

In the case of **Munich**, three key programmes were initiated by the State of Bavaria, both to secure the competitive position of the metropolitan region's existing firms and to engage with new ideas and new technologies: the Future Bavaria Initiative, the High-Tech Initiative and the Cluster programme. Munich's institutional thickness – including strong and stable public institutions, productive public-private partnerships, political leaders committed to investing in technology and innovation and a common purpose and flexibility – has been an important factor in the success of these programmes.

Fostering innovation

Munich's 'active state' has been crucial in delivering on the metro's long term economic objectives. In growing a green economy, in particular, it is essential to shape markets, foster long term investment and generate public demand. Munich's economic development vision is innovation-centred, and aims to help the metro 'stay ahead', maintaining its position as a high-tech, ideas-rich city. During the 1990s, state and city leaders took steps to renew the metro's innovation capacity, building on long term strengths in high-value manufacturing, and diversifying into new 'game changers' such as life sciences and green industries.

Interventions centred on (a) heavy investment into science, technology and education; (b) strengthening existing networks between public, private and research communities; (c) establishing new institutions to promote innovation, entrepreneurialism and foreign investment, namely Bayern Innovativ, Bayern Kapital, and Invest in Bavaria; Bayern Innovativ was set up in 1995 in the context of the Future Bavaria Offensive to promote cooperation and networking between actors in business and research, and does so by setting up working groups, organising congresses, connecting individual partners and more; (d) re-using inner-city brownfields created by restructuring processes as

well as wider political dynamics (retreat of the American forces in the 1990s), thereby turning a threat into an opportunity, and creating new spaces for growth, such as the Garching and Martinsried clusters.

As Fiat increasingly focused its research and training activities on its own internal processes rather than on its wider suppliers as it underwent restructuring processes, a range of new urban actors emerged in **Torino**, utilising and building on the skills and training resources developed by Fiat. Firms themselves adapted to the new conditions they faced, and the bank foundations and the Politecnico di Torino became increasingly important, as they shifted from their traditional roles towards much more active roles as intermediaries between researchers, the private sector and the government. Local authorities in Torino and Piemonte regional government played an important role, turning the failing 'technology poles' into 12 more effective 'innovation poles', forming a regional system of innovation that would also encompass the new relationships being formed by the Politecnico and the bank foundations as well as by individual firms and industrial bodies.

Promoting entrepreneurship

According to the OECD, Barcelona Activa has been one of the most important actors in **Barcelona's** transformation from an industrial economy to a knowledge economy over the last thirty years. From a small business incubator hosting 16 companies in 1986, it now runs a range of initiatives to promote entrepreneurship, including providing spaces for networking and collaboration, as well as running services and programmes for entrepreneurs.

By investing into setting up a city-wide high capacity telecommunications infrastructure **Munich** is taking a big step in supporting 'garage entrepreneurialism', in particular in the media industries – one of the most prolific sectors of the Munich economy. Both individual entrepreneurs as well as small enterprises will benefit from an infrastructure currently available to large companies only. Also see comments on Bayern Kapital below.

In 1997, the South Korean government launched its own venture capital funds and established a programme to provide match funding for venture capital. This contributed to the development of the ICT cluster in the Gangnam areas of **Seoul**.

Entrepreneurship in **Torino** has been driven by a wide range of actors, starting with businesses themselves and aided and enhanced by government, universities, bank foundations and business groups. The business incubator I3P, for example, is a not-for-profit joint-stock consortium made up of the Politecnico, the Province of Torino, the Chamber of Commerce of Torino, and the City of Torino. I3P has facilitated the start-up of 122 companies since 1999, helping to make Piemonte one of the top-performing Italian regions in terms of spin offs from incubators. Piemonte is now developing a regional innovation system, based around 12 innovation poles.

