



2019
International Construction Costs
Smart decisions creating long-term value

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Nairobi
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Istanbul
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Buenos Aires
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Malaga
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Seoul
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New Delhi
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Kuala Lumpur
Ho Chi Minh
Wuhan



This year's report builds upon its strong heritage as the leading reference point in relative comparison of global construction costs.

This year the comparison covers 100 major cities. From New York to Hong Kong, Mumbai to Buenos Aires, and Barcelona to Sydney, this is one of the largest comparisons of its type and covers every major construction market.

Arcadis' annual International Construction Costs Comparison report is based on industry-leading market knowledge. Apart from providing a comparative indexation of construction costs around the world, the report also provides market insights and recommendations on the factors clients should be considering in order to continue being successful in the future.

Arcadis draws upon its global scale, its leading set of data and local expertise, to deliver an additional 50 cities to the 2019 comparison, with a considerable expansion of coverage in Europe, North America and the United Kingdom. There are nine new cities in the United States, including large construction markets in Las Vegas, Los Angeles, and Miami. There are ten new cities in the UK, including Belfast, Edinburgh and Liverpool. Ireland's capital Dublin is now part of the index. Two cities in China, Chengdu and Guangzhou, are new to the 2019 comparison, as well as Christchurch, New Zealand. The addition of Barcelona, Malaga, Porto and Valencia give a better view of construction costs across the Iberian Peninsula.

The **Arcadis** International Construction Costs Comparison **2019**



Andrew Beard

Global Head of Cost and Commercial Management

With the global economy providing fresh uncertainties and opportunities, now more than ever, construction clients, serving local or global markets, require predictability in outturn costs and insights, to help them to make smart decisions.

Arcadis' work with clients in and across key global markets demonstrates that those that make the right decisions with a focus on innovation, end-user benefits and sustainability can improve outcomes and deliver enhanced business results.

In line with globalization, the Arcadis International Construction Costs Comparison now features 100 cities across the major international construction markets. This report provides clients, across the construction industry, an unprecedented look at the relative costs of building around the world. The use of industry-leading data and insights is becoming increasingly more important in enabling asset investors, owners, and operators to make their money go further and gain competitive advantage in their chosen markets.

Value creation despite headwinds

On the whole, 2018 was a good year for the construction industry, driven by a strong global economic performance, particularly in the first part of the year.

By the end of 2018, though, there were already ominous signs that the global economy was beginning to cool off. This was perhaps best encapsulated in the title of the World Bank's January 2019 Global Economic Prospects report: *Darkening Skies*.

Political uncertainty, erratic global markets, and trade conflicts have all contributed to a dubious outlook for 2019. This has had three principal impacts on construction market conditions:

Tightening of financing conditions:

Globally, financing conditions have tightened, meaning that loans have become more expensive and difficult to obtain. Finance is crucial for development and construction projects, in terms of smoothing cash flows and helping to ensure bills are paid on time.

Changes to financing conditions, particularly if unexpected, can impact the commercial dynamics of projects and contribute to higher costs of delivery.

Volatility of materials supply and costs:

Global trade tensions have led to volatile commodity markets. Energy prices reached a high towards the end of 2018, only to fall consistently through early 2019. Metals costs have also experienced volatility.

Additionally, new policy measures and tariffs have called into question the viability of supply lines in some markets. This has impacted the price and sourcing of goods, as well as client confidence in the ability of the construction industries around the world to deliver their projects.

Downside risks to construction demand:

The current moderation of global economic growth comes with the risk that construction demand will slow. This will impact different markets to different extents, but some markets have seen significant headwinds across 2018 and entering 2019.

Construction supply chains, therefore, face additional challenges with filling medium to long