Agility, Talent and Technology

The pace and scale of change in today’s globalised, digitised economy is leading to an unprecedented transformation of our cities. As technology-enabled platforms lower barriers to entry and ensure that demand for talent and innovation becomes increasingly global, cities are needing to adapt and build environments that foster innovation ecosystems, talent and connectivity in order to maintain their competitiveness and gain the benefits of this rapid shift.

JLL’s City Momentum Index (CMI), now in its fifth year, tracks a broad range of factors to identify those cities which possess the attributes for success over the short and long term. The Index covers 131 major established and emerging business hubs across the globe, measuring each city’s short-term socio-economic and commercial real estate momentum, together with its ‘future-proofing’ capacity – the ability to maintain this momentum over the longer term.

The 2018 CMI focuses for the first time on those cities which have the qualities necessary to manage and benefit from this rapid technological shift in the global economy and assesses their future-proofing potential – potential founded in factors such as innovation capability, talent and world-class higher education; high levels of technology start-ups and scale-ups; patent applications; public infrastructure; and the quality of the environment. While some of the world’s largest and most globally-connected cities feature in this list – like New York, London, Paris and Tokyo – smaller metro areas able to leverage their strengths in education, liveability and sustainability such as Silicon Valley, Melbourne and Stockholm also perform strongly.

The need to take into account a city’s future-proofing capabilities is increasingly recognised by real estate investors, developers and corporations. For investors, there is an imperative to comprehend which cities will be able to gain from technological transformation for long-term value preservation and growth. Developers can contribute to city success by understanding city strategies and their capacity for supporting the move towards new types of economy activity, enabling them to produce transformational projects that facilitate creativity, innovation and the sustainable communities that businesses and workers are now demanding. And with access to talent a key consideration for corporate location strategies, businesses need to know which cities have the attributes necessary to attract and retain skilled workforces.

The 2018 edition of the CMI also identifies the cities exhibiting the greatest short-term economic and real estate momentum (over a three-year horizon). These cities are undergoing significant change to their urban fabric as they build out the infrastructure to meet urgent demand, and many are quickly moving up the value curve, dominated by cities in the Asia Pacific region.

Combining the different components of the CMI together also allows us to highlight cities which are seeing strong short-term momentum while also possessing the features necessary for long-term success, such as Singapore and Seattle.
City Momentum Index: Future-Proofing

Global Top 30


Future-Proofing: Key Ingredients

- Technology Firms
- Education
- Environment
- Transparency
- Infrastructure
- International Patents

The cities which top the CMI 2018 Future-Proofing rankings are at the forefront of the innovation economy. By investing in and leveraging their strengths in technology, physical and digital connectivity, quality of life and sustainability, they are positioned to maintain their performance into the future in this new competitive landscape.

Source: JLL, 2018
Technology clusters underpin sustained momentum in North America

Home to some of the world’s most dynamic technology ecosystems, North America accounts for half of the cities in the Future-Proofing Global Top 30:

- The San Francisco Bay Area’s **San Francisco** (1st) and **Silicon Valley** (2nd) top the Future-Proofing component as the world’s premier technology hubs. Between them, these two cities are home to more than a third of all tech ‘unicorns’ created over the last 15 years globally, while they also host the largest number of new tech start-ups.

- **New York** (3rd) has the most people employed in tech occupations in the U.S., as well as adding the largest amount of people in this category over the five years to 2016. Supplementing its concentration of the world’s biggest companies, it has the second highest number of tech start-ups in the CMI (after San Francisco).

- A unique concentration of some of the world’s leading research institutions and human capital ensures **Boston’s** (5th) status as a global leader in research and technology. Heading the rankings for education infrastructure and impact, the city is among the most prolific sources of patent applications globally.

- Southern California’s **Los Angeles** (6th) and **San Diego** (10th) are also both in the top 10 markets. World-class university systems are underpinning substantial growth in technology talent, with their combined metros employing more people in computer and mathematical occupations than any other West Coast market. This is translating into significant innovation potential, with both cities also among the top 5 U.S. markets for international patent applications.

- **Toronto** (9th) is home to a thriving technology sector and is a global leader in commercialising new technology. Projects such as Quayside – a waterfront neighbourhood which is being designed as a new form of tech-enabled community in partnership with Sidewalk Labs, an Alphabet subsidiary – underscore the city government’s commitment to leading on new forms of city innovation.