Modernising manufacturing industries and diversifying supply chain activities

In **Torino**, suppliers of the automotive sectors have diversified their production to meet new, diverse needs and serve international markets. Some firms continued to supply Fiat, but changed the nature of their businesses, 'learning by doing' as Fiat devolved productive and then design capabilities to its suppliers, while others applied their technical knowledge and capability to new sectors, such as aerospace and rail transport. These adaptations spread to many firms, as suppliers learned best practices from each other and from foreign firms who relocated to Torino. In addition they shared knowledge, dropped out-dated techniques and products, and merged or split up according to market mechanisms. This evolution was aided by other actors, such as the Politecnico di Torino, which adapted its courses and research to the changing economy and has been a key factor in major firms' decision to locate in Torino, including General Motors, Motorola and JAC, China's second largest car manufacturer. Other city and regional government initiatives, such as the innovation poles and the sector-specific programmes such as *From Concept to Car*, and *Torino Piemonte Aerospace*, have also been important in encouraging diversification to spread.

From October 2009, Samsung Electronic Corporation (SEC) in **Seoul** began pursuing a cluster strategy whereby it has re-named its complexes located in Suwon as the 'Samsung Digital City'. Though this cluster was a success before it was renamed, the concentration of ICT plants and activity in the Samsung Digital City has created huge demand for R&D support and supply chain activity. SEC now employs around 21,000 workers in the Suwon complex, of which one third are R&D workers. Its first and second tier suppliers in Suwon also provide more than 10,000 jobs (Nam, 2009).

Promoting investment into cutting-edge science and technology facilities and infrastructures

The Barcelona Economic Triangle encompasses seven million square metres of land for knowledge-intensive activities in the **Barcelona** Metro Region, with the potential to generate more than 200,000 new jobs. It is formed of three sets of clusters, which include a number of cutting-edge facilities as well as major strategic transport infrastructure. The ALBA Synchrotron Light Source, the cornerstone of the energy cluster, Parc de l'Alba, is a new-generation synchrotron (electron accelerator), and the largest scientific installation in Spain.

In **Munich**, State as well as local actors have time and again displayed a strong capacity in winning federal funding for existing research institutions or for the development of new institutions and the carrying-out of innovative pilot projects, which contributed to pushing the metro economy forward. These successes were supported by the collaborative capacity and broad goal alignment between state and city actors.

One such catalyst was the federal BioRegio competition, running from 1995-2005, which provided €26 million in funding for the Munich biotech region. While no direct link can be shown between winning the competition and the number of biotech start-ups it can be argued that participation in the competition provided an impetus for biotech firms to cooperate more strategically.

The attraction of new national research centres such as Fraunhofer Institutes depends in large part on investments by the State Government as well as, in the case of Fraunhofer, the existence of a thriving business community that collaborates in applied research. Existing Universities in the Metro Region play a crucial role in developing new science facilities and attracting federal and state funding for this. The Munich Gene Centre, established in 1984, developed out of a cooperation between Ludwig Maximilian University and the Max Planck Institutes and is now forming an important element of the Martinsried technology cluster.

In **Seoul**, the relaxation of the Industrial Placement and Factory Construction Act by central government eased the regulation against venture business boosting. This deregulation permitted the construction of apartment-type firms for venture business in the Seoul Metro Region and has directly contributed to the emergence of the Teheran Valley, in southern Seoul, which is now considered to be the richest centre for ICT activity in South Korea

Re-using industrial land for 'new economy' purposes

The 22@Barcelona innovation district in **Barcelona** is transforming 200 hectares of industrial land into an innovation district in which knowledge-intensive activities will concentrate and develop. As is typical for Barcelona, it links to and consolidates a series of other transformations in the area, including the introduction of high-speed rail and the renovation of the waterfront. By introducing a new land classification, 22@ (activities whose primary productive resource is talent), and a new requirement that landowners must include no less than 20% 22@ activities in their developments, the aim is to transform the area into a hub for knowledge-intensive industries such as research, biological sciences, design, engineering, and media. Although it does not complete until between 2015 and 2020, as at September 2007, 60% of industrial land had already been refurbished. As at December 2009, some 1,502 businesses were located in 22@Barcelona, employing 44,600 workers. Despite the global financial crisis, the volume of business conducted in the innovation district increased by 5.4% between 2008 and 2009, to around €6 billion during 2009. Although more time is needed before the extent of the economic transformation is clear, the proportion of economic activity within the area that can be classed as '22@ activities' has been steadily growing year on year, as has the proportion of firms in the area that employ high-skilled individuals and undertake R&D.

