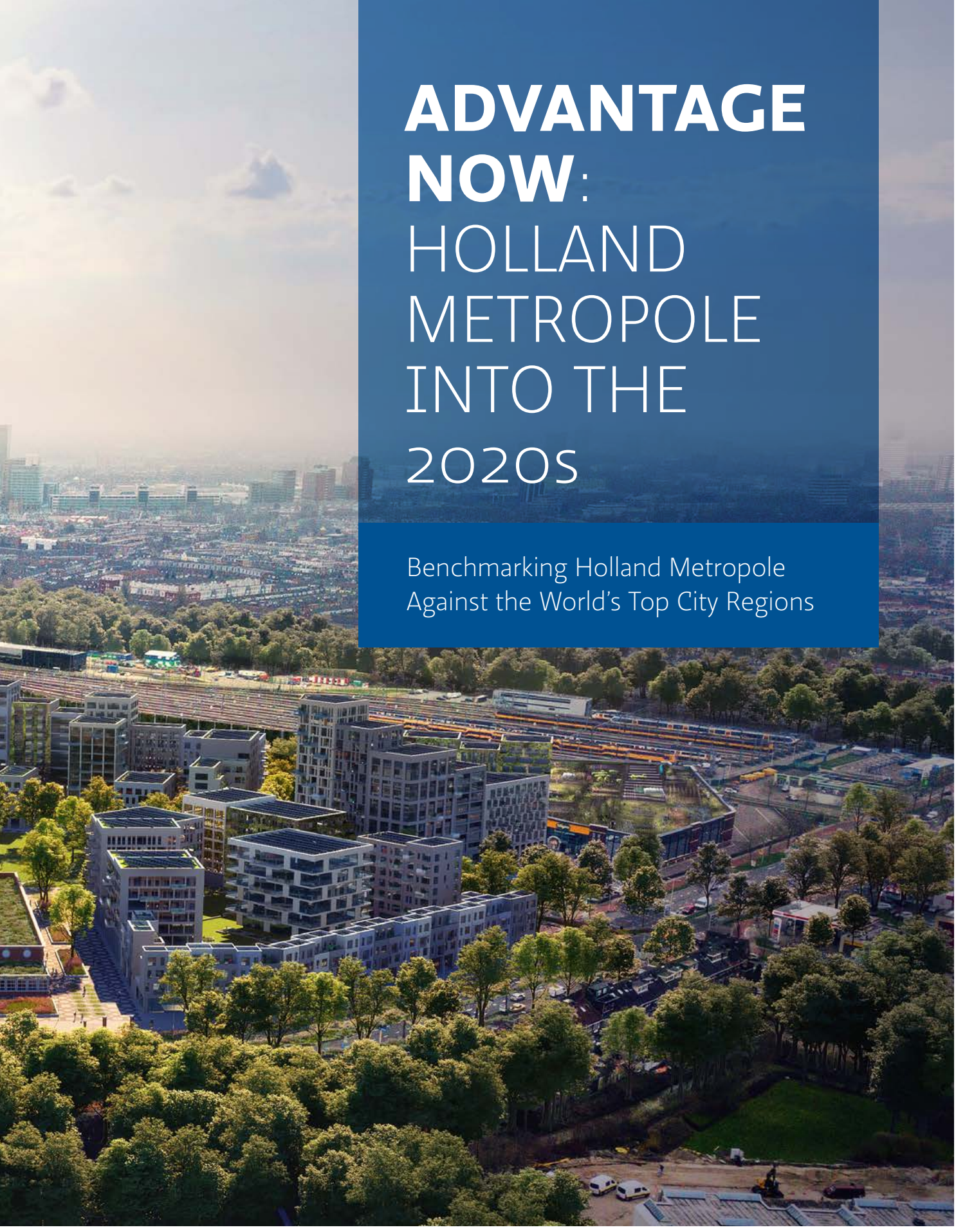
ADVANTAGE NOW: HOLLAND METROPOLE INTO THE 2020s

Benchmarking Holland Metropole Against the World's Top City Regions



2019 Edition

The Business Of Cities

ABOUT THE BUSINESS OF CITIES

The Business of Cities is an urban intelligence firm working with more than 100 cities and companies worldwide each year. It helps leaders to navigate the rapidly evolving relationships between business and cities, and respond purposefully to the twin dynamics of urbanisation and globalisation. The company provides strategy, benchmarking and analysis to help global cities and businesses to work together, find, and learn from, each other, and adopt strategies and tools to achieve their goals.

ABOUT HOLLAND METROPOLE

The Holland Metropole initiative is an alliance between Amsterdam, Rotterdam, The Hague, Utrecht and Eindhoven together with regional partners and major private real estate companies. As world's best connected region, Holland Metropole offers investors a world class business and investment climate.
hollandmetropole.com

AUTHORS

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FOREWORD

With 2020 nearly upon us, the time of the multi-city metropolis has come. In several of the global cities we work with, leaders are revisiting the opportunity to partner much more effectively with the surrounding cities in their region in order to achieve scale, create spaces for specialisation, and foster housing and labour markets that provide attractive choices for everyone.

In 2019 and into the 2020s, this phenomenon is emerging like never before. Sydney, Singapore, Toronto and San Francisco are just some of the examples of great cities collaborating with their neighbours, planning shared futures, establishing a regional innovation strategy and identifying common housing and infrastructure needs. Collaborating to compete is now a global phenomenon. These regions know that the promise of an integrated region is great, even though the journey to get there will be bumpy.

For the cities of Amsterdam, The Hague, Utrecht, Rotterdam and Eindhoven, the experience of a well-connected region is already a daily reality, inherited from choices made in the past but now driving an exciting shared destiny into the future. The mix of companies and institutions now moving to the Holland Metropole is a big vote of confidence in the combined scale and complementary lifestyle and innovation assets that the five cities together possess.

In a context of geopolitical controversy and market volatility, it has become even more apparent that both new and established industries are preferring the regions that have the scale, diversity, global reach and depth of talent to accommodate them. Here the complete offer of the Holland Metropole compares favourably to most in Europe and around the world. A new scenario for Europe means new opportunities for this well-balanced region.

These advantages are reflected in the spikes of performance we observe in 2019's report. Amsterdam maintains its upward curve while the region provides an even more competitive innovation and logistics platform, and the lifestyle and job choices to meet global demand. Success is enhancing the identity and distinctiveness of all five cities, within a single compelling package. Holland Metropole is becoming the multi-city metropolis to watch.

Professor Greg Clark CBE
& Dr Tim Moonen



EXECUTIVE SUMMARY

2019 is accelerating critical trends for the future of cities. The ongoing fall in the costs of computing power and communication, and the amplified capability of digital technologies, are accelerating the pace of globalisation. Technology and urbanisation continue to add to the premium on density, proximity, interaction and efficiency, and to more pressure on metropolitan regions to achieve a high amenity, healthy and sustainable urban experience. Meanwhile a high level of saturation in leading global cities' housing markets and CBDs is driving increased demand from capital, companies and talent for other cities and secondary centres, as well as to bring forwards new land supply, new housing models, and effective urban regeneration.

The result is a revised equation for how cities and regions succeed. To simultaneously compete successfully in established markets, pivot towards innovation and new edges, and meet the needs and expectations of residents, they are having to strive towards a medium density, multi centred metropolis, underpinned by high quality public transport, superb placemaking, and institutions willing to innovate.

These ingredients have existed in the Holland Metropole for a long time. Yet despite their close proximity and connectivity, its five largest cities - Amsterdam, Rotterdam, Utrecht, The Hague and Eindhoven - are usually identified, observed, and measured in isolation from one another. The world does not easily see or recognise that these 5 cities are part of one integrated inter-dependent region.

THE HOLLAND METROPOLE: A SINGLE GLOBAL METROPOLIS

This project, first developed in 2017 and now in its 3rd edition, benchmarks how these five cities would perform if they were measured as a single metropolis. It does this by comparing the whole Holland Metropole region against a group of the most advanced metropolitan regions around the world, using the latest global datasets.

Studies and benchmarks that compare the performance of cities and regions have become much more widespread and sophisticated. They can be used for many purposes. One way is to assess how capable and ready a region is to compete successfully in globally traded markets, and to manage their growth as they attract new kinds of mobile activity.

In the last five years, as this report shows, the data and benchmarks of the world's cities illustrate that as the Holland Metropole has come to be understood more often as one single integrated region, rather than as four or five cities, it has broken away from other high quality cities and established itself among an elite group of global 'Contenders' (see Figure 1). This group possess the assets and aspirations to join the long established global centres – London, New York, Hong Kong, Singapore, Paris and Tokyo – but also to retain some of the qualities that make them a different kind of global city: highly liveable, innovative, influential or well-connected.



Figure 1: The Typology of City Regions in the Global Economy.
Source: The Business of Cities/JLL (2018).



HOW COMPETITIVE REALLY IS THE HOLLAND METROPOLE?

The findings of last year's study demonstrated that while other regions excel in individual areas, the Holland Metropole has the breadth, scale, diversity and dynamics to deserve comparison with the world's best. This year the key findings are that:

1 **Holland Metropole's cities are rising up the Global Benchmarks** faster than nearly all other regions. This is underpinned by the success of the core city of Amsterdam in terms of lifestyle, technology adoption, inclusion, and connectivity, but is supported by the appeal of Rotterdam, Utrecht, The Hague and Eindhoven in terms of the next generation of jobs and talent.

2 **Holland Metropole's cities tend to rank higher for objective performance than they do for the perception** of experts, commentators, or global audiences. The world is not yet fully aware of how successful and how integrated the region is. There is high performance but lower expectation.

3 **Holland Metropole's super-connectedness is driving above average growth in air, port and visitor demand**, even among its peers of world-class regions. Its special internal connectivity between all five cities emerges very clearly compared to other mono-centric regions, and this is providing flexibility and confidence to multiple segments. Its compact, dense development model and its improving digital connectivity (from an already high base) also sees Holland Metropole sharpening its productivity edge.

4 **Holland Metropole's innovation ecosystem is maturing and even by global standards is now delivering very high levels of growth in start-ups and growth ventures.** The growing availability of and appetite for venture capital financing, and the relative rise in co-working spaces, is pronounced. The region is benefiting from different angles of innovation in Eindhoven (energy, photonics, robotics), Rotterdam (circular), Amsterdam (digital and creative industries), The Hague (cybersecurity) and Utrecht (biotech, IoT).

This mix is energised by the region's attraction of leading institutions such as the European Medicines Agency and big firm HQs such as Panasonic, Ferrovial and Unilever. The next step is to translate this entrepreneurial appetite into even more scalable companies, as this is one area the region is behind. Just under 50% of the region's venture-capital backed firms are in the early 'seed' stages of financing, higher than any other region.

5 **Holland Metropole is managing the consequences of its success comparatively well, and maintaining a high-quality set of choices and experiences.** Of the 10 regions' core cities, Amsterdam is the only one to have reduced its overall congestion level since 2008. Holland Metropole is also one of only two regions to have consistently reduced its air pollution exposure in recent years. Despite its global scale and credentials, Holland Metropole remains a relatively affordable region across a wide variety of measures, and its strong DNA of tolerance and work-life balance, and high standard of public services, is also shining through in a range of new measures.

Holland Metropole has the fundamentals of growth, knowledge and infrastructure in place, and is developing its innovation edges that promise to drive a productive, pioneering and inclusive future. As the region evolves and matures into an established metropolis at the forefront of multiple global industries, it will make sense to communicate the story, messages and data of the region more distinctively, and to organise around the vision, investment and tools needed to translate the promise into reality.

