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AVIVA INVESTORS CITIES OF THE FUTURE: EUROPE

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INTRODUCTION

- Knowledge-based capital drives economic growth
- But human capital and networking capabilities are not evenly spread: not all cities will profit from the growth of the knowledge economy
- In continental Europe, Paris, Munich, Dublin and Amsterdam look likely to thrive in the knowledge economy

Given its nature as a long-term asset class, it is important that real estate investors have an understanding of structural drivers of growth and major shifts in the sources of growth. The rising importance of the knowledge-based economy is one such shift that is of considerable importance for the outlook for city office markets.

Knowledge-based economic factors, notably human capital and networking capabilities, are not evenly spread: they feature much more prominently in some city economies than in others. As a result, not all cities are equally likely to profit from the growth of the knowledge economy. We have developed a range of indicators to allow us to rank 50 European cities by their potential to develop as knowledge-based economic centres. These indicators are measures of cities' strengths in human capital and their strengths as innovative business hubs.



Image shown: The harp bridge Dublin, Ireland.

GROWTH IN DEVELOPED ECONOMIES INCREASINGLY DRIVEN BY KNOWLEDGE-BASED CAPITAL:

A clear trend in the most-developed economies in recent decades has been the shift to a knowledge-based service economy. Globalisation has meant the outsourcing of manufacturing and back-office functions to emerging markets and the automation of routine tasks has led to the demise of many lower-skilled jobs. In the most successful economies, this loss has been countered by growth in knowledge-intensive service sector roles. These trends are likely to continue in the coming years, with emerging technologies driving a major new round of job automation¹.

Though the rise of the “knowledge economy” is very visible, it can be difficult to measure. The OECD has, however, launched an initiative to try to determine the economic value of knowledge-based capital as a source of economic growth². It finds that “investment

and growth in OECD economies is increasingly driven by knowledge-based capital”. It estimates that, in some member countries, “firms now invest as much or more in knowledge-based capital than they do in physical capital such as machinery, equipment and buildings”.

Knowledge-based capital is made up of a broad range of factors. The OECD identifies two types that are of particular importance. The first is termed “economic competencies” and is made up especially of human capital and network effects. The second it terms “innovative property” and comprises items such as patents, trademarks, copyrights and designs. These factors are inter-related aspects of an economy’s capacity to apply knowledge to the productive process.



Image shown: Office buildings with people bicycling at Amsterdam Zuid, Amsterdam, Netherlands.

¹ Rise of the Machines, UK Real Estate in the Computer Age. Richard Levis, Aviva Investors Investors’ Journal, Nov 2014.

² OECD. New Sources of Growth: Knowledge-based Capital. <http://www.oecd.org/sti/inno/newsourcesofgrowthknowledge-basedcapital.htm#background>

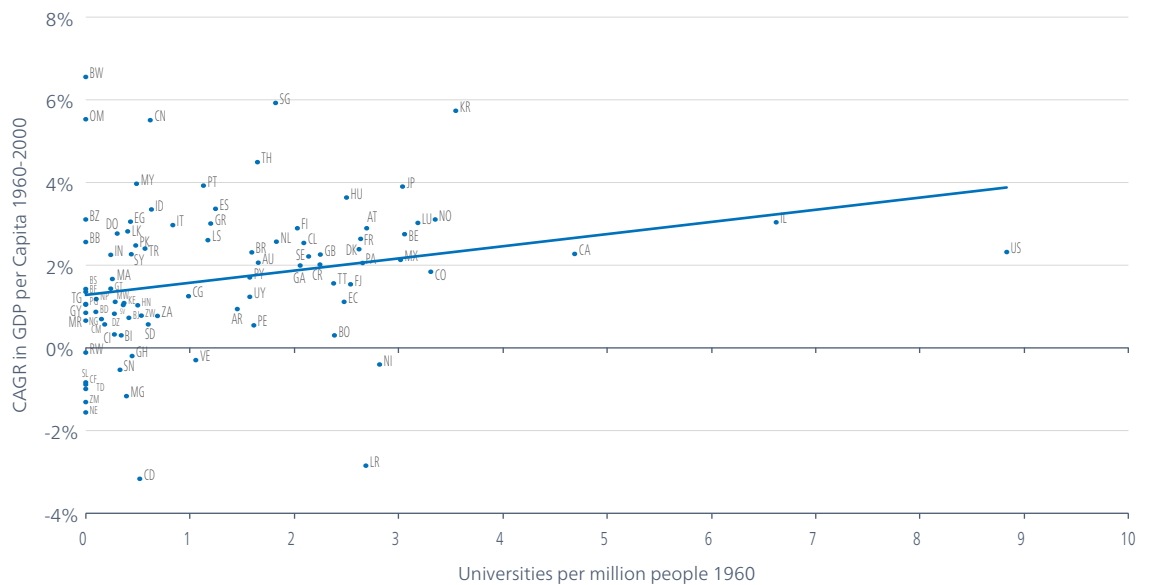
IDENTIFYING INDICATORS OF CITIES' KNOWLEDGE CREDENTIALS:

Knowledge-based economic factors, notably human capital and networking capabilities, are not evenly spread. They feature much more prominently in some city economies than in others. As a result, not all cities are equally likely to profit from the growth of the knowledge economy. For a long-run real estate investor, it is useful to determine in which cities these factors are most prominent as these are the office markets that are best placed to benefit from higher productivity, stronger demographics and more robust real estate demand.

In order to identify which cities have most potential as knowledge centres, we have selected a range of indicators of strength in human capital and innovation for 50 European city economies.

Human capital may be thought of as the stock of knowledge, habits and social attributes found in a population that allows it to produce economic value. In many ways human capital is intangible but it is clear that the educational attainment of a population is crucial to its development, and educational attainment can be measured. Academic evidence finds, for instance, that there is a significant positive correlation between the density of universities in a region and future economic growth in the region³.

University density vs growth in GDP per capita



Source: Valero, Anna and Van Reenen, John (2016) The economic impact of universities: evidence from across the globe. CEP Discussion Paper, No 1444. Centre for Economic Performance, London School of Economics and Political Science, London, UK

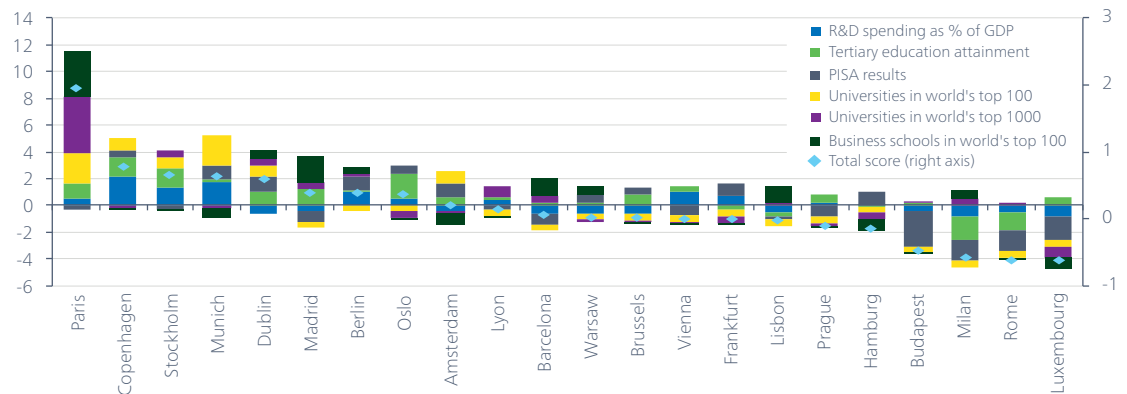
Key: Argentina (AR), Austria (AT), Australia (AU), Barbados (BB), Bangladesh (BD), Belgium (BE), Burkina Faso (BF), Burundi (BI), Benin (BJ), Bolivia (BO), Brazil (BR), Bahamas (BS), Botswana (BW), Belize (BZ), Canada (CA), Chad (TD), Congo (Democratic Republic) (CD), Central African Republic (CF), Congo (CG), Côte d'Ivoire (CI), Chile (CL), Cameroon (CM), China (CN), Colombia (CO), Costa Rica (CR), Denmark (DK), Dominican Republic (DO), Algeria (DZ), Ecuador (EC), Egypt (EG), Spain (ES), Finland (FI) Fiji (FJ), France (FR), Gabon (GA), United Kingdom (GB), Ghana (GH), Greece (GR), Guatemala (GT), Guyana (GY), Honduras (HN), Hungary (HU), Indonesia (ID), Israel (IL), India (IN), Iceland (IS), Italy (IT), Japan (JP), Kenya (KE), Korea (Republic of) (KR), Sri Lanka (LK), Liberia (LR), Lesotho (LS), Luxembourg (LU), Morocco (MA), Madagascar (MG), Mauritania (MR), Malawi (MW), Mexico (MX), Malaysia (MY), Niger (NE), Nigeria (NG), Nicaragua (NI), Netherlands (NL), Norway (NO), Nepal (NP), Oman (OM), Panama (PA), Peru (PE), Papua New Guinea (PG), Philippines (PH), Pakistan (PK), Portugal (PT), Paraguay (PY), Rwanda (RW), Sudan (SD), Sweden (SE), Singapore (SG), Sierra Leone (SL), Senegal (SN), El Salvador (SV), Syria (SY), Togo (TG), Thailand (TH), Turkey (TR), Trinidad and Tobago (TT), United States of America (US), Uruguay (UY), Venezuela (VE), South Africa (ZA), Zambia (ZM), Zimbabwe (ZW).