In **Torino**, several out-dated industrial sites in the city centre have been reconverted for new economy uses, enabled by the changes made in the 1995 Master Plan, and the €2.45 million investment in transport infrastructure that followed it. Redevelopment works began in 2000, and are due to complete in 2010. In total, they will increase the amount of Torino's land available for development by two million square metres. The site of a former Fiat-owned steelworks in the city centre has been transformed into VitaliPark, a building with a floor space of 15,000 square metres, designed to accommodate manufacturing activities with low environmental impact, craft laboratories and service activities for SMEs. Lingotto, Fiat's historic production plant was adapted in 1985 by internationally renowned architect Renzo Piano into a flexible and versatile space that is today the site of an automotive engineering school of the Politecnico di Torino. Part of Mirafiori, another historic Fiat plant, is also being developed by a joint-venture between the Piemonte region, Torino city, Torino province and Fiat, into a design centre that will bring together all of Politecnico di Torino's research and training activities on design in one place in the city.

In **Seoul**, industrial areas that were once used for low-value, light manufacturing are now being redeveloped to house high-value firms, specialising in high-tech R&D, prototyping and services, such as digital content. One such case study is the Guro Digital Complex, formerly the Guro Industrial Complex, which housed textiles and clothes manufacturing in the 1960s. By 2008, through a mix of fiscal incentives, industrial policy and land use planning, over 16 new buildings were built by the municipal government, designed for high value, IT related activities. 6,784 firms now occupy the Guro Digital Complex employing approximately 109,000 people. The project is not complete, and more construction is underway for facilities and 'apartment-type' (compact) factories to house similar firms.

Overall impact of knowledge economy, innovation-based entrepreneurship and modernisation of manufacturing

The overall impact of these initiatives has been that our metros have all been able to take a lead in the transition to the next economy by both stimulating new enterprises and jobs in wholly new sectors, and by modernising existing industries to increase productivity and diversify markets, rather than remaining 'de-industrialising', 'rust belt' cities with limited economic vision. Important relationships have been built between business, government and higher education, and attention has been focused on economic diversification and entrepreneurship.

In the process, much industrial land has been cleaned up and converted for new uses and infrastructure investment in new modes of production has been substantial. Through such initiatives, new jobs and enterprises have been created, and our four metros have become part of the high competitive value chains of both new sectors and more established industries. Although, our metros have been shaken by the crisis in varying ways, they have all been more resilient than they would have been with less diversified economies.

5
Strong link between human capital, and attractive, distinctive cities

Overview

Each of our metros have successfully pursued efforts to develop human capital, improve quality of life and quality of place, and transition towards a knowledge-based economy. Three fundamental roles are observable:

1. As university systems adapt to changing economic conditions, they must work together with local and regional governments to fully realise the benefits of new and re-configured courses and research priorities and attract students, researchers and businesses in innovative partnerships.
2. Local and regional governments must work in innovative partnerships with the private sector to invest in the metro's natural and built environment and cultural amenities in order to support high quality of life and to compete internationally.
3. Metros must develop a powerful and distinctive image, innovatively leveraged in international markets to develop and attract human capital, investment and tourists, and to grow strategic sectors.

In our four metros the 'human capital', 'quality of life', and 'quality of place' agendas have merged with the 'knowledge economy' agenda. Competitive cities in a knowledge-led economy also need to be places that produce human capital, and are attractive to mobile people and talent. Part of that attraction is quality of life in compact cities that offer a mixture of uses and lifestyle choices. To deliver human capital systems that both *produce* skilled people and *attract* them from elsewhere, the four metros have pursued action on a variety of fronts, as set out below.