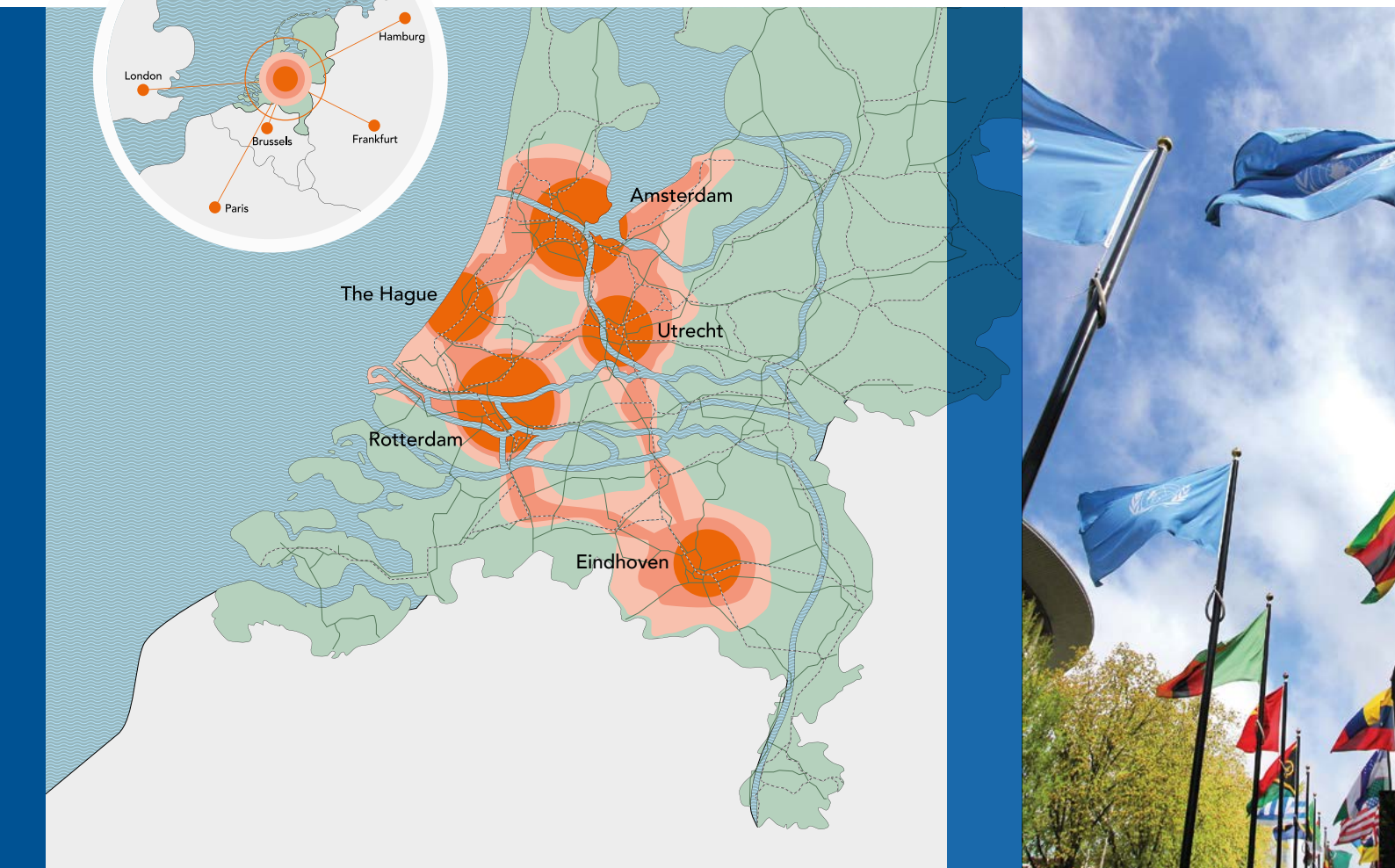
INTRODUCTION

While other globalising city regions have grown outwards from a single city, Holland's global city region has inherited a distinct polycentric form where the five largest cities are all important locations for firms, universities, talent and housing. As we show in this report, the Holland Metropole is unique in that its major cities all have superb connectivity, especially to each other, giving it the feel and appeal of a much larger metropolis.

This inherited dynamic means that its five largest cities have developed shared commuting patterns, and have come to share their ports, airports and connective infrastructure. The sharing of assets, resources and economic specialisations means that Amsterdam, Rotterdam, Utrecht, The Hague and Eindhoven have a combined scale, common factors and complementary assets that allow them to punch above their individual weight.

Today, Amsterdam, Rotterdam, Utrecht, The Hague and Eindhoven are widely known, and typically measured, as five separate cities. But functionally they are one metropolitan region: the Holland Metropole.

The question that presents itself, is if we were to accept the functional reality and look at the Holland Metropole as one region, how competitive is it in the global league table of metropolitan regions? This is what this report tries to answer.



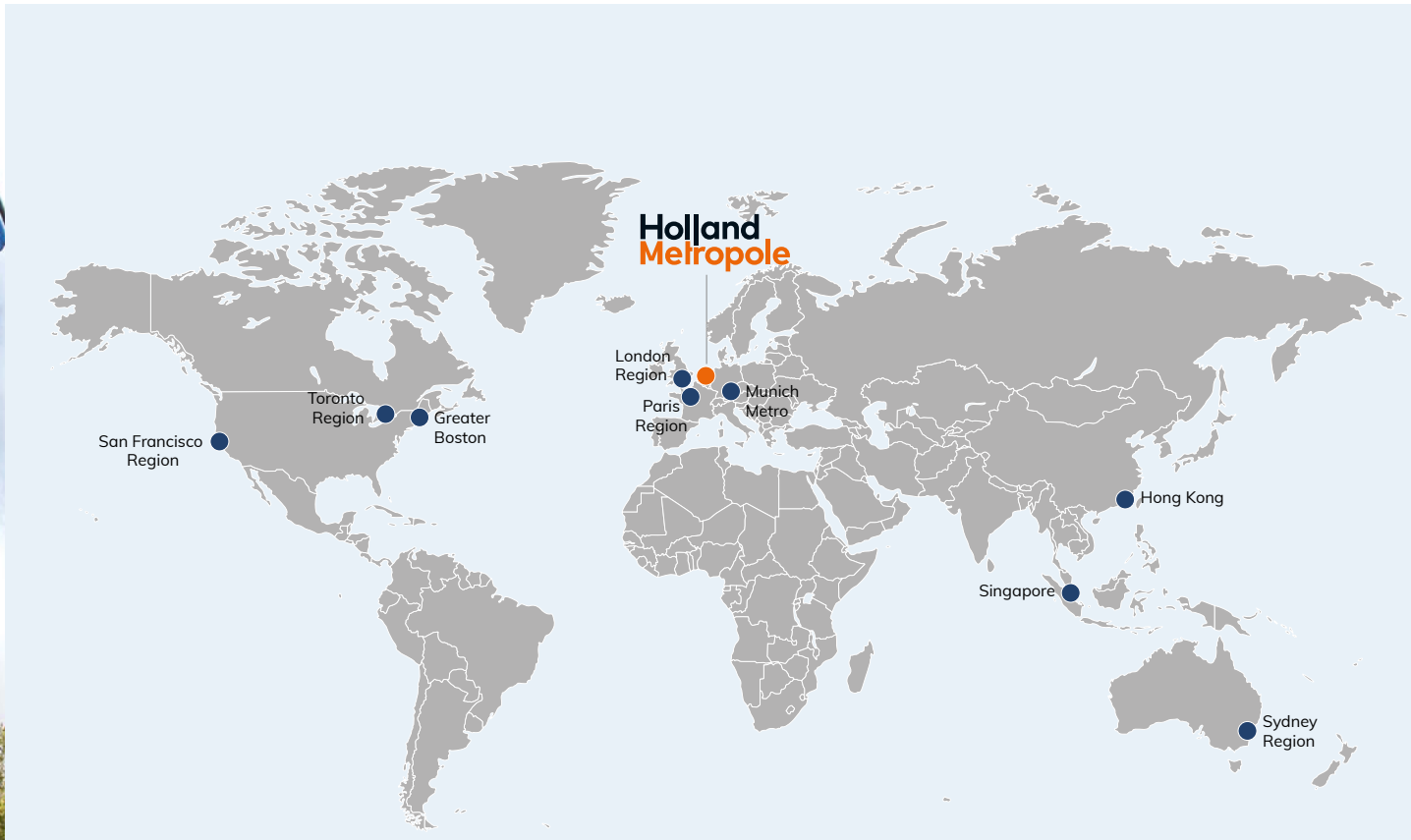
THE 2019 EDITION

In this report we examine the performance of Holland Metropole against 9 of the other highest calibre city regions around the world.

To provide an accurate comparison in terms of scale, the other city regions include outer centres with similar proximity and connectivity to Holland Metropole's furthest city, Eindhoven (see Appendix). This analysis therefore gives even more of a flavour of the real functioning labour market and housing market in these regions, and allows us to see how Holland Metropole performs against other regions that also depend on linkages between more than one city.

Every effort has been made to ensure comparability across regions. In some charts and graphs, different definitions are used and explained explicitly in footnotes.





THE GLOBAL DATA ON CITY AND METROPOLITAN PERFORMANCE

This study draws on a unique combination of data sources to compare the fundamental competitive ingredients of city regions:

- The Business of Cities database of nearly 500 benchmarks of city and regional performance.
- The latest global datasets on metropolitan areas (Brookings, OECD, Oxford Economics).
- National and regional statistics agencies
- Data from regional infrastructure providers.
- Data on company, start-up and innovation activity.
- Regional data from global apps and websites (e.g. Citymapper, Tripadvisor)

Holland Metropole's inclusion in this elite group of regions is justified on the basis of aggregate size, global reach, trade and investment, which have been driving an important cycle of productivity growth. The headline figures show that Holland Metropole's productivity growth is faster than most. The latest figures show that Holland Metropole's GDP per capita grew by 3.3% year-on-year, while the productivity of other European peers has grown more slowly. In London, productivity has even declined, as a result of the depreciation of the pound relative to other currencies (see Figure 2). Holland Metropole is creating jobs, but importantly they are more productive and higher value jobs. This underpins its stable and robust labour market that makes the region appealing to workers but also offers predictability for those looking to invest.

	% YoY growth, GDP per capita
Singapore	+7.5%
San Francisco Region	+4.0%
Hong Kong	+3.3%
Holland Metropole	+3.3%
Paris Region	+3.0%
Greater Boston	+1.8%
London Region	-3.4%

Figure 2: Latest year-on-year productivity growth, Holland Metropole and selected peers. 2016-2017 data. Data for Munich Metro, Greater Toronto and Greater Sydney could not be retrieved due to data constraints. See appendix for sources and regional definitions used



HOLLAND METROPOLE'S CITIES ARE RISING UP THE GLOBAL BENCHMARKS IN 2019

The past year has seen significant evolution in the universe of city benchmarks. There are now well over 500 such studies produced worldwide, by a mix of international organisations (e.g. UN Habitat and the World Bank), think-tanks (e.g. Brookings Institution, Mori Memorial Foundation), global consultancies (e.g. AT Kearney and Mercer), built environment companies (e.g. Arcadis and Arup), technology providers (e.g. TomTom and IBM), and many more. In this cycle, there have been two major changes:

1 **A new generation of benchmarks is revealing greater insights into city performance by leveraging data mining and aggregation techniques.** These not only reveal cities' performance across a much wider set of indicators than before, but also include insights into global perceptions as well as local performance.

2 **There has been a shift to focus on how well cities manage growth at a wider scale.** Whereas established benchmarks focus on economic growth and investment attraction, a new wave of indexes explores how well cities manage growth – their equations for liveability, sustainability, brand identity, affordability and meeting resident needs.

Holland Metropole is one of the most frequently ranked city regions worldwide, with more than 400 appearances (in indexes and sub-indexes) across all five cities. Partly due to the way each city borrows scale from the others, and partly due to its unique system of economic specialisation, **Holland Metropole performs very well in these new benchmarks.** It is particularly striking that across all benchmarks, **Amsterdam has maintained its position as the 3rd highest performing city region worldwide**, behind only London and New York (see Figure 3). Over 40% of all benchmarks take into account the wider metropolitan and regional level of performance, reflecting the success of Amsterdam but also the appeal of the wider region.

2017-2018	
1	London
2	New York
3	Amsterdam
4	San Fransisco
5	Singapore
6	Tokyo
7	Berlin
8	Stockholm
9	Paris
10	Toronto

2018-2019	
1	London
2	New York
3	Amsterdam
4	Berlin
5	Singapore
6	Paris
7	Munich
8	Zurich
9	San Francisco
10	Stockholm

Figure 3: Top-10 performing cities across all global benchmarks, 2017-2018 and 2018-2019.
Source: The Business of Cities. Performance assessed using an ELO algorithm to measure city performance across all indexes for the 100 most frequently measured cities worldwide.



This improvement is down to Amsterdam's exceptional performance in new measures of **liveability, technological readiness, inclusion, and connectivity.** Some highlights include:

- 1st-place performances in global studies such as the Healthiest Cities Index, Best Cities for Tech Enthusiasts and Qatar FCA Global Green Finance Index (for the depth of its green finance).
- Top-5 performances in the 2019 editions of established global benchmarks, such as Oliver Wyman Future of Mobility Competitiveness Index (2nd), IESE Cities in Motion Index (3rd), AT Kearney Global Cities Outlook (4th), and Tan et al. Global Liveable and Smart Cities Index (4th).
- Multiple top-10 performances in other global and regional studies, such as the Mori Memorial Foundation Global Power City Index (6th) and fDi Global Cities of the Future (8th).