Together with these major tech clusters, a number of smaller tech and knowledge-intensive cities such as **Austin** (18th), **Vancouver** (19th) and **Denver** (20th) also feature in the Global Top 30, drawing on strong education systems, connectivity and liveability platforms to attract companies and talent.
Northern Europe outperforms

Northern European cities are strongly represented among the Future-Proofing Global Top 30, boosted by high levels of knowledge-intensive employment, physical and digital infrastructure, and sustainability credentials. Three metro areas stand out in the top 10 of the rankings:

- **London**’s (4th) strengths in education and innovation support vibrant and diversified technology and creative sectors, as it registers the largest number of tech start-ups as well as tech ‘unicorns’ in Europe. It has ranked as the top destination for foreign companies to invest in software and IT services globally over the last 10 years, and 2017 marked the seventh successive year with over US$1 billion of foreign investment in the sector.

- **Paris** (7th) is Europe’s research engine, with the biggest high-tech workforce in the region and accounting for the greatest number of international patent applications. Significant investment – such as the ‘Grand Paris’ project, one of the largest infrastructure programmes in the world – is laying the groundwork for sustained momentum in the future.

- **Amsterdam** (8th) has one of Europe’s fastest-expanding technology scenes, with the highest levels of tech start-ups per capita in the region, underpinned by its global connectivity and multilingual and highly educated workforce. Successful local firms like Booking.com, TomTom and Gemalto are now being joined by a new set of tech start-ups, such as WeTransfer and Adyen, while the city is also the regional base for several global tech companies.

A number of other European cities also perform particularly well, supported by exceptional levels of high-tech employment, concentrations of innovative, globally successful firms and a high quality of life, including the Nordic capitals **Copenhagen** (22nd), **Stockholm** (23rd) and **Helsinki** (27th), the German cities of **Munich** (15th) and **Berlin** (16th), and **Edinburgh** (24th) in the UK.
Mapping the City Momentum Index:

**Future-Proofing Global Top 30**

Future-Proofing: Key Ingredients

- Technology Firms
- Education
- Environment
- Transparency
- Infrastructure
- International Patents

Source: JLL, 2018
‘Established World Cities’ maintain their lead in Asia Pacific

Several of Asia Pacific’s most globally connected, high-value and transparent cities have made considerable progress towards building the innovation ecosystems and human capital required to continue to thrive in the new digital economy:

- **North Asia’s largest urban economies Tokyo (13th) and Seoul (28th)** both feature in the Global Top 30. Concentrations of innovative global firms and among the world’s best digital connectivity are helping them maintain their positions as global research leaders, particularly in hardware and robotics, as they take the top two positions for international patent applications. Both cities are also investing in significant infrastructure projects – such as Seoul’s Pangyo Techno Valley and the development of new autonomous public transit systems in Tokyo, expected to be ready for the 2020 Summer Olympics.

- **Australia’s Tier 1 cities Sydney (14th) and Melbourne (17th)** both figure in the Global Top 30, supported by robust technology sectors and strengths in education and liveability.

- **Singapore (29th)** has supplemented its established strengths in high-tech hardware manufacturing with a growing focus on software innovation, supported by high levels of R&D spending and a robust education system. The regional headquarters for several of the world’s largest technology companies, it is also home to R&D centres for Google, HCL and Infosys as well as to one of the largest tech start-up scenes in Asia. Government commitment to fostering new technology – like piloting NuTonomy, the world’s first autonomous taxi service – is also positioning it robustly for the future.
City Momentum Index:

**Short-Term Momentum Top 30**

<table>
<thead>
<tr>
<th>Rank</th>
<th>City</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hyderabad</td>
<td>Asia</td>
</tr>
<tr>
<td>2</td>
<td>Bangalore</td>
<td>Asia</td>
</tr>
<tr>
<td>3</td>
<td>Ho Chi Minh City</td>
<td>Asia</td>
</tr>
<tr>
<td>4</td>
<td>Pune</td>
<td>Asia</td>
</tr>
<tr>
<td>5</td>
<td>Kolkata</td>
<td>Asia</td>
</tr>
<tr>
<td>6</td>
<td>Hanoi</td>
<td>Asia</td>
</tr>
<tr>
<td>7</td>
<td>Nanjing</td>
<td>Asia</td>
</tr>
<tr>
<td>8</td>
<td>Delhi</td>
<td>Asia</td>
</tr>
<tr>
<td>9</td>
<td>Hangzhou</td>
<td>Asia</td>
</tr>
<tr>
<td>10</td>
<td>Xian</td>
<td>Asia</td>
</tr>
<tr>
<td>11</td>
<td>Nairobi</td>
<td>Africa</td>
</tr>
<tr>
<td>12</td>
<td>Chongqing</td>
<td>Asia</td>
</tr>
<tr>
<td>13</td>
<td>Wuhan</td>
<td>Asia</td>
</tr>
<tr>
<td>14</td>
<td>Chennai</td>
<td>Asia</td>
</tr>
<tr>
<td>15</td>
<td>Shanghai</td>
<td>Asia</td>
</tr>
<tr>
<td>16</td>
<td>Guangzhou</td>
<td>Asia</td>
</tr>
<tr>
<td>17</td>
<td>Tianjin</td>
<td>Asia</td>
</tr>
<tr>
<td>18</td>
<td>Manila</td>
<td>Asia</td>
</tr>
<tr>
<td>19</td>
<td>Shenzhen</td>
<td>Asia</td>
</tr>
<tr>
<td>20</td>
<td>Mumbai</td>
<td>Asia</td>
</tr>
<tr>
<td>21</td>
<td>Chengdu</td>
<td>Asia</td>
</tr>
<tr>
<td>22</td>
<td>Beijing</td>
<td>Asia</td>
</tr>
<tr>
<td>23</td>
<td>Jakarta</td>
<td>Asia</td>
</tr>
<tr>
<td>24</td>
<td>Kuala Lumpur</td>
<td>Asia</td>
</tr>
<tr>
<td>25</td>
<td>Lagos</td>
<td>Africa</td>
</tr>
<tr>
<td>26</td>
<td>Singapore</td>
<td>Asia</td>
</tr>
<tr>
<td>27</td>
<td>Dubai</td>
<td>Asia</td>
</tr>
<tr>
<td>28</td>
<td>Bangkok</td>
<td>Asia</td>
</tr>
<tr>
<td>29</td>
<td>Seattle</td>
<td>North America</td>
</tr>
<tr>
<td>30</td>
<td>Bucharest</td>
<td>Europe</td>
</tr>
</tbody>
</table>

**Short-Term Momentum: Key Ingredients**

- Population
- Connectivity
- RE Investment
- Property Prices
- Economic Output
- Corporate Activity
- Construction
- Retail Sales

Source: JLL, 2018
Asia Pacific cities in the ascendancy

The CMI Short-Term Momentum rankings identify the urban economies and real estate markets which are currently undergoing the most rapid growth. They highlight the continued rise of Asia Pacific’s cities as destinations for global capital, commerce and innovation, with markets from the region accounting for 25 of the Global Top 30:

• India maintains its pre-eminence in the Short-Term Momentum rankings with four of the top five markets, as its cities register among the highest rates of demographic and economic growth globally, while also benefitting from government efforts to boost business attractiveness and invest in infrastructure. The country’s leading tech hubs Hyderabad (1st) and Bangalore (2nd) take the two top positions, while Pune (4th) and Kolkata (5th) round out the top 5. India’s Tier 1 cities Delhi (8th), Chennai (14th) and Mumbai (20th) also feature in the Global Top 30, with continued strong demand from technology, finance and pharmaceutical companies keeping take-up volumes buoyant and investor activity on an upward path.

While economic energy is propelling India’s cities forward, they also exemplify some of the challenges facing markets with strong momentum, including strains on infrastructure and local amenities; high levels of inequality and affordability issues; and environmental degradation, which can all be compounded by a lack of planning oversight and transparency. In order to maintain their growth over the longer term, these cities will need to focus on future-proofing their markets through improved liveability and affordability, regulatory transparency and physical and technological infrastructure.

• Chinese cities show no sign of diminishing momentum, accounting for 11 of the Global Top 30. China’s ‘Powerhouses’, which are firmly integrated into global production networks and engines of the national economy – Nanjing (7th) and Hangzhou (9th) – are the top performers, boosted by their shift up the value chain. They are joined by markets with a strong talent base which are becoming global leaders in technology and advanced manufacturing such as Guangzhou (16th) and Shenzhen (19th), while China’s ‘Established World Cities’ Shanghai (15th) and Beijing (22nd) remain among the world’s most dynamic markets, supported by a raft of innovative, ‘next generation’ corporations, rapidly-developing infrastructure and educated workforces.

• The Vietnamese cities of Ho Chi Minh City (3rd) and Hanoi (6th) are attracting sizeable volumes of foreign direct investment (FDI) as they integrate into regional and global supply chains for high-technology manufacturing. This is helping to spur rapid economic and income growth, leading to among the world’s highest rates of increase in retail sales and air passenger numbers.