Building and developing human capital

In **Torino**, the Politecnico reconfigured its courses for the new economy (e.g. automotive engineering, design), which attracted foreign firms and talent back to Torino. Private firms have taken up positions in the new university campus in the city centre, including GM Powertrain Europe and China's second largest car manufacturer, JAC. The Politecnico's business incubator 13P, jointly owned with city and provincial governments and the Torino Chamber of Commerce, has been a major contributor to Piemonte's emergence as the Italian region with the most university spin-offs. More generally, the expertise built up by Fiat has been retained by its former suppliers, as they diversified into new sectors and new markets, and remains a major attractor for foreign firms.

Munich and Bavaria are recognised within Germany as one of the States with the most rigorous education system, and one that emphasises academic 'elite' building. Locally this is manifest in the recent years' efforts to build up Munich's main universities as globally recognised elite institutions. This is balanced on the other hand by the specific German system of vocational training – a joint system of state-provided schooling and business-provided practical training that assumes the character of a 'social contract' at the core of the country's cooperative society model. The City of Munich contributes to the building of human capital by being the only German city without the status of a federal state that runs its own public schools – widely described as being of high standard while accessible to all strata of society (incurring no fees). In addition the city offers language courses and other training programmes designed to foster the integration of its diverse population.

Developing a better 'quality of life offer' and creating new amenities

Barcelona has been ranked as the highest European city in relation to quality of life since 1998 (European Cities Monitor). This high ranking relates to its natural assets, such as its attractive climate and location on the coast, and its cultural assets, such as the rich Catalan language and culture, architecture, gastronomy and lifestyle, both of which have been enhanced by sustained investment by city, regional and national governments over the last 30 years. The urban reconfiguration and reclamation of the waterfront and 4.5km of beach which accompanied the 1992 Olympics were crucial in reconnecting the city's natural and cultural assets and attracting tourists and entrepreneurs. Today, investments in infrastructure, such as the new high-speed train link to Madrid (already in operation) and France (under development) are explicitly linked to Barcelona's ability to attract skilled labour and international entrepreneurs through, for example, cluster initiatives such as 22@ Barcelona Innovation District.

Seoul has increasingly recognised the need to present a globally attractive city to attract international investment. Since Mayor Lee Myung-Bak, the city has undertaken publicly-funded initiatives to improve public services and attractiveness of the city. The widely publicised Cheonggyecheon stream restoration project, whereby the city removed 5.8km of highway to reveal the old stream underneath, brought international attention to Seoul. It demonstrated the city's commitment to improving the physical environment for its citizens, by removing congestion, reducing air pollution in downtown Seoul, and providing amenities for cultural activities, wellbeing and general enjoyment of the city.

In **Munich**, while the city is privileged by its natural setting, lessons as to building and maintaining a high quality of life can nonetheless be learned. Access to its natural assets is open to all of its citizens rather than at the exclusive disposal of its richer inhabitants. The high quality of its public spaces is both supported by and in turn reinforcing a sense of civic pride. This attitude to inclusiveness pervades the city's history, displaying an ongoing effort to integrate the influx of migrants to the city, from rural Bavaria in earlier times to the international migrants of today.

Over 650 foreign companies have already set up operations in **Torino**, where quality of life has become a key factor for this location, as claimed by the Politecnico di Torino. The continuing influx of foreign students further demonstrates the diversity and vitality of Torino's cultural appeal. The University in Piemonte in 2007/2008 attracted 4,578 foreign students, who form 4.6% of the total student body; this is an increase of over 17% on the previous year.

Delivering urban regeneration and revitalisingcity centres

Barcelona has been at the forefront of attempts to reuse and revitalise city space for the new economy. Investment has been at the heart of the city centre revival. The City Council started small, investing in run-down public spaces in order to demonstrate their capacity to change the city and to bring back confidence in Barcelona amongst its own citizens as much as amongst its potential investors. Building on this,

sustained investment in roads, green space, new offices, hotels and homes provided the basis from which the new knowledge economy could take root in Barcelona. In the case of the 22@Barcelona innovation district, for example, the aim has been to create a new central area within Barcelona, with the density, connectivity and mix of the urban fabric being seen as a key asset in the development of new economic strengths in knowledge-intensive sectors such as design, media and ICT.