But what has really been important for Holland Metropole's rise is that the **region's other constituent cities are also performing very well**. For example:

- Utrecht, Rotterdam and Eindhoven all rank in the top 20 in Europe for the number of app economy jobs (ppi)
- Eindhoven, Rotterdam and The Hague all rank in the top 25 global innovation hubs in EMEA. (Hickey & Associates)
- Utrecht, Eindhoven and Rotterdam now rank in the top 80 globally for job opportunities (Movinga)
- Rotterdam, The Hague and Eindhoven rank in the top 45 globally for talent competitiveness (INSEAD)

Exceptional performance not yet matched by perception.

Across more than 500 benchmarks, **Amsterdam continues to rank higher for objective performance than it does for the perception of experts or global audiences.** It ranks 3th for performance but only 5th when perception components are included – including perceptions about which cities are most successful, attractive and efficient. This suggests that global perception of Amsterdam's urban performance has not yet caught up with the reality of how the region operates and flourishes on a day-to-day basis. The opposite is true in other regions, where perception is better than performance – notably, Singapore and the San Francisco Region.



HOLLAND METROPOLE'S SUPER-CONNECTEDNESS IS DRIVING GLOBAL GROWTH

Holland Metropole continues to excel in measures of connectivity and infrastructure – particularly digital and rail connectivity. It stands out for the recent rapid growth of its infrastructure demand.

The region's special connectivity is firstly visible in the number of annual air passengers travelling to and from the region. Amsterdam Schiphol Airport, Rotterdam-The Hague Airport and Eindhoven Airport together welcomed nearly 80 million passengers in 2018, putting Holland Metropole 4th of the 10 regions, ahead of Hong Kong and Singapore and just behind the San Francisco Region (see Figure 4).

Passenger numbers have grown faster than in other regions. With a year-on-year growth of just above 4%, Holland Metropole's growth in passenger numbers is on par with its peer regions (see Figure 4). This reflects the high level of recent investment in airport upgrades and long-term strategic vision for the region's future airport capacity and is becoming an even more important competitive advantage for Holland Metropole. Among regions of less than 10 million people, Holland Metropole may become the world's leading aviation hub in the next decade based on its trajectory.

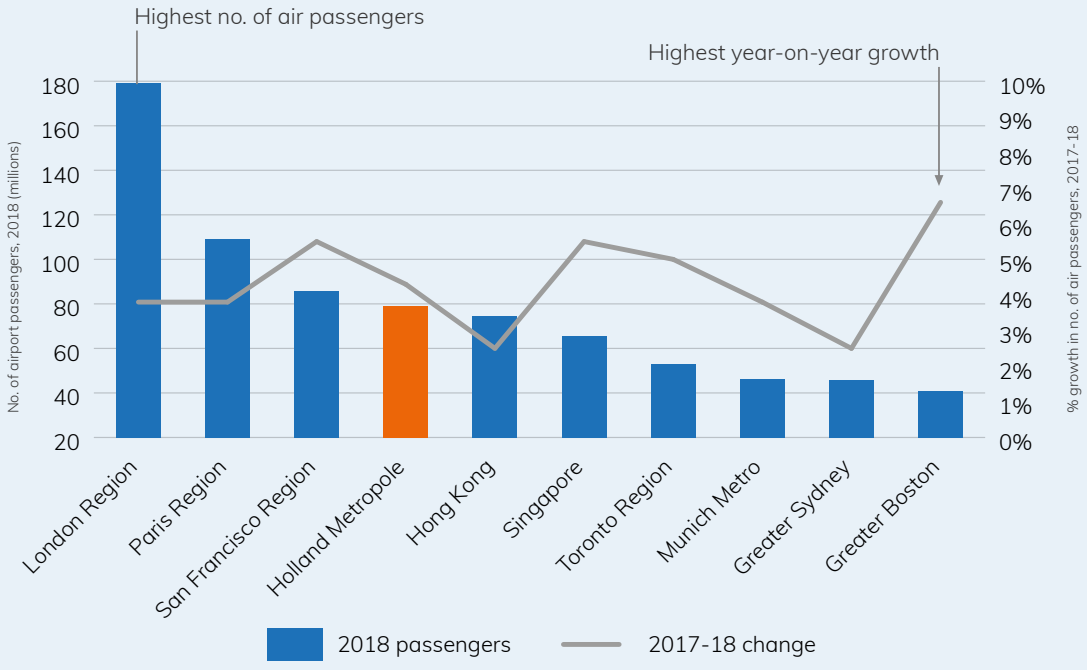


Figure 4: Number and year-on-year growth of annual air passengers Source: ACI. See Appendix for further details.

Holland Metropole is also a major airport and port cargo hub. While the region places 5th among peers for the amount of airport cargo it processes, its total port cargo throughput has witnessed a massive uptick over the past year, growing 10% year-on-year. Total port cargo throughput is third only to Singapore and Hong Kong, and far greater than in the San Francisco and Sydney regions (see Figure 5). This rapid growth in cargo reinforces Holland Metropole's DNA as a trading region and its recent efforts to pivot the regional innovation ecosystem towards the circular economy and advanced manufacturing/logistics.

Holland Metropole's super-connectedness stands out most of all in its internal connectivity. Its polycentric character means the region offers the unique ability to connect multiple large cities directly by rail. Other regions, by contrast, have inherited a pattern of growth around a single centre which has reduced access to jobs and other key urban assets.

When comparing the 10 global regions in terms of the rail connectivity between its five key cities or centres within each region (see Appendix for methodology), **Holland Metropole emerges as by far the best-connected region overall.** The region boasts an average travel time between the five centres of just over 50 minutes (second only to Greater Boston) and an average speed of around 85km/h (third only to Munich Metro and the London region) (see Figure 6).

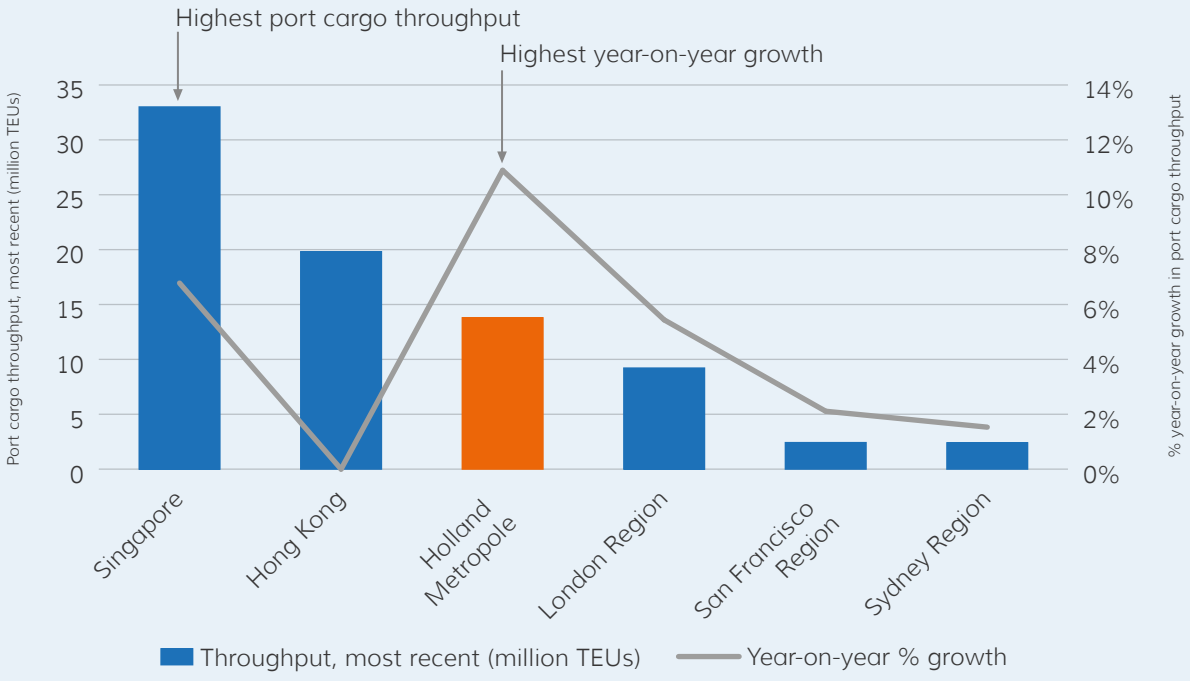


Figure 5: Total volume and year-on-year growth of port cargo throughput.
Source: ACI. See appendix for further details.



Holland Metropole's special connectivity is reflected in the fact that it **is the only region among its peers to provide direct rail travel between all its major centres.** Every connection scores highly in terms of time and speed (60+ out of 100) (see Figure 7). This contrasts with other regions where travel between regional centres requires changing trains, often in the core city – such as the Paris Region, Munich Metro and the London Region – or where public transport journeys more frequently require the use of bus services and are therefore less reliable – such as the Toronto Region and Greater Boston.

This efficiency of Holland Metropole's public transport system represents a big competitive advantage over other regions for several reasons.

1 The high speed, reliability and capacity of the region's transport options provides certainty and confidence to commuters.

2 It discourages car use and in turn reduces congestion and air pollution (see Section 3: Liveability and Talent).

3 Frequent and reliable rail links are a prerequisite to successfully accommodate the innovation economy in dense nodes that are able to host a critical mass of economic activity and interaction.

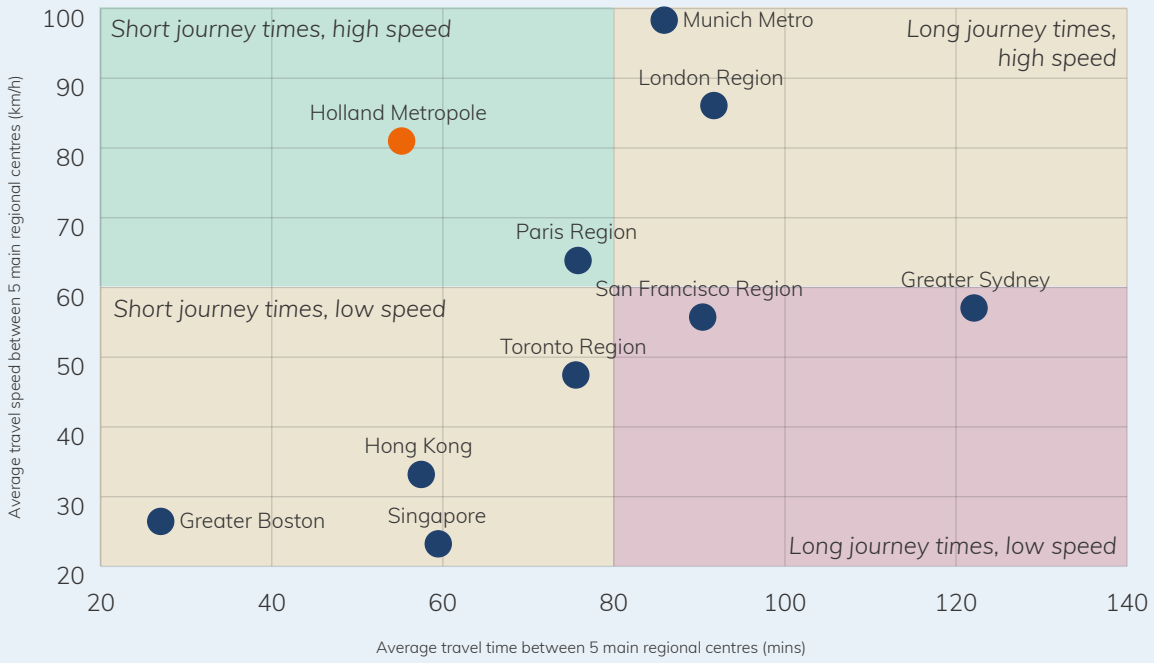


Figure 6: Average travel time and speed between 5 main regional centres in each region.
Source: Google Maps. See Appendix for methodology.