³ The Economic Impact of Universities: Evidence from Across the Globe. Valero & Van Reenan, London School of Economics, 2016.

We have chosen the following factors to rank cities by their strength in human capital:

- Percentage of the population completing tertiary education;
- The OECD’s Programme for International Student Assessment (PISA) results;
- The number of highly-ranked universities in the city;
- The number of highly-ranked business schools in the city;
- Spending on Research & Development (R&D) as a percentage of city GDP.

Human capital scores



Source: Aviva Investors as at November 2017

A city’s capacity for innovation meanwhile will be heavily influenced by its industrial structure. Cities with greatest potential are likely to be those that already have a large share of activity in knowledge-intensive industries such as IT, financial services, professional and scientific activities. Conversely, cities that are heavily dependent on public sector employment are likely to have below average potential for innovation. In seeking to determine cities’ potential for innovation, or what we term attractiveness as a **business hub**, we look at:

- Patent applications and trade mark registrations;
- Employment in knowledge-intensive industries;
- Employment in the public-sector, less being better;
- A city’s ranking as a financial centre.

Putting together these measures of human capital and attractiveness as a business hub allows us to generate rankings of cities’ potential as knowledge centres. This forms part of a broader effort to gauge their relative attractiveness for investment by looking at a range of drivers, notably economic outlook, demographics, governance, international links and technology.

HIGHEST-RANKING KNOWLEDGE CENTRES CONCENTRATED IN NORTHERN EUROPE:

A clear outcome of this analysis is that the centres with greatest potential as knowledge centres are concentrated in Northern Europe, with cities in Southern and Eastern Europe tending towards the bottom of the rankings.

Within Northern Europe, Paris stands apart for the sheer scale of its education and other infrastructure. It boasts continental Europe's biggest number of top-class universities and business schools, is a major financial centre and is a leading centre for a broad range of knowledge-intensive industries. Other high-ranking centres are the Nordic cities, especially their capitals, the larger Dutch cities and Dublin. Germany's major cities present something of a mixed bag with some, notably Munich and Frankfurt, featuring strongly in many respects but some others scoring quite poorly.