The city's 1995 Master Plan and 2000 Strategic Plan enabled **Torino's** out-moded industrial artery and railway running through the centre of the city to be re-claimed for new uses. The 'Spina Centrale' and four brownfield sites were re-developed into mixed-use neighbourhoods, and linked back to the urban fabric through new transport infrastructure. Since the mid-1990s, €2.45 billion of public and private capital has been invested in the regeneration of Torino's urban fabric, with special emphasis on transport infrastructure. As a result Torino now has a metro line, a high speed train linking the city to Milan, shared public and green spaces, and new cultural and research centres. Today, the former industrial areas are home to new institutions and firms, such as the design and engineering research and training centres of the Politecnico di Torino, General Motors, Volkswagen and the Chinese car giant JAG, and major international organisations, such as the International Labour Organisation, European Training Foundation, the United Nations Interregional Crime and Justice Research Institute and the United Nations System Staff College. Torino's cultural and historic amenities, including the Museo Egizio and the Mole Antonelliana, have also been renovated and promoted, as part of broader efforts to re-discover the city and the region's vernacular activities and cultural and creative industries.

Branding initiatives and metropolitan identity building

In order to boost **Torino's** international image and kick-start its internationalisation in new economic sectors, the city authorities decided to promote Torino as a location for mega-events, including international sporting events and sector-themed promotional events. The Winter Olympics were hosted in Torino in 2006, and had a catalytic impact on the city's infrastructure investment and the development of new economic sectors. After the Olympics, Torino succeeded in winning the title of World Capital of the Book (together with Rome) in 2006 and World Design Capital in 2008 (a designation conferred by the International Council of Societies of Industrial Design) and continues to host international sporting events and slow food fairs, such as Salone del Gusto and Terra Madre.

Seoul is keen to become a globally attractive city, and to that end the current Mayor Oh Se-Hoon has given Seoul the title 'the Soul of Asia' and implemented a 'Creative City Policy'. Creative and design-led initiatives and projects, such as Zaha Hadid's Dongdaemun Fashion District and Daniel Liebskind's Yongsan International Business District, have led to designations of Seoul by UNESCO as the UNESCO City of Design in July 2010 and World Design Capital 2010. Seoul has also hosted a number of global conferences, including the C40 Large Cities Climate Summit in 2009 and more recently, the G20 and G8 Summits in November 2010.

Barcelona has been developing and promoting its brand internationally throughout the last 30 years. From the urban revitalisation and mobilisation of civic pride of the Olympic period, Barcelona has more recently sought to capitalise on its brand in a diverse set of ways. The consortium, Barcelona Tourism, was created to develop a tourism promotion programme for the city, while the trade fair body, Fira de Barcelona, sought to boost Barcelona's profile as a business destination. Strategic platforms were created to promote priority growth sectors and to attract foreign entrepreneurs and foreign investment. According to the OECD, the Barcelona brand is 'universally accepted and promoted by all the key organisations and is clearly a unifying message' (2009, p.40). Thus, as well as attracting tourists, businesses and investors, the Barcelona brand can be considered to have a mobilising effect within Barcelona itself. Through platforms such as the Barcelona Economic Triangle, the Barcelona brand is now being leveraged across the metro and Catalonian region more generally.

Supporting talent attraction and retention

Building on the international boost given to **Barcelona's** reputation as a result of the 1992 Olympic Games, strategic platforms were created to attract foreign entrepreneurs, researchers and investors to Barcelona and Catalonia. These included 'Invest in Catalonia', the international promotion body of the Government of Catalonia, and 'Do it in Barcelona', the promotional platform of Barcelona Activa.