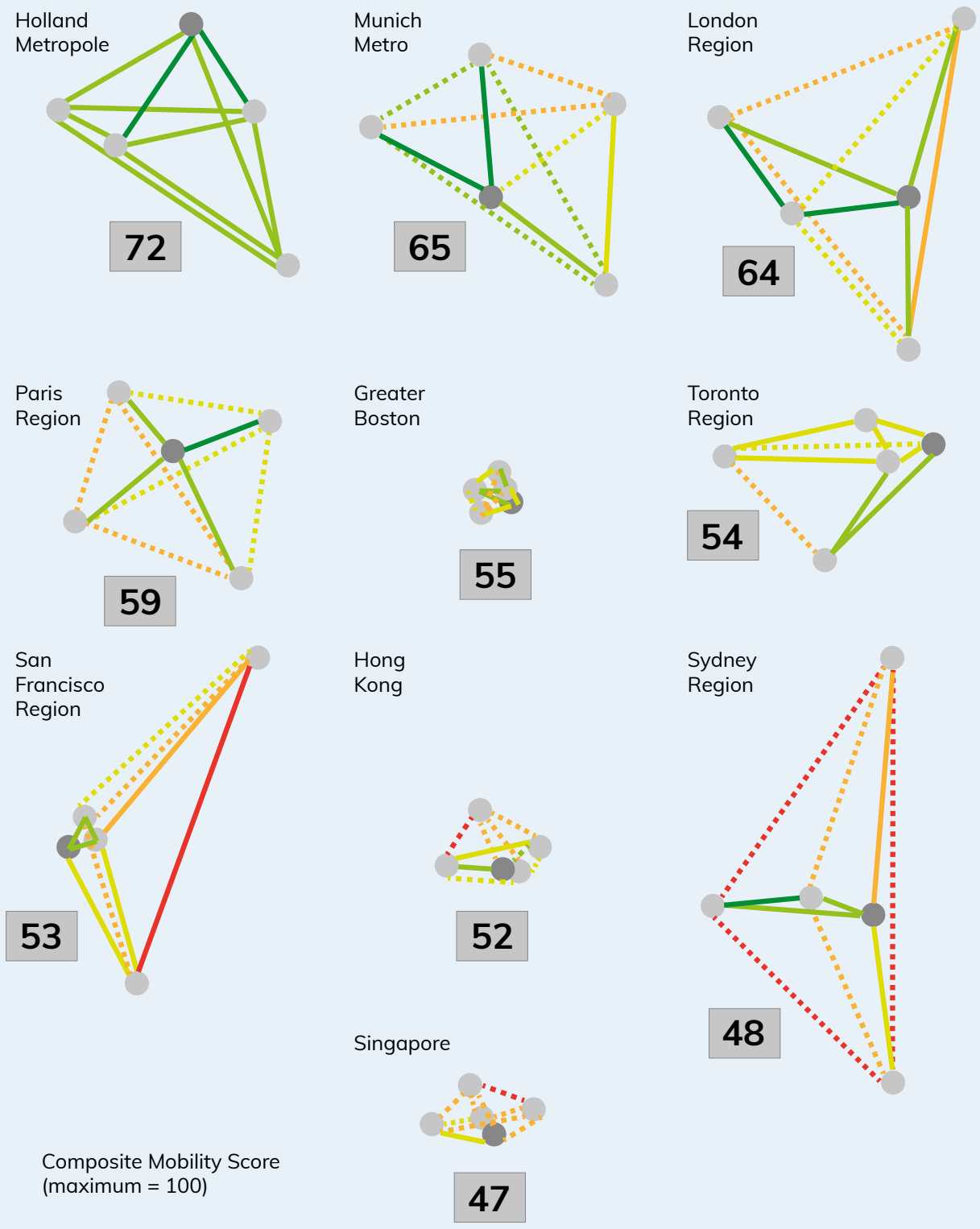


Figure 7: The 10 Regions ranked in terms of connectivity between the 5 main centres in each region.
Source: Google Maps. See Appendix for Methodology.

Meanwhile Holland Metropole's digital infrastructure platform remains very strong by global standards. The region's internet speeds are second only to Hong Kong among its peer group and are more than 50% higher than in Greater Boston, the Toronto Region and the London Region (see Figure 8). The evidence base is now clear that strong digital infrastructure boosts digital workforce skills, internet usage and access to smart services, so it is unsurprising that Amsterdam, Rotterdam, Eindhoven and The Hague all recently ranked in the top 20 cities in Europe for the number of people working in jobs in the 'app economy', or appeared in multiple top 10 rankings in recent Smart Cities Indexes.

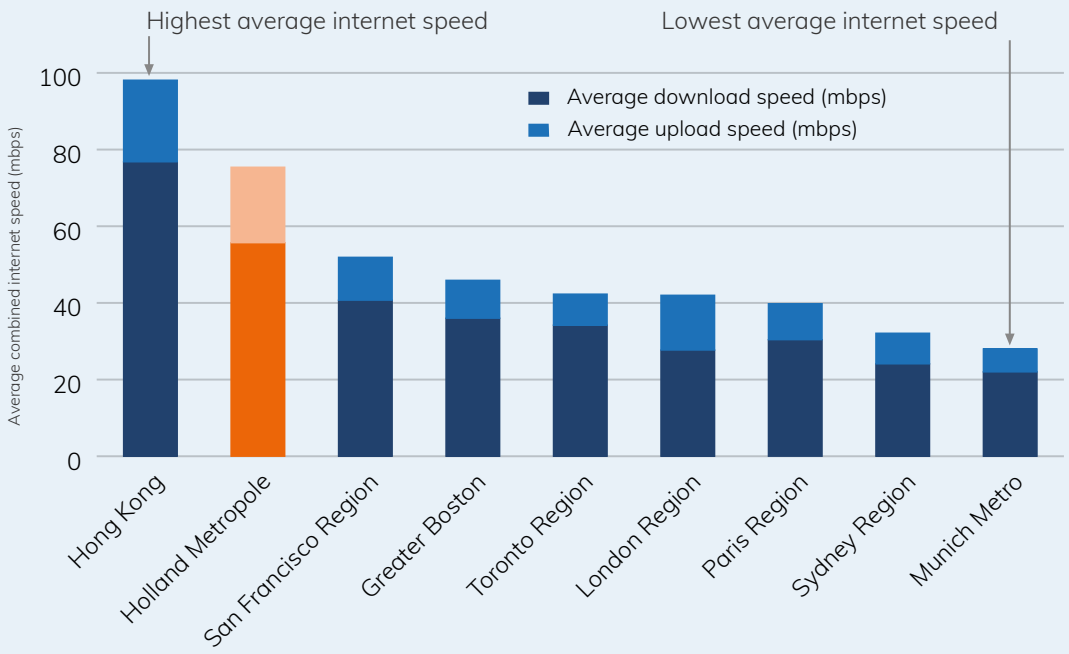


Figure 8: Average internet speed.
Source: testmy.net, August 2018 figures. Singapore not included.




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HOLLAND METROPOLE'S INNOVATION ECOSYSTEM IS NOW DELIVERING A LARGE AND DYNAMIC START-UP SCENE...

Innovation and entrepreneurship are ingrained in Holland Metropole's DNA. The region's ecosystem is based around multiple clusters across a range of sectors and at different stages of maturity. The region's innovation poles include the following sectors:

- Aerospace (Schiphol)
- Logistics (West Amsterdam, Rotterdam)
- Fintech, adtech and the creative industries (Central Amsterdam)
- Sustainable energy, waste and the circular economy (South Amsterdam, Rotterdam)
- Higher education, life sciences and the green economy (Utrecht, Eindhoven)
- (Cyber)security (The Hague)
- Semiconductors, photonics and materials sciences (Eindhoven)

The Holland Metropole region is home to the 3 overarching pillars of the contemporary Dutch port economy:

- "Brainport" (Eindhoven)
- Airport (Amsterdam)
- Seaport (Rotterdam)

Holland Metropole's capacity for innovation continues to be underpinned by an exceptional talent pool and cluster of universities. Currently 41.5% of 25-64-year-olds hold the equivalent of a bachelor's degree or higher. Although this is not as high as in the London Region (51%) and Paris Region (49%), it is higher than in Munich (40.6%) and on a par with the Toronto Region.

Meanwhile 2019 data show that 6 of the region's institutions are stable members of the global Top 200: Delft University of Technology (50th), University of Amsterdam (64th), Eindhoven University of Technology (102nd), Leiden University (118th), Utrecht University (120th) and Erasmus University Rotterdam (183rd). Overall Holland Metropole has more top-200 universities than all peers except London, and benefits from the added advantage of an even dispersal across the region's constituent cities (see Figure 9).

These ingredients have long helped to drive the Holland Metropole's innovation system, which is now a force to be reckoned with, and by several measures on a par with other established global hubs such as the Paris and Toronto Regions:

1 Firstly Holland Metropole

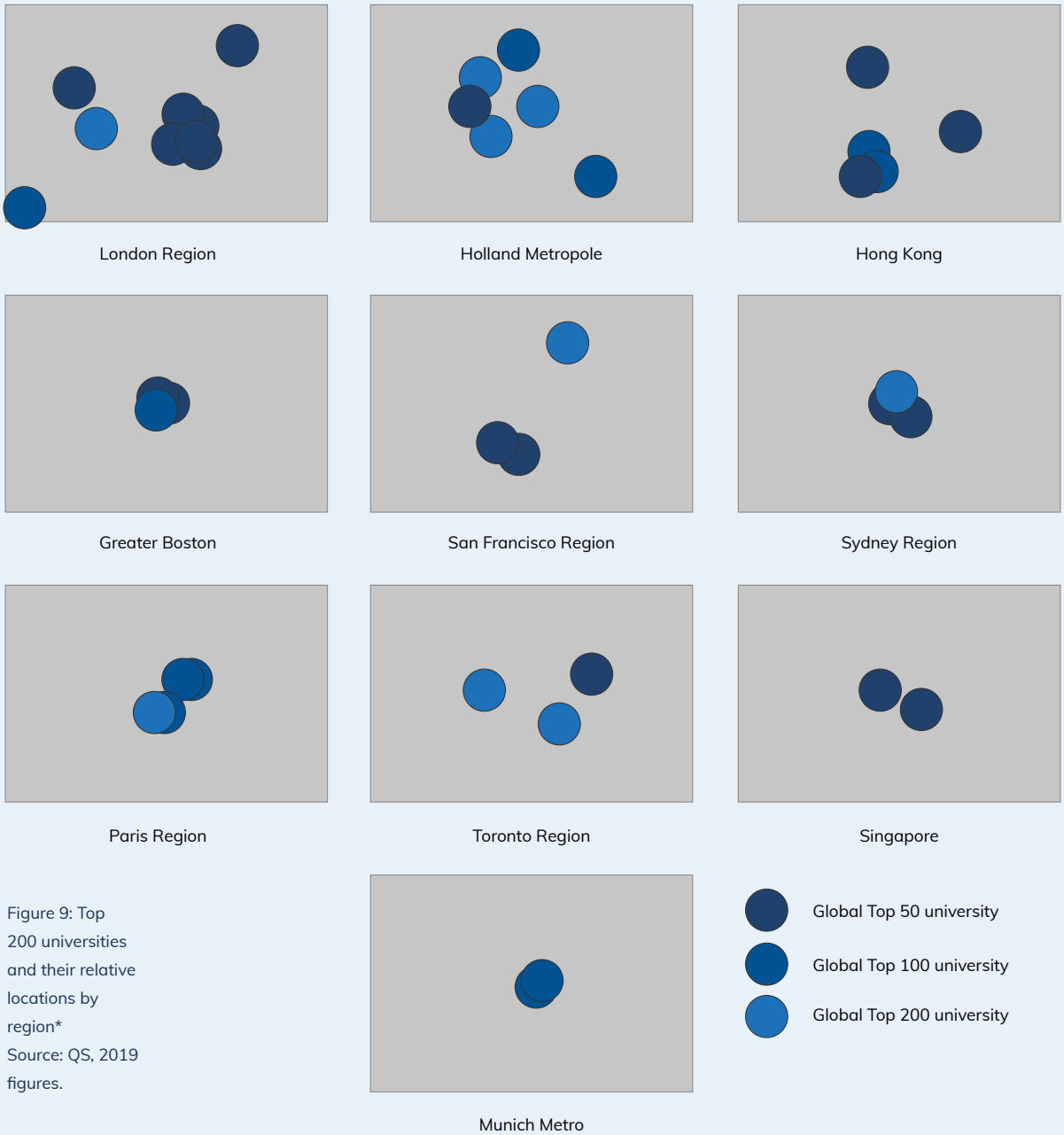


Figure 9: Top 200 universities and their relative locations by region*
Source: QS, 2019 figures.

is expanding its base of start-up and scale-up companies. The region now ranks 6th among the 10 regions for the number of innovative firms (see Figure 10), and there has been a high level of absolute growth in the region's main cities – particularly Amsterdam. With a growth of nearly 60% in the total number of regional innovative firms over the past 12 months, Holland Metropole ranks 1st among peers for this measure (see Figure 11).

2 **Secondly, Holland Metropole benefits from a spatially diversified innovation ecosystem compared to its peers.** Over 60% of the region's innovative firms are located outside the core city - the 2nd highest proportion among peers behind Greater Boston (see Figure 12). This makes the region's innovation ecosystem much less concentrated than in the London and Paris Regions, where less than one third of firms are located outside the urban core. This is partly due to the even spread of top-performing educational institutions throughout Holland Metropole's constituent cities (see Figure 9), which has been important in unlocking innovation not only in the established core cities, but also in smaller and fast-growing cities and municipalities such as Leiden, Delft and 's Hertogenbosch.

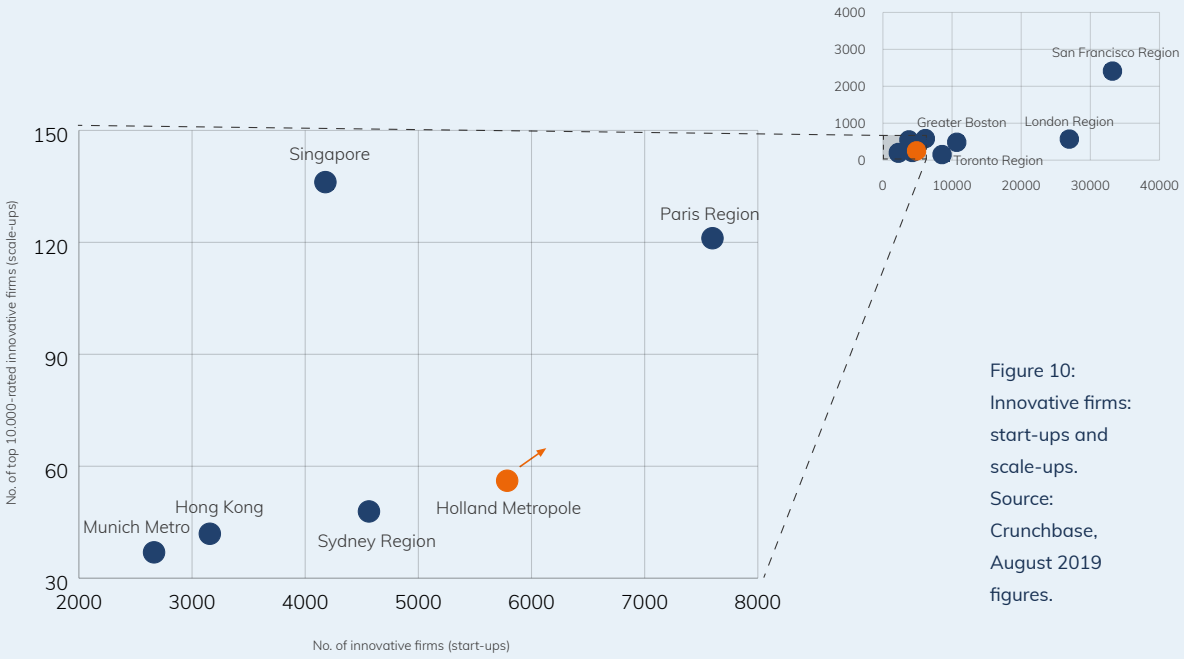


Figure 10: Innovative firms: start-ups and scale-ups. Source: Crunchbase, August 2019 figures.

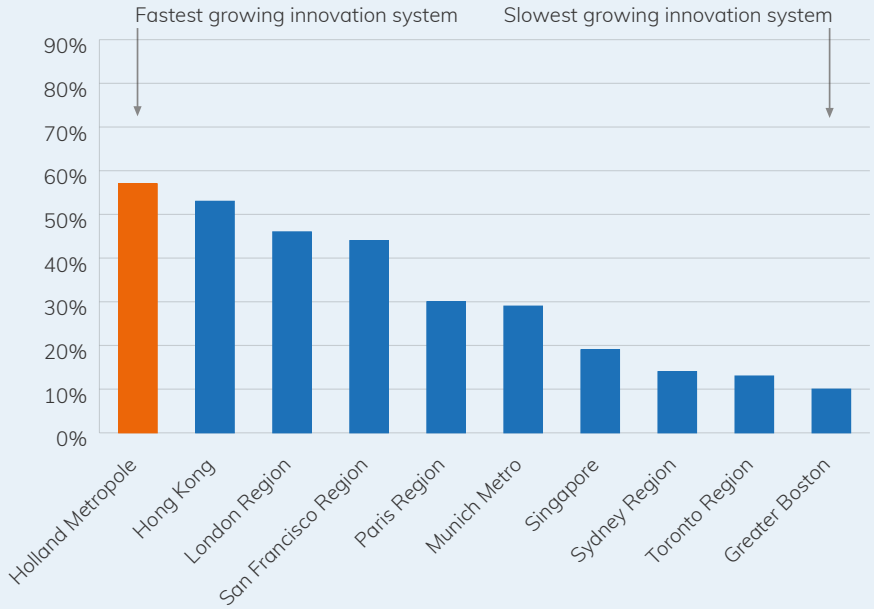


Figure 11: Rate of growth in total number of innovative firms by region, last 12 months Source: Crunchbase, August 2018 and August 2019 figures.

3 Thirdly, Holland Metropole's start up scene now benefits from the **growing availability of and appetite for venture capital financing.** The region currently ranks 4th among peers for the total number of venture-capital backed firms, behind only the regions of London, San Francisco and Paris. With more than 950 venture-capital backed firms in total, the region is well ahead of Singapore and Toronto in 6th and 7th (see Figure 13). The number of venture-capital deals has increased by 117% between the period 2010-12 and 2015-17, making it the 5th highest growth of its peers, way ahead of Toronto and Paris. The introduction of new VC-funds within the region is leading to better upstream funding options, and there has also been an enhanced focus in recent years on hosting large co-working spaces.

4 Finally, new and established high-profile global rankings of innovation capability see the region **excel in specialised** niches, including ranking 2nd for the number of jobs in the app industry, ahead of Paris, and top ranks in RS Components' Best Cities for Tech Enthusiasts (1st), the Innovation category of the 2019 edition of AT Kearney's Global Cities Outlook (6th), and StartupBlink's Best Start-up Ecosystems (16th). Holland Metropole's cities also jointly feature in the top-5 ecosystems for AgTech and CleanTech.

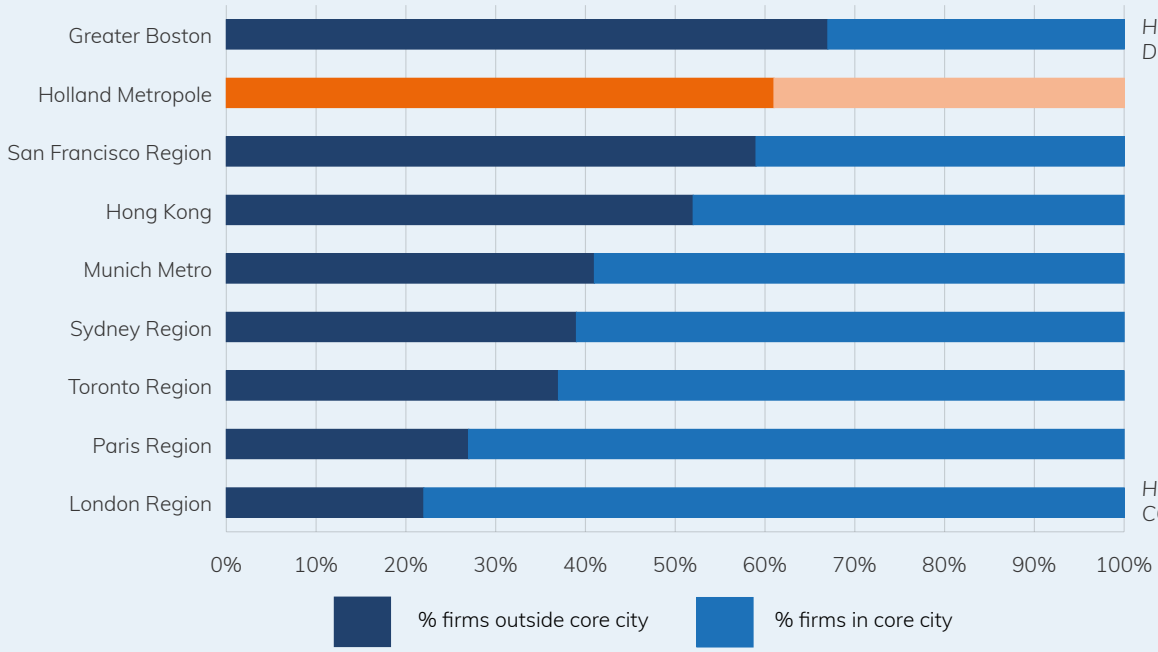


Figure 12: % Diversification of innovative firms beyond core city, by region.
Source: Crunchbase, August 2019 figures. Singapore has been excluded due to its status of city-state.

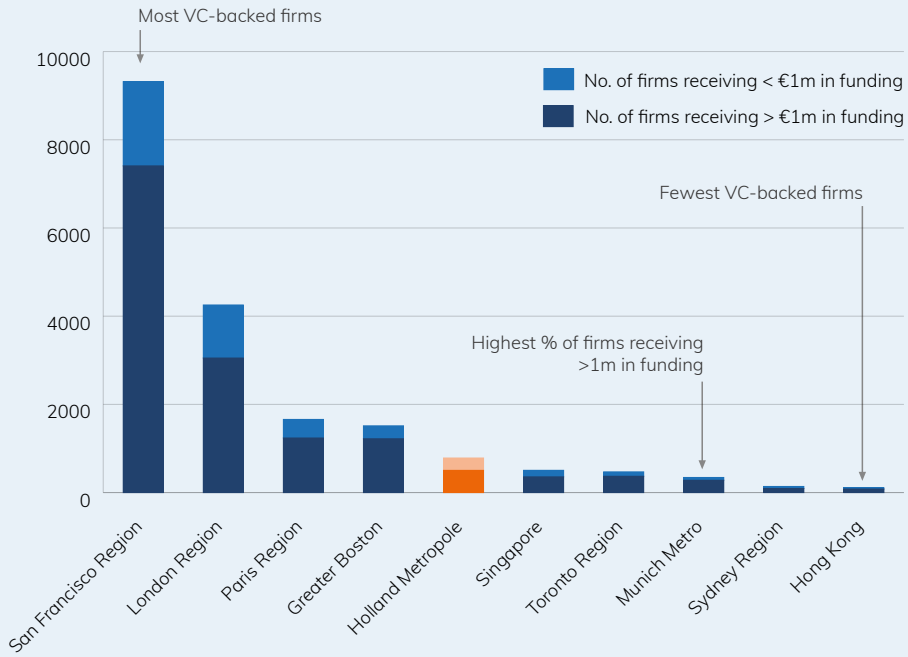


Figure 13: Number of venture-capital backed firms, total and by investment amount.
Source: Dealroom, August 2019 figures. Hong Kong is not included due to lack of data in 2019.



THE JOURNEY TOWARDS MORE SCALE AND GLOBAL REACH

Holland Metropole is hosting more start-ups than ever. The next step is to translate this entrepreneurial appetite into even more scalable companies. The region still ranks 7th of the 10 regions for the number of innovative firms rated among the top 10,000 globally, and the regions in 8th, 9th and 10th are catching up close behind. Just under 50% of the region's venture-capital backed firms are in the seed growth stages, higher than any other region (see Figure 14).

This highlights the high number of capable start-ups and the potential for the region, and that a key priority will be ensuring that these seed-growth firms can move on to receive multiple rounds of funding. The region's innovation intensity is now very impressive. The region currently has more than 750 innovative firms per million inhabitants, which, although significantly behind the leading regions of San Francisco (3,656) and Boston (2,186), is still an improvement since 2018 putting Holland Metropole above Greater Sydney (737) and Singapore (713). (see Table 1).

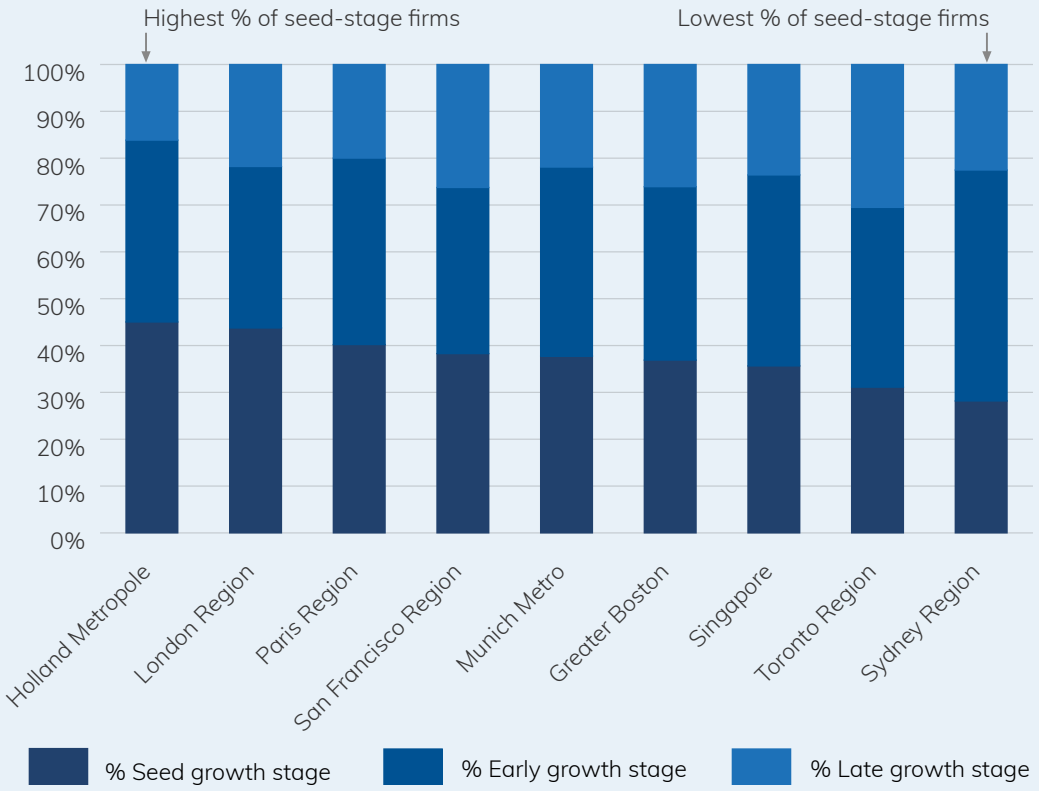


Figure 14: Proportion of venture-capital backed firms by growth stage. Source: Dealroom, August 209 figures.

	Total no. of innovative firms	Regional population (millions)	Innovation intensity (firms per million population)	
San Francisco Region	33,176	9.1	3,656	Highest innovation intensity
Greater Boston	10,658	4.9	2,186	
London Region	26.946	21.7	1,241	
Toronto Area	8,622	7.7	1,120	
Holland Metropole	5,785	7.6	761	
Sydney Region	4,571	6.2	737	
Singapore	4,189	5.9	713	
Paris Region	7,596	12.2	622	
Munich Metro	2,671	6.0	445	
Hong Kong	3,162	7.5	423	Lowest innovation intensity

Table 1: Innovation Intensity: innovative firms per million population.
Source: Crunchbase, August 2019 figures.

HOLLAND METROPOLE: BECOMING AN INNOVATION LEADER IN EUROPE

Data from 2019 also reveals Holland Metropole's success relative to the European innovation scene. All five cities in the region record an Innovation Score among the top 40 in the latest EC Regional Innovation Scorecard (see Table 2). Holland Metropole's innovation performance is more than 20% higher than the EU average by this measure.

Rank in Europe		Aggregate Innovation Score	Innovation Status
1	Zürich Region	160.1	Leader +
3	Helsinki	156.0	Leader +
9	Berlin	145.4	Leader +
11	Munich Metro	140.4	Leader +
18	Utrecht	134.8	Leader
24	Eindhoven	129,1	Leader
30	Holland Metropole	124.5	Leader -
31	Amsterdam	123.0	Leader -
35	Brussels	121.9	Leader -
36	London Region	121.6	Leader -
38	Rotterdam	121.5	Leader -
38	The Hague	121.5	Leader -
47	Paris Region	116.5	Strong +
140	Barcelona Region	77.6	Moderate +

Table 2: Aggregate innovation score of Holland Metropole and Its constituent cities compared to European leader and selected European peers.
Source: European Commission Regional Innovation Scoreboard 2019. Aggregate figure for Holland Metropole calculated from weighted average of constituent cities based on relative metropolitan-scale population sizes.

Holland Metropole's cities have all become highly specialised in different strands of the innovation economy (see Figure 15). For example:

- Utrecht has the most mature educational innovation framework, and very high levels of public sector R&D expenditure (17th of 200+ European regions)
- Amsterdam stands out for its very high number of trademark applications per billion GDP (22nd)
- Eindhoven ranks very highly both for corporate R&D spending (13th in Europe), and the rate of EPO patent and design applications (1st and 13th respectively)

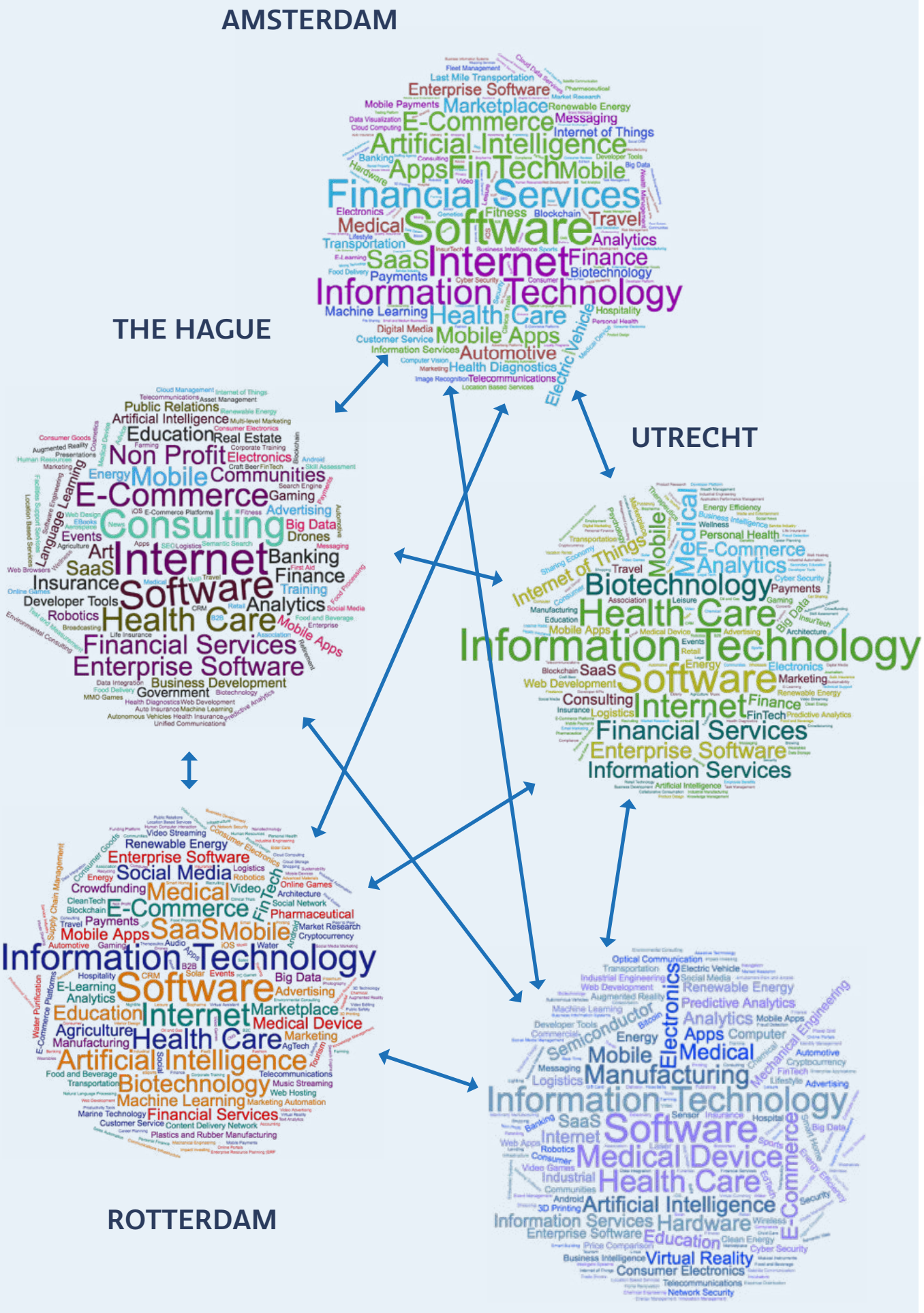


Figure 15: Innovation Specialisms of the 5 cities, based on the Top 100 leading innovation firms in each city.
Source: Crunchbase, August 2019



Eindhoven's critical mass of anchor firms driving R&D and patent activity represents an important momentum force for the whole region. The "Brainport Region" now accounts for more than 40% of total Dutch R&D spending and patent applications. The High-Tech Campus - the so-called "smartest square kilometre in Europe" – and the Brainport Smart District, are gaining international recognition for their concentration of innovation, and benefit from the strong Brainport Foundation stakeholder partnership.[i] Given that the Dutch government recently announced plans to give a further €130 million to Brainport Eindhoven, and that the Foundation is currently shifting its approach from triple helix to multi-helix (involving citizens, designers and investors), Eindhoven is likely to be a significant driving force for the regional innovation economy for many years to come, on a par with leading cities at the edge of successful regions, such as Cambridge (UK) and Waterloo (Canada).

The next stage is to overcome the **remaining barriers in the region's innovation ecosystem.** Although the region benefits from a strong inherited government and educational framework for innovation, it is still less experienced at commercialising and scaling-up its innovation activity compared to other top European regions. On average, Holland Metropole ranks much more highly for university attainment and research output than for knowledge exports and sales of new-to-firm innovations.

Overall, Holland Metropole has now cemented its globally competitive innovation ecosystem, and the coming years hold a lot of promise. The region's attributes of fast mobile internet and broadband speeds, favourable business climate, dedicated pursuit in capturing a larger share of the innovation economy, and high net salaries in technology jobs compared to other regions globally, are all advantages, and vigilance will be required as more cities and regions look to compete.


JOPIE

HOLLAND METROPOLE IS SUCCESSFULLY MANAGING THE EXTERNALITIES OF GROWTH AND OFFERS A HIGH-QUALITY LIVING EXPERIENCE...

Since 2018, even more attention is being placed in new ways to compare liveability and appeal in cities. The benchmarking of lifestyle is increasingly reflecting life in the metropolitan city, and the content of what is being compared is changing. Benchmarks are moving away from inherited natural and lifestyle assets to instead consider how well the externalities of city growth – such as congestion, housing affordability and air pollution – are managed.

Other successful city regions are continuing to feel the effects of hyper congestion and saturation and are trying to overcome 'lock in' to models that drive housing unaffordability, long commute times and relative unsustainability. Holland Metropole is not. The region's polycentric model continues to prove flexible to accommodate growth in different locations and serve many different needs and preferences.

Firstly the data shows that at the centre of all top global regions, congestion is a problem, including for Amsterdam. But it is apparent that Amsterdam is actually by far the least congested of the 10 regions studied. The latest data shows that Amsterdam's congestion delay in peak hours is 24%, around 2/3 of that of London, Sydney and San Francisco (see Figure 16). Moreover, Amsterdam is the only core city among peers to have reduced its overall congestion level since the global financial crisis, from 27% in 2008. This is helped by the fact Amsterdam is the only leading city in Europe with Stockholm where fewer than a quarter of residents drive to work.[II]

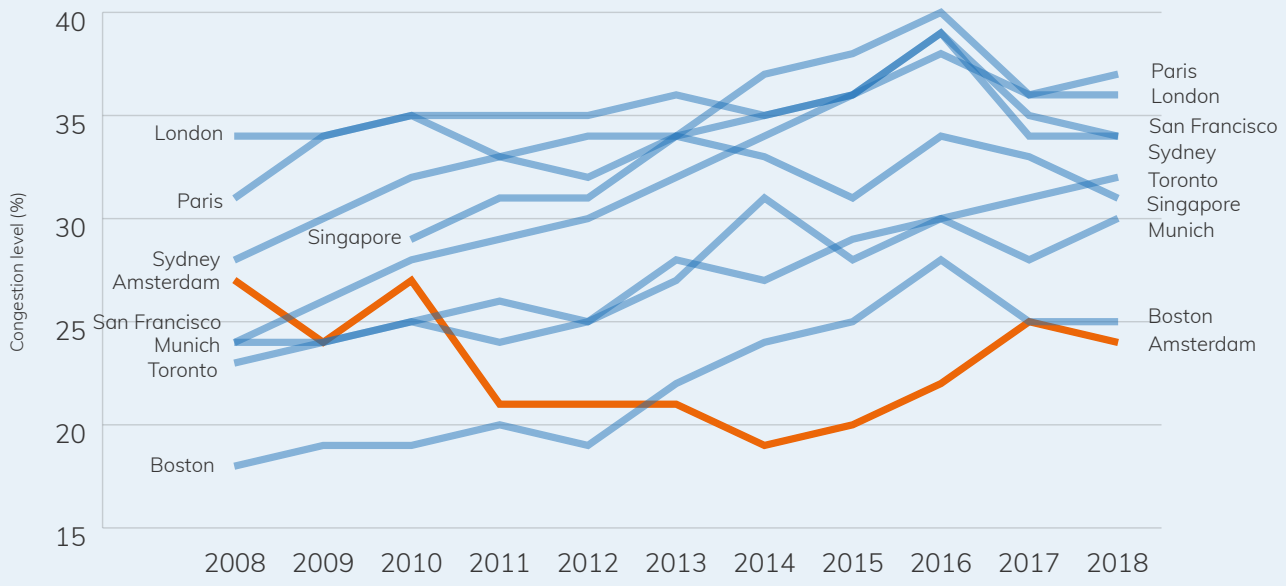


Figure 16: Congestion level since 2008, based on average delay in peak hours vs non-peak journeys.
Source: TomTom Trafic Index 2019

Holland Metropole is also unique among peers for its commitment to reduce air pollution. The region currently ranks 4th among peers for total exposure to PM2.5 air pollution (see Figure 17). The region is the least polluted in Europe and is the only region except for Munich to have consistently mitigated its exposure since 2014. This is partly due to increasing uptake of bicycles, and partly due to consistently high levels of public transport use (and low levels of private vehicle use) in comparison to other regions. Amsterdam and Utrecht rank 2nd and 3rd respectively in the latest edition of the most comprehensive study of cities' cycling friendliness. The region is also investing in electric vehicle infrastructure: Amsterdam and Rotterdam have the 2nd and 3rd highest number of electric car charging points within a 5-mile radius of the city centre globally. Holland Metropole's reduced exposure continues to help reinforce the region's reputation for health and sustainability.

Despite its global scale, Holland Metropole remains a highly affordable region across a wide variety of measures. Median multiple data show that the region has the lowest ratio of median house price : median household income among the peer group, almost three times lower than in the Sydney Region, and nearly half that in the London and San Francisco Regions (see Figure 18).

Holland Metropole's rental market is also highly affordable by global standards. Data shows that the region is the 5th most affordable for apartment rentals (see Figure 19). Overall, the region's relative affordability is reflective of more careful oversight and management of regional housing stock and the availability of a wide variety of price points and living environments that can meet the needs of an increasingly diverse labour pool. Eindhoven is an example where rising prices (+9.4% in 2017) have encouraged the municipal government to fast-track plans for 3,000 new dwellings.[III]

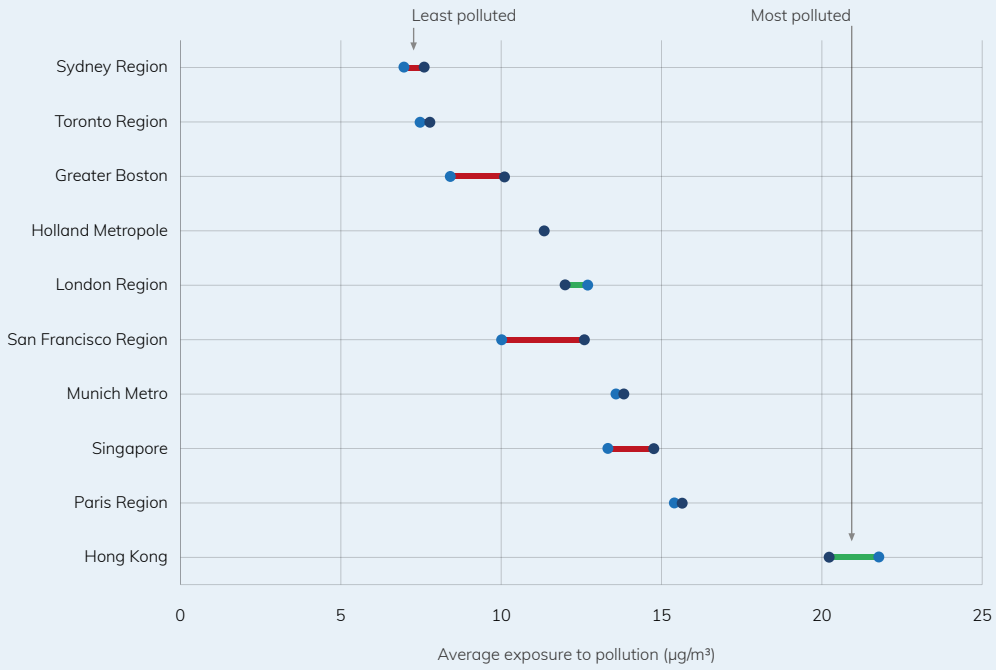


Figure 17: Exposure to air pollution over time. Source: IQ Air 2018

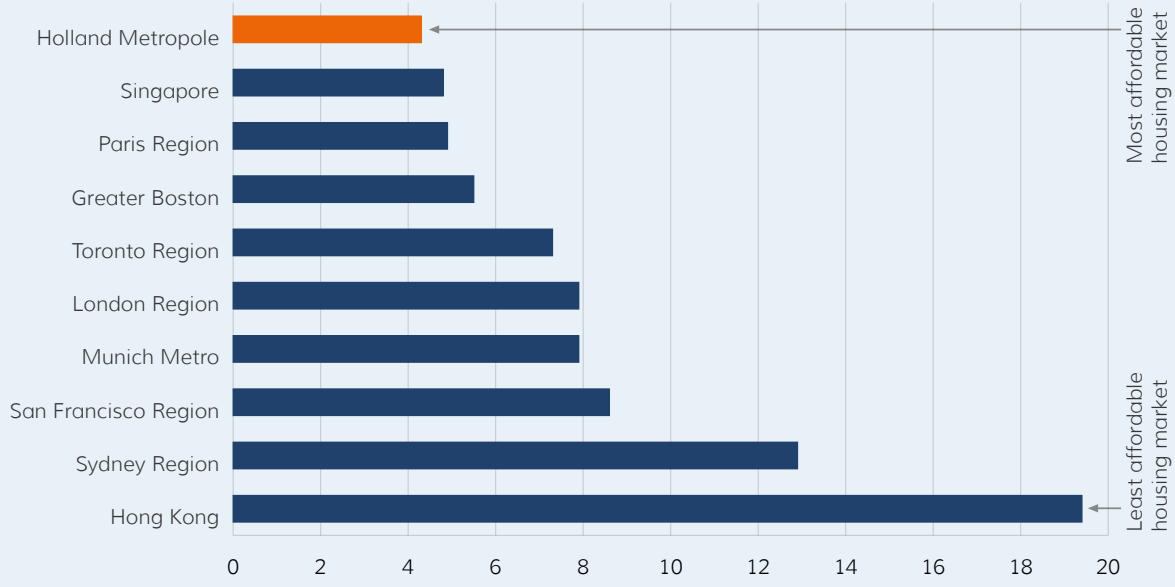


Figure 18: Ratio of median house price: median household income. Sources: Demographia Affordability Index 2018, City, Regional and National Statistics Agencies.

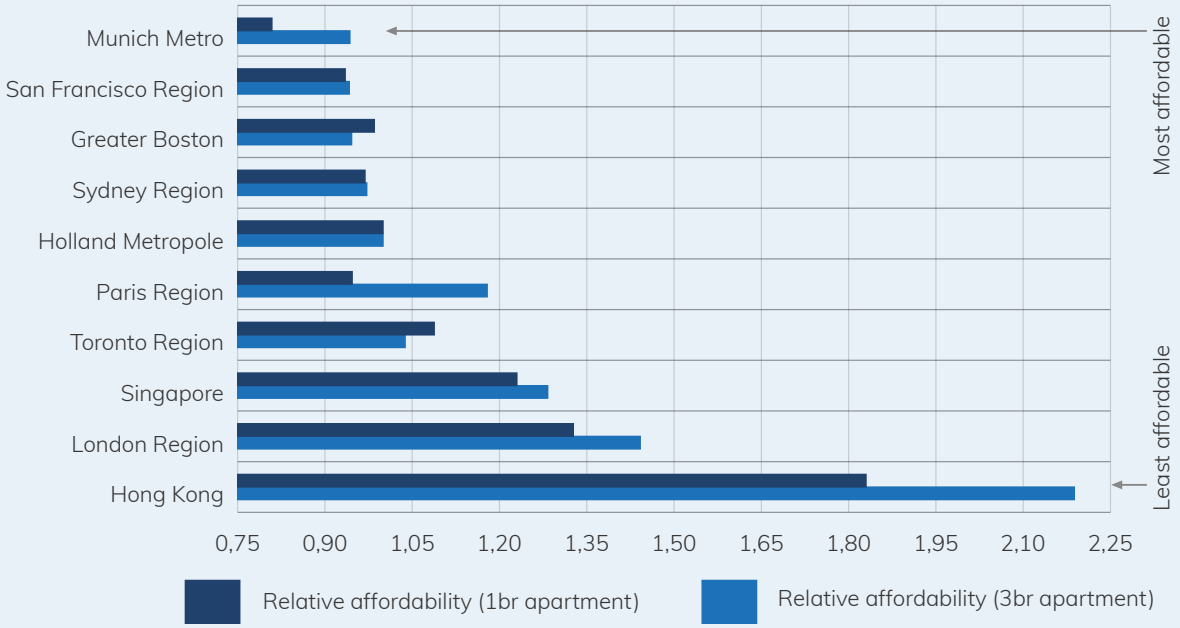


Figure 19: Affordability of rented accommodation compared to Holland Metropole (Holland Metropole = 1). Source: Numbeo, August 2018 figures. Relative affordability calculated by comparing average monthly salary to average rent.



By global standards Holland Metropole's wider liveability equation remains very much intact. Looking across five broad categories of liveability (tolerance, culture, environment, healthcare and safety), Holland Metropole's five cities together rank as the 3rd most liveable region of its peers, just behind Greater Boston and Munich Metro (see Figure 20). The region stands out for its consistent performance across categories, and scores particularly highly for healthcare, safety and tolerance. This is mainly due to high scores for life expectancy, expenditure on healthcare, LGBT rights and equality, and relatively low crime levels in comparison to other regions globally. Eindhoven emerges as a stand-out performer, ranking 9th globally out of 200+ cities for tolerance, 15th for healthcare, and 24th for environmental quality.

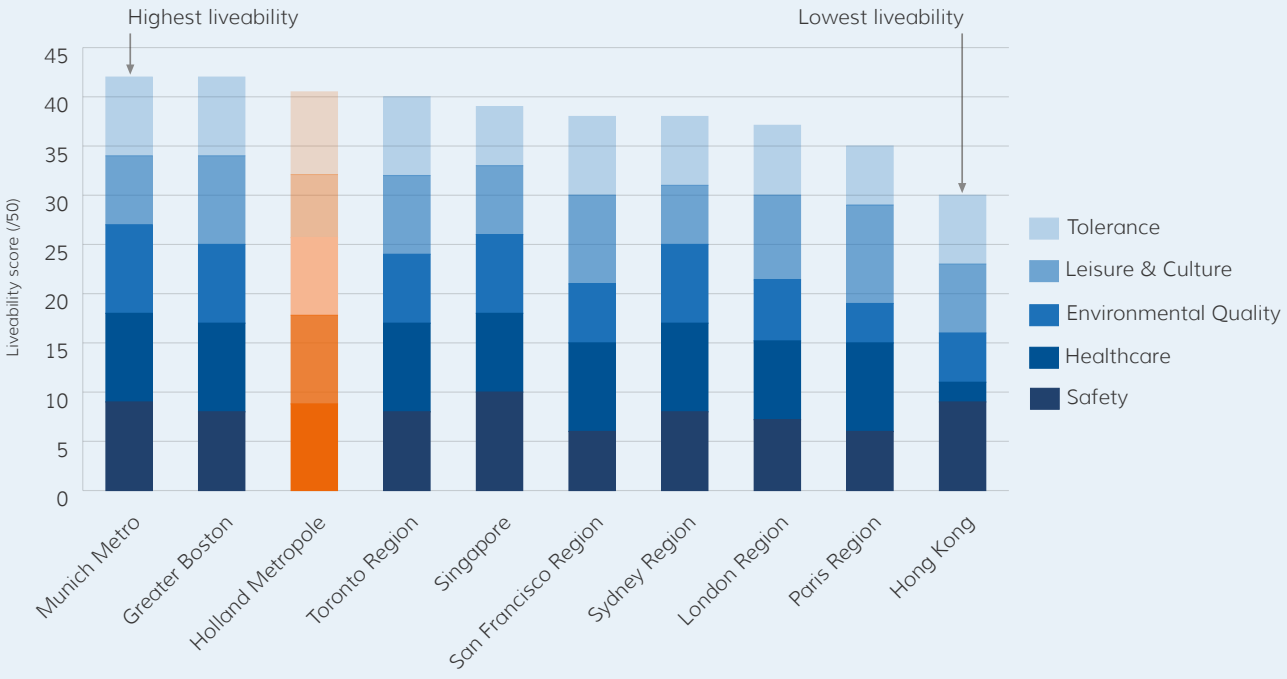


Figure 20: Liveability across different categories.

Source: Teleport, August 2018 figures. Each category carries maximum score of 10. See appendix for the indicators used within each category.

Holland Metropole's special combination of higher relative affordability, lower congestion and a cleaner environment, together with its inclusive growth model, makes it a favourite among millennials and career-age talent. All of the region's constituent cities except for Utrecht rank in the top 45 globally for talent competitiveness (e.g. attraction and retention) in the latest INSEAD study. 4 of the region's 5 cities feature in the top 80 most millennial-friendly cities globally and Amsterdam ranks 4th, just behind Berlin, Montreal and London. Meanwhile Rotterdam and Eindhoven both appear in the top 35 for Social Cohesion globally in the latest edition of IESE's Cities in Motion Index, and in benchmarks of inclusion, Rotterdam and Amsterdam ranked 4th and 5th respectively for income equality, and 13th and 12th for overall quality of life, ahead of all peers apart from Munich.

In the latest edition of the major study of the perceived best destinations for working abroad, Amsterdam, Rotterdam and The Hague all rank in the top 20 globally, and the top 15 for work-life balance. In The Hague in particular, 84% of expats are satisfied with their work-life balance, and 73% are content with their jobs. Meanwhile, Amsterdam emerges as the 4th most desirable city in which to work globally among digital experts. These figures are also reflected in the other cities in studies such as EU-Barometer.

Finally, Holland Metropole's appeal and diverse offer is also helping to drive very healthy growth in international tourists and conferences. Four of the region's 5 cities rank in the top 80 cities in which to spend a weekend, and Rotterdam recently ranked 16th in Airbnb's ranking of the best cities in which to celebrate Pride. And in 2018-19, Holland Metropole hosted over 200 high-level ICCA-registered rotating meetings and conferences (see Figure 21), meaning it is well on its way to catching up with London in 1st. Given the increasing recognition of the long-term benefits and spillovers of MICE tourism, this represents an important competitive advantage moving forwards.

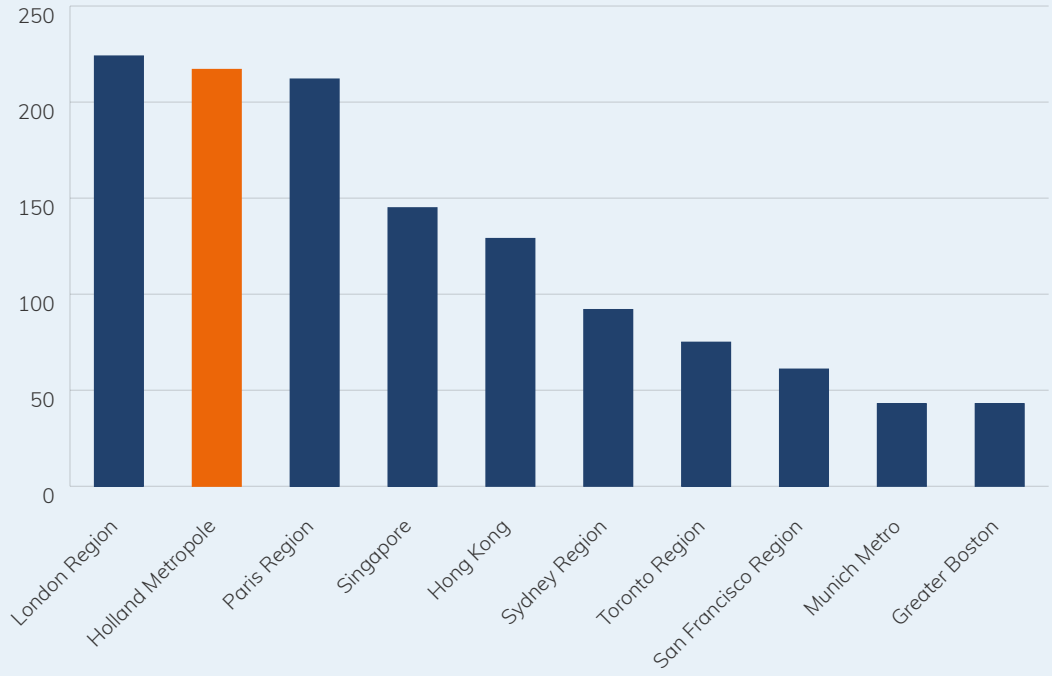


Figure 21: Number of high-level rotating meetings and conferences.
Source: ICCA 2018

THE NEXT CHAPTER

The signs are very promising that Holland Metropole is establishing itself as a unique multi-city region with the ingredients to contend and succeed in the cycles of globalisation to come that are driven by technology and re-urbanisation.

As this 2019 report shows, not only are the fundamentals of growth, knowledge and infrastructure in place. The region is also developing its innovation edges, and making faster adjustments than many of the world's leading regions to make the metropolitan promise come true for young and old. Demand is growing to locate in and near to the region's big five cities, fostering the specialisation, critical mass and flexible growth that provides real choice and opportunity.

The region is also adapting well to this cycle of change. Local and provincial governments are becoming more administratively agile to enable housing supply to grow more rapidly. Local governments in the cities (Amsterdam, Rotterdam-The Hague, Utrecht and Eindhoven) have become more engaged in important inter-municipal collaborations, producing ambitious visions for the future. The business and innovation leaders are fostering visible locales (Brainport, Rotterdam Port, Zuidas, etc) into major locations capable of delivering world-changing innovations and world-inspiring urban life. Business and civic leadership is taking a greater role in promoting and advocating for the cities agenda.

Holland Metropole's promise is very clear. And yet as the region evolves and matures, it is starting to experience more of the dynamics that the very top regions in the world are living through. This requires even more focus, attention and innovation.

The journey for Holland Metropole in the next cycle:

	FROM
1	Planning and policy for the sub-regions
2	Promotion of Holland Metropole in one or two sectors
3	Ambitious city visions
4	Bidding to central government for projects
5	Inter-municipal collaboration
6	Densification in some locations
7	Demonstration projects for urban living and new models
8	Housing supply and tenure constraints
9	Inherited infrastructure platform
10	Smart cities



	TO
1	Strategic and long term planning for whole region
2	Promotion of region in all sectors
3	Shared visioning process
4	'Deals' with central government for regional
5	Empowered metropolitan and regional institutions
6	Densification in many more locations, more housing choice
7	Common Brand platforms
8	Regional investment prospectus
9	New catalytic projects at scale
10	Smart region



To fulfil its potential and avoid experiencing the problems and 'lock in' that other top global regions are now managing, it is likely that Holland Metropole may come to require a few of the following catalysts:

- **More visualisation of the opportunity 'map' of the region.** Holland Metropole may become more visible to external markets, and generate even more enthusiasm and appetite, with clearer visualisations of the linkages, flows, projects and developments that are underway in the region. Improved and accessible data will also contribute to enhanced visibility.

- **Deals for long-term transport investment.** Central Government is providing welcome short-term investment in road transport, station terminus improvements, and cross-river bottlenecks. The region will benefit from cooperation with national government to consistently increase the rate of investment in the regional transport system and ensure that progress managing congestion around the big cities continues, particularly as these cities continue to drive job creation.

- **Increase and diversification in housing.** The private rental market in the Holland Metropole's main urban centres has only just over half the market share compared to other global cities and development policies. The regional housing market will benefit from Utrecht, Amsterdam, Rotterdam, The Hague and also Eindhoven aligning their policies to ensure that the region as a whole continues to provide opportunity and choice, supported by housing policy reforms and incentives at the national level.

- **Shared vision across all levels of government and civic leadership** to support future growth in the region, and allow even more innovations to be piloted, enabling Holland Metropole to be recognised as the Netherlands' major source of prosperity, jobs, and soft power in the coming decades. This will require careful and sustained advocacy and negotiation with central government to ensure that Holland Metropole's success is not perceived to come at the expense of the rest of the nation, and delivers real benefits for the whole country.

This 2019 report appears to confirm that Holland Metropole belongs on the global stage. The next imperative is to stay there and make its model of success even more resilient.

APPENDIX & REFERENCES

Metropolitan and regional definitions:

The definitions for Boston, Singapore, Hong Kong, Paris and Munich remain unchanged (Greater Boston, Singapore, Hong Kong, Ile-de-France/Paris Region and Munich Metropolitan Region). In other regions, the addition of Eindhoven has prompted the addition of new cities which:

- Are located no further than 125km from the urban core
- AND have city populations of more than 200,000 OR metropolitan populations of more than 300,000
- OR contain at least one globally significant (top-200) university

This year, the London Region includes Southampton, Portsmouth, Brighton & Northampton. The Toronto Region now includes the innovation capital of Waterloo-Kitchener-Cambridge (Waterloo Region) and the Hamilton Region (former Regional Municipality of Hamilton–Wentworth). The San Francisco Region now includes the nearby city of Sacramento, and the Sydney Region now also includes Wollongong and Newcastle, which, together with Sydney, comprise the 'Sandstone Mega Region.'

Data on GDP per capita is based on assembling the NUTS2 or MSA data for the respective regions 2016-2017 data for Munich Metro, Greater Toronto and Greater Sydney could not be retrieved due to data constraints.

Data aggregation: Data on annual air passengers and port cargo throughput are based on assembling figures from all ports/airports in the territories of each of the 10 city regions, and calculating weighted regional averages based on number of airport passengers (to correct for the outsized influence of small, rapidly growing airports), and total port cargo throughput, respectively. Data on internet speed, venture capital firms and investment, rental and housing affordability, exposure to pollution and liveability (Teleport) are based on assembling figures from all cities in the territories of each of the 10 city regions, and calculating a weighted regional average based on population size.

Notes to individual Figures:

Figures 6 and 7.

Figure 6: We selected the 5 largest regional centres by population size and used Google Maps to determine the fastest rush-hour journey by public transport between each of the centres. Further details of methodology, including details on the regional centres used, can be found at: http://bit.ly/2kgMqwv.

Figure 7: Composite mobility score was calculated by calculating the time and speed of each of the 20 possible journeys between the five main cities within each region, versus the fastest and highest speed journey of all 10 regions.

Figure 20.

Indicators used for each category:

Safety: Crime rate, gun-related deaths per 100,000 residents per year, guns per 100 residents

Healthcare: Healthcare expenditure, healthcare quality, life expectancy

Environmental quality: Air quality, cleanliness, drinking water quality, urban greenery

Leisure and culture: Art galleries, cinemas, comedy clubs, concert venues, historical sites, museums, performing art venues, sport venues, zoos

Tolerance: LGBT Equality index, LGBT adoption rights, LGBT age of consent, LGBT blood donation and conversion therapy regulations, LGBT discrimination legality, LGBT gender-changing and marriage rights, tolerance towards minorities

References

[I] https://www.citylab.com/transportation/2017/10/riding-bikes-buses-trains-in-european-cities/543141/

[II] http://www.jll.nl/netherlands/nl-nl/Research/Office%20special%20Brainport%20Eindhoven.pdf

[III] https://www.iamexpat.nl/expat-info/dutch-expat-news/best-dutch-city-expats-not-amsterdam



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