Southern European centres meanwhile tend towards the bottom of the rankings. Italy is especially weak with education attainment results among the very worst in our sample. Centres on the Iberian peninsula also fare poorly as a rule. Madrid ranks highest, helped by its position as a regional financial centre, but its overall score is only middling nonetheless.

Cities in Central & Eastern Europe are also generally to be found in the bottom half of the rankings of human capital. Only Warsaw manages to barely squeeze into the top half. Its growing role as a financial centre and some strength in knowledge-intensive industries allow it to score quite highly as a business hub, however.

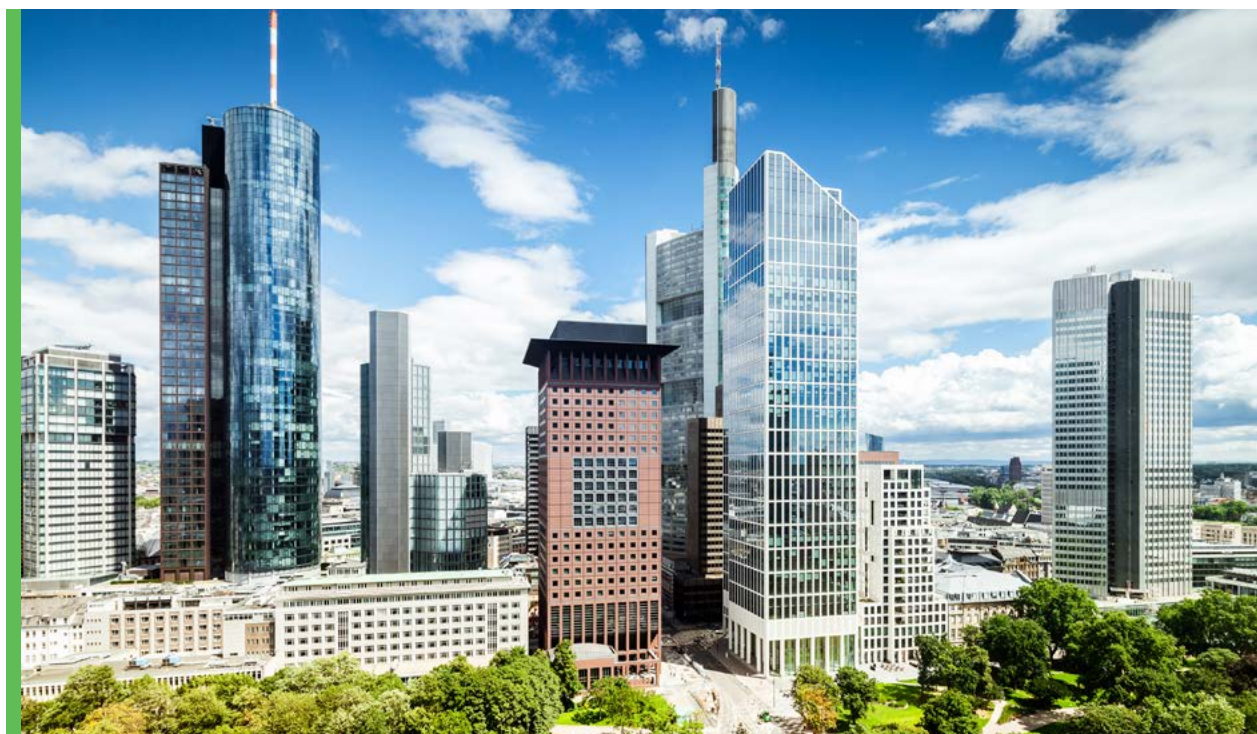


Image shown: Frankfurt city downtown with view on park.

KNOWLEDGE CAPITALS

The purpose of our analysis is to identify cities where highly-skilled people want to live, work and learn. Investment out-performance will not come merely from being in the right cities, however. Real estate is a local asset class in which access to information gives a competitive advantage. Investors with the greatest city-level expertise are therefore the best positioned to create value through asset management and by sourcing the most attractive buying and selling opportunities. So, by focusing on the most robust office markets and developing deep expertise, real estate investors position themselves to make the large conviction calls that are required for sustained investment out-performance. On the basis of our analysis, a number of cities suggest themselves as targets for investment and the development of expertise.

Paris

Paris stands out especially for the scale and diversity of its economy. It is the largest city economy in Europe, a little ahead of London and multiples the size of any other city in continental Europe. Its economy is heavily weighted to service functions and exhibits a very broad diversity of activities with major clusters in aerospace, IT, telecommunications, bio-technology and science. Given its importance as a global mega-city, it provides a strong draw for major companies. According to KPMG⁴, Paris was the second-largest centre in 2017 for greenfield international investment in Europe after London, and the fifth-largest in the world. According to Forbes⁵, 29 of the 31 largest French companies have their headquarters in Paris and a third of the top 500 global companies have a head office in the region. This puts it third globally for the number of major companies and first in Europe. In total, over 11,000 foreign companies have functions in the Paris region⁶.

Befitting a city of its size, its education infrastructure is very substantial. It boasts 15 universities in the world's top 1000, with 2 of these in the top 100, the Ecole Normale Supérieure and the Ecole Polytechnique⁷. According to QS World University Rankings, it is the best city in Europe in which to be a student and the second best in the world overall⁸. It also possesses 2 business schools in Europe's top 5 according to the FT: HEC Paris and Insead⁹.

Reflecting its role as a global business, financial, political and cultural centre, Paris has extremely strong international transport links. Its airport traffic is second only to London's in Europe and it has more hotel stays than any city in Europe. Not resting on its laurels, however, there are ambitious plans to add to its infrastructure. The Grand Paris Express will see upgrades to existing metro lines as well as the addition of 200km of new automated lines and 57 new stations¹⁰.

Though a larger national economy than France's, Germany has no city economy that comes close to the scale of Paris. This reflects its more decentralized economic and political structure. It does, however, offer a large number of medium and large-sized cities that may be worthy of investment. Berlin, Cologne, Frankfurt, Hamburg, Munich and Stuttgart all have economies that are larger than the average of our sample of fifty cities. By comparison, all the French regional cities are significantly smaller than the average.

⁴ KPMG Global Cities Investment Monitor 2016.

⁵ Forbes Fortune Global 500.

⁶ <http://www.gouvernement.fr/en/20-facts-and-figures-that-show-just-how-much-the-ile-de-france-region-has-to-offer>.

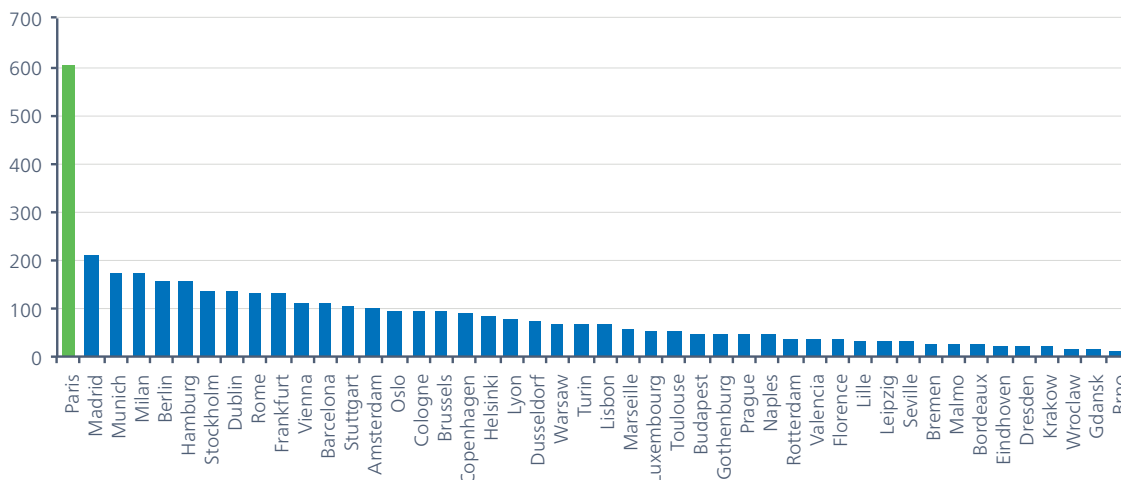
⁷ QS World University Rankings 2017.

⁸ <https://www.topuniversities.com/city-rankings/2017>.

⁹ FT World Business School Rankings 2017.

¹⁰ <http://www.gouvernement.fr/en/20-facts-and-figures-that-show-just-how-much-the-ile-de-france-region-has-to-offer>.

Metropolitan GDP (€m, 2016, current prices)



Source: Oxford Economics

Munich

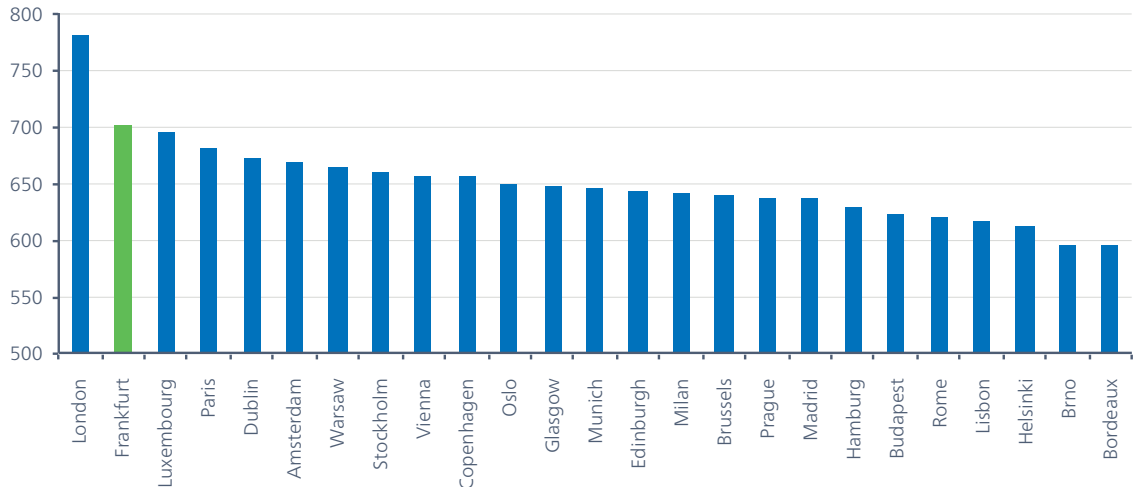
Munich is Germany’s largest city economy and its most prosperous as measured by GDP per capita. It enjoys the lowest unemployment of any major German city and robust population growth. It has a diverse economy and scores among the very highest cities in our sample for exposure to knowledge-intensive industries. It is Germany’s second most important financial centre after Frankfurt. It hosts the headquarters of a wide range of major German companies including Siemens (electronics), BMW & MAN (automotive), Allianz & Munich RE (insurance), Hypovereinsbank (banking) and Rohde & Schwarz (electronics). Its robust labour market makes it a major destination for migrants and it has one of the highest foreign-born populations in Germany. It scores fourth out of 230 cities globally in Mercer’s quality of life ranking based on political, social, economic and environmental considerations¹¹. One blot on its copybook is a relatively modest presence of quality educational institutions. It boasts no business schools from Europe’s top 100 and is home to only two universities from the global top 1000. Admittedly, these two universities are among the world’s top 100.

Frankfurt

Frankfurt also fares relatively poorly in terms of the higher education offer attainment with just one university that ranks in the top 1000 globally, though the Frankfurt School of Finance & Management does make it into the world’s top 100 business schools. As a result, Frankfurt posts an unremarkable score for human capital credentials, barely making the top half in our rankings. This weakness is balanced by its considerable strengths as a business hub, however. It is continental Europe’s second highest-ranking financial centre and it also scores well for the presence of knowledge-based industries.

¹¹ Mercer Quality of Living Ranking 2016.

Financial centre score



Source: ZYen, 2017

Berlin

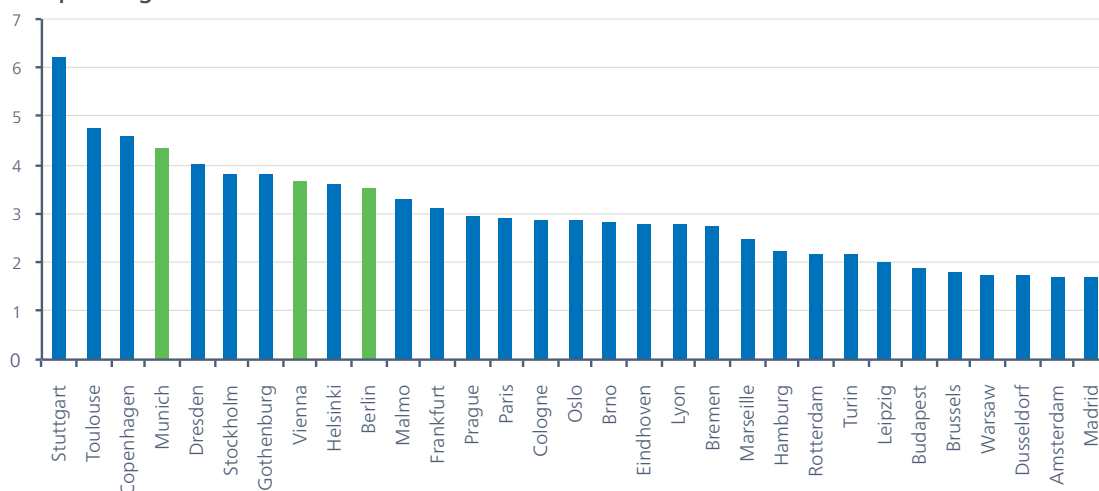
Berlin meanwhile exhibits a mixed score card. It is Germany’s largest city by population but, in part as a legacy of the partition era, its per capita income is far lower than the major cities in West Germany. Though most of Berlin remained part of West Germany during the Cold War period, its difficult geographic position inside of the German Democratic Republic led to an exodus of major firms to West Germany. As a result, West Berlin stagnated during this period while East Berlin of course suffered the economic follies of communism.

Reunification in 1989 brought a far more certain political and economic backdrop. Its large population, political significance and relatively cheap operating costs have prompted many companies to set up a presence in the city. Growth has been driven by the service sectors with important contributions from life sciences, IT, media, biotechnology and medical engineering. Berlin has a particularly strong appeal to tech entrepreneurs thanks to its cheap rents, vibrant culture and government support. According to Startup Genome, it has the best start-up ecosystem in continental Europe¹². Berlin hosts an estimated 1,800-2,400 active tech start-ups, with rapid growth in categories such as fin tech, digital health, artificial intelligence, mobility food technology and cyber-security¹³. Among European start-up hubs, Berlin attracts the highest proportion of start-ups from outside of the country, reflecting its international profile.

Moreover, the city scores highly in our ranking of human capital, helped by the presence of two business schools ranked in the top 100, ESMT Berlin and ESCP Europe, three universities from the world’s top 1000 and a high number research and development institutions.

¹² <https://startupgenome.com/report2017/?forward=thank-you-enjoy-reading>.
¹³ <https://startupgenome.com/report2017/?forward=thank-you-enjoy-reading>.

R&D spending as % of GDP*



Source: Eurostat, 2015 / *Refers to NUTS2 regions

Amsterdam

Amsterdam is a relatively small city economy but one with a strong and diverse economy. It is, of course, one of the oldest financial and trading centres in the world, home to the world's oldest stock exchange for instance. But more recently it has added to these strengths by becoming a major growth centre for digital media and e-commerce. It has enticed international companies such as Facebook, Netflix and Salesforce to establish their European headquarters here and boasts about 170 international ICT companies with headquarters in the city. Though not a particularly big city in its own right, it is part of a much larger cross-border economy spanning parts of France, Germany and Benelux. With Schiphol the third-busiest airport in Europe, it is also among the best-connected cities in the world. Amsterdam's growth in recent decades as a business centre has necessitated the development of important business hubs outside the traditional city core. The most prominent example is the Zuidas which has established itself as the city's most important financial and legal centre.

Dublin

Dublin is also a relatively small city economy but one which has seen remarkable growth in the past twenty-five years or so. An important foundation for this transformation is a well-educated English-speaking workforce: despite its relatively modest size, Trinity College Dublin features in the top 100 global universities with 3 other Dublin universities making the top 1000. Meanwhile the Smurfit Business School at UCD and the DCU Business School rank in Europe's top 100. With other strengths such as its common law legal system and an attractive corporation tax regime, it has established itself as a viable destination for international companies seeking a presence in the EU. Epitomised by the enormous Google campus, it is especially well represented in the IT and digital media sectors. From very modest beginnings, it has also established itself as an important and growing financial centre. With it soon to be the only major English-speaking centre in the EU, as well as the Euro-zone, there may well be scope to build on its credentials as a financial centre.

¹¹ Mercer Quality of Living Ranking 2016.

Luxembourg

Luxembourg, despite being one of the smallest cities in our sample by population, scores very strongly as a business hub. This reflects its prominence as a financial centre, of course, but also a strong position in knowledge-intensive industries. Its education scores are relatively weak, however, with no university in the world's top 1000 and no business school in the top 100. Nonetheless, its ability to import highly-qualified workers may suggest that this will not constrain its knowledge centre potential. It is among the cities with the very highest share of foreign-born workers for example.

Vienna

Vienna is a medium-size city with an economy dominated by knowledge-intensive activities. It is an important research and development hub, with life sciences (biotechnology, pharma, medical devices) particularly well represented. According to Lisa Vienna, over 35,000 people work at 480 companies, research institutions and other organizations in the field of life sciences in Vienna. The city offers an outstanding quality of life, thus adding to its attraction to global talent. Mercer has ranked Vienna first in its global quality of living ranking every year since 2009 and the Economist Intelligence Unit has ranked it the second most liveable city in the world since 2011.

	Quality of living global rank
Vienna	1
Zurich	2
Munich	4
Dusseldorf	6
Frankfurt	7
Geneva	8
Copenhagen	9
Basel	10
Amsterdam	12
Berlin	13
Bern	14
Hamburg	19
Stockholm	20
Luxembourg	21
Stuttgart	26

Source: Mercer, 2017

CONCLUSIONS

- Knowledge capitals - cities with the strongest human capital and networking characteristics - are likely to see the most robust demand for office space in the long run. These cities are expected to thrive in the knowledge-based economy. Jobs they are likely to attract will be more resilient to automation than other types of activities.
- These cities are likely to experience stronger demographics than other locations as they will be able to generate the most attractive jobs and attract more people. They should also outperform other cities in terms of economic growth by hosting the most productive economic activities. Other factors that increase a city's appeal to highly skilled individuals will contribute to its success. These include cultural appeal and quality of life as well as the quality of governance.
- Knowledge capitals are appropriate long-term real estate investment targets. Simply being in the right cities will not be sufficient to guarantee investment out-performance, however. Real estate is a local asset class, therefore it is crucial to develop deep local expertise and local networks in each city. This will position investors to create value through asset management and by sourcing the most attractive buying and selling opportunities.



Image shown: La Defense financial district in Paris, France.

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