Munich is a city with a strong historic identity. Its leaders have always used its spectacular natural setting and high quality of life as a means of retaining skilled workers and their families. State and metro also invest heavily in high-quality public services, in particular school, higher and vocational education. A third pillar is investment in key infrastructure – the city has developed a new airport and expanded its metro and rail networks.

The Milano-Torino ('MI-TO') axis is already heralded as a brand that has enabled **Torino** to attract highly-skilled workers, even from Milan; Torino is promoting its high quality of life and the fact that 'smaller' means 'more liveable' in order to attract these workers. Contrary to initial expectations, the high speed train between the two cities is slowly becoming a Torinese competitive advantage.

Overall impact of strong link between human capital, and attractive, distinctive cities

Each of our four metros has a strong and effective core city within it, and in all cases the core city is the anchor of the metro area. From a human capital perspective, although there is some diffusion of institutions across the metro area, the core city hosts most of the universities, specialist colleges and institutes and is the hub of human capital system in each metro.

The universities and other institutes are becoming increasingly internationalised and specialised. They are attracting international talent and are increasingly engaged with business at multiple levels. These human capital systems serve to both produce skilled people and to attract from outside. They are underpinned by deepening labour

markets and high quality of life which provide the combination of both employment and quality of life choices that mobile talent workers seek. In turn these stronger labour markets have spurred and encouraged city centre living and urban regeneration, contributing further to quality of life and further reinforcing the human capital and talent attraction strategies of the metros. These strategies have also been reinforced by the growth of urban tourism which has further supported investment in culture, amenity, and quality of leisure and life style choices.

Through their various initiatives to link human capital to attractive, distinctive cities, our four metros now possess a more competitive and better-skilled workforce, with a core set of competencies in both traditional and emerging productions and services. Superior quality of life has acted as a magnet for attracting international talent and innovative companies.

6
Green economy, resource efficiency and decarbonisation

Overview

Each of our metros have understood the unique opportunity of shifting towards a green economy and combining environmental sustainability with new business opportunities, job creation and a more resilient metro economy. Three fundamental roles are observable:

1. Local, regional and national governments must create a strong policy framework and invest in green energy and green transport for their metros, setting them on a more sustainable and secure energy footing, decarbonising travel and investing in a more competitive future economy.
2. Working together with business and research institutions, local and regional governments must identify the sectors of the green economy into which their metros might specialise and compete, and target policy and investment on these sectors in order to drive innovation and gain a first mover's advantage.
3. Metro governments must emphasise the principles of compact city development in strategic (spatial) planning processes, in order to maximise the economic and environmental benefits of its urban form.

Our four metros have been encouraged to shift towards a green economy through multiple initiatives and incentives, but most important has been the sea-change in public opinion towards much lower carbon living and systems, and awareness within business of the growth potential of 'cleantech' products and processes. In many cases these initiatives are not yet operating at scale, nor are they fully effective. However there have been some notable successes, some of which are outlined below in relation to our four metros.

Long-term investment and a strong policy framework to drive green energy solutions

Germany's feed-in tariffs have unleashed unprecedented levels of renewable energy investments that are further accelerated by Munich's own ambitious renewable targets. The **Munich** city government is pursuing a long term vision to reduce carbon emissions per head by 80% in 2050 (from the level of 1990) and to draw all of its energy supply from renewable sources by 2025. While reducing carbon emissions is an explicit climate protection policy, the transition towards renewables is also seeking to avoid dependence on the Russian gas monopoly. The ability to set political targets for its publicly owned utility company (SWM) allows the city to pursue these goals. In turn these goals drive the internationalisation of SWM as it seeks to exploit a range of renewable energy sources in the locations most suitable – solar power in Spain and wind power in the UK amongst others. SWM is building its capacity as renewable energy provider by partnering with technology firms including Siemens, other utility companies and local partners in these countries. Rather than a case of exporting technology this learning process may well lead to green technology innovations being 'imported' to the Munich Region and feeding back into local innovation processes.