• Asian ‘Megahubs’ which act as regional gateways and have the scale to compete for talent, visitors and innovation – including Manila (18th), Jakarta (23rd), Kuala Lumpur (24th) and Bangkok (28th) – are continuing to drive forward on the back of significant economic momentum. Offering substantial growth potential, these cities are key expansion markets for many corporates and are drawing particular interest from Chinese companies as they internationalise. They also have some of the highest levels of real estate completions across the globe as they build out the infrastructure to service this demand.
Short-Term Momentum versus Future-Proofing

Singapore and Seattle in the sweet spot

The two components of the City Momentum Index enable cities to be grouped according to their short-term economic and real estate dynamism, as well as the extent to which they have built the future-proofing capacity necessary for longer-term success. This highlights two cities in particular which are combining strong short-term momentum and robust future-proofing potential, scoring in the Global Top 30 on both measures:

- **Singapore** has registered the greatest improvement in Short-Term Momentum of any market over the past year. Rising global trade levels have boosted economic momentum and contributed to an improvement in corporate demand, with net office absorption in 2017 doubling from the previous year. Singapore is projected to record the largest rental growth of any major office market globally in 2018.

- Significant demand from growing tech companies is continuing to boost economic momentum and real estate take-up in **Seattle**. Supported by growth in its share of U.S. tech market jobs, more than 60% of the office space currently being sought by tenants is required by technology companies, boding well for continued strong performance of the Seattle office sector. Tech tenants’ ongoing need for additional space has placed a premium on centrally-located, creative offices with high-end amenities and transit accessibility and is contributing to among the highest rates of forecast office rental growth globally over the next three years.

---

![Short-Term Momentum v Future-Proofing Diagram](image-url)

*Source: JLL, 2018*
The 2018 edition of the City Momentum Index focuses for the first time on two separate elements of city dynamism: short-term market momentum and ‘future-proofing’ for longer-term success. New indicators in the CMI 2018 include the number of technology ‘unicorns’ created in each city and the quality of public transport infrastructure.

The City Momentum Index presents a weighted overall score for the sub-scores of 46 variables. For each variable the model calculates a score based on the city’s performance relative to the distribution of all 131 city regions, scaled from zero to one. Thus the top-scoring city for each variable has a value of one, while the lowest-scoring city receives a value of zero. The variables used in the model are summarised in the chart on the following page, combining variables of short-term socio-economic and commercial real estate momentum with variables measuring longer-term potential – its future-proofing credentials.
Short-Term Momentum

- **Socio-economic momentum** (accounting for 50% of the model) includes variables relating to the recent percentage changes in city GDP, population, air passengers and corporate headquarters presence; projected percentage changes in GDP, population and retail sales; and recent levels of and changes in foreign direct investment (as a proportion of a city’s economy).

- **Commercial real estate momentum** (accounting for 50% of the model) includes variables relating to recent and projected percentage changes in office net absorption, office construction, office rents, shopping mall construction, retail rents and hotel rooms. This sub-index also includes international retailer presence, home-sharing listings, and recent changes in direct commercial real estate investment volumes and real estate transparency.

Future-Proofing

Future economic strength and real estate momentum over the longer term are likely to be partially determined by the quality of a city’s education infrastructure, its innovation capability, environmental sustainability and the strength of its technology sector. This index includes a weighted score of the presence of the world’s top universities, international patent applications, air quality, public transport infrastructure, third-party indices of the innovation economy, and the presence of technology firms.

**Data sources:** All real estate data for the City Momentum Index is sourced to JLL. The non-real estate data is drawn from a wide range of sources that includes Oxford Economics, United Nations, ACI, OECD, WHO, GaWC, fDi Markets, QS, 2thinknow, Atomico and AngelList. The Index also sources data from many national statistical offices.

**Data comparability and accuracy:** The CMI model is based upon data which we believe to be reliable. While every effort has been made to ensure the accuracy and completeness of the data used, we cannot offer any warranty that factual errors may not occur. For the vast majority of cities and variables, data relating to the city region has been used, but in a few cases, particularly in emerging markets, we have had to rely on national data.

**How is the City Momentum Index constructed?**

46 variables are combined to assess short-term momentum and longer-term future-proofing attributes.

---

Source: JLL, 2018
The 131 cities covered by the City Momentum Index have been shortlisted on the basis of a combination of a weighted index of population, GDP, corporate presence, air connectivity, real estate investment activity and commercial real estate stock. Each city is defined as its metropolitan region as delineated by national statistical offices or by international organisations (e.g., United Nations).
To learn more about cities and real estate, visit our website
www.jll.com/cities-research