In relation to **Barcelona**, a city and regional energy plan have been produced, in addition to the national policies of the Spanish government for feed-in tariffs for renewable energy. The key initiative of the Barcelona energy plan was a Solar Thermal Ordinance, which required all new buildings and those undergoing major refurbishment to include solar energy sources to provide for 60% of hot water supply. This was the first Solar Thermal Ordinance introduced by a European municipality, and has since been rapidly introduced into Catalonia and Spain's legislation and is now being replicated in over 20 Spanish cities. So far, Barcelona's Solar Thermal Ordinance has led to a ten-fold increase in the amount of solar thermal square metres (in terms of licenses requested) in Barcelona. The success of the measure has been associated with the way in which it was developed through successful partnership working, technical input and knowledge/skills development. In addition, renewable energy initiatives have been included in major new developments in Barcelona, such as Forum 2004's urban solar power station (10,700m2 of photovoltaics), district heating and cooling system and energy efficient buildings. The 2006–2015 Catalan Energy Plan includes a target to increase the percentage of primary energy consumption from renewables from 2.9% in 2003 to 9.5% by 2015, and of generation of electricity to 24.0% by 2015, through a programme of work including the creation of energy research institutes and the development of an industrial plan for the energy technology sector.

Promoting green economy approaches to sustain economic growth and job creation

In **Torino**, Fiat has produced and sold the Fiat 500, a hugely successful retrospective design small car, which has the lowest carbon emissions of any car in its class and has become very popular across the world. In addition, many of Fiat's former suppliers have moved into new sectors, including environmental services. For example, Sicme Motori recently began the production of mini windpower machinery, Golden Car now also produces recycling bins, and Simpro now operates in the railway and tyre-recycling sectors.

Looking forward, **Munich's** leaders are focused on two main economic development fields. The first is 'e-mobility' – a cluster of activities including low-carbon and electric vehicles, electric car grids and the next generation of high-speed rail. The second is 'future infrastructure' – the city plans to have a 100% renewable electricity supply by 2025, and the SWM is developing an ultra-fast fibre optic network in anticipation of future commercial and household demand.

Munich has been running a so-called 'Energy Saving Programme' since the end of the 1980s. It supports private investments into energy saving measures, for example installing state-of-the-art insulation in residential buildings. This programme not only contributes to reducing the city's carbon footprint but also to supporting local businesses and employment. Efforts to promote local solar energy production via the new 'Solar Initiative Munich' are feasible only in the context of the German Renewable Energy Sources Act, a policy in place since 2000 that guarantees renewable energy producers a set feed-in tariff over a 20 year period.

One of the cluster projects within the **Barcelona** Economic Triangle is the Parc de l'Energia, a 25,000 square

meter park which brings together teaching centres, R&D centres and energy businesses. The new park also includes Fusion for Energy, a new European agency which will monitor and coordinate an international collaboration project for the development of nuclear fusion.

Expanding green transport infrastructure

In **Barcelona**, connection to the Spanish High Speed Rail Network has reduced the need for air travel between Barcelona and Madrid, decreasing the carbon intensity of domestic travel around Spain. In a similar way, the planned high-speed rail connection to France is also likely to reduce the need for air travel to and from Barcelona. Other examples of Barcelona's investment in green transport infrastructure include the current expansion of its metro network to include a new 47.8km, mainly subterranean, metro line, the expansion of its tramways and the introduction of the 'Bicing' cycle-hire scheme,.

Torino has also invested in a metro line and a high-speed rail link to Milan, generating both environmental and economic benefits to the city and the region. Sustainable mobility and ICT have also been boosted by the crucial intermediary role between Torino's political system and the market place played by Torino's bank foundations, Compagnia di San Paolo and Fondazione Cassa di Risparmio di Torino, which have accelerated innovation in both sectors.

The governments of Incheon, **Seoul** and Gyeonggi Province have collaborated to establish a bus rapid transit system (BRT) in the Seoul Metro Region, which traverses into Seoul city, Incheon city and parts of Gyeonggi Province. This is in addition to the extensive subway/underground system that extends from downtown Seoul outwards into the Metro Region. More recently, Kim Moon-Soo, the Governor of Gyeonggi Province in the Seoul Metro Region, strongly advocates the central government-led construction of the GTX, the Seoul metropolitan high-speed train system. The Governor actively advertises GTX as a true green transportation revolution, which will improve competitiveness by resolving the chronic traffic congestion problems of the Seoul Metro Region while reducing environmental emissions.

Committing to strategic (spatial) planning to advance compact city development and the integration of land-use, urban design and transport

Barcelona has created new urban centres linked to new transport hubs, such as the 22@Barcelona Innovation District, seeking to maximise the economic and environmental benefits of its compact and mixed urban form. At a metropolitan and regional scale, spatial planning and land development policies continue to emphasis the compact-city model, supported by the necessary transport infrastructure, and in particular the metro's rail and metro networks.

Munich's 'compact, urban and green' paradigm has enabled efficient, green transport and improved quality of life. The development of brownfield sites within the city increased density and mixed use and led to better local accessibility, public transport access and helped to promote walking and cycling. Public transport connectivity is critical within the metropolitan region, which consists not just of Munich and its periphery, but several other second tier cities within a 60-80km distance. Metropolitan region leaders have not only connected Munich to its hinterland by greener transport but to its broader national and international context in Central Europe. A number of investments have been key, including the 1971 urban rail system and upgraded rail lines linking Munich via Augsburg and Ingolstadt to Germany's high-speed rail network.

In **Seoul**, where population density places high pressure on land, urban regeneration has been used to systematically recycle polluted urban land and to improve the physical and natural environment. The Digital Media City in Seoul is a local government-led redevelopment project that reuses an area near an old landfill site, south of the river. New buildings are being constructed by the city to house new ICT industries and related service companies. Moreover, as previously mentioned, the Cheonggyecheon stream restoration and landscape project in downtown Seoul has reduced congestion, and provided a pleasant 5.8km pedestrian path in the busiest part of the city from Gwanghwamun in the heart of Seoul east to Dongdaemun (East Gate) of Seoul.

The 1995 master plan, **Torino's** first for 50 years, provided a basis from which Torino could be reconfigured to better support the economic diversification and re-orientation that was beginning to occur, moving from a mono-centric city that was centred around the FIAT factories, to a denser, better connected, polycentric metropolis.

Overall impact of green economy, resource efficiency and decarbonisation

By increasing their energy efficiency and their capacity to generate cleaner energy, our metros have strengthened their resilience in an increasingly volatile global (energy) market. While data on the impact of green economy policies on overall economic performance and job creation is only just starting to emerge, the four metros suggest that taking action on a range of green and low carbon initiatives can certainly help sustain employment, grow new markets for business, and improve the quality of life and identity of the metros themselves.

7
Concluding comments

EU and Asian metros have learned much from US metros over the past 50 years about the importance of capable city leadership and business-focused economic development. As we approach the next urban economy, EU and Asian metros have developed practices of their own that can add to the global knowledge on how to fully realise the potential of the metropolitan platform to achieve economic progress and meet other important goals.

Our four metros in the EU and Asia have pursued their different initiatives through an integrated approach, taking action on all five fronts and setting themselves on a path to longer-term success. These five ingredients have been:

1. Active, aligned and intentional government with private sector and institutional partnership;
2. Internationalisation, global positioning and trade;
3. Knowledge economy, innovation-based entrepreneurship and modernisation of manufacturing;
4. Strong link between human capital, and attractive, distinctive cities; and
5. Green economy, resource efficiency and decarbonisation.

The experiences of Munich, Barcelona, Torino and Seoul over the last 30 years offer important insights to US metros seeking to develop their next urban economy. The LSE Cities series of case studies suggest that metros that develop active, aligned and integrated approaches - strengthening their international position, fostering economic diversification and re-orientation, investing in quality of life and place to produce and attract human capital, and shifting towards a green economy – will be rewarded in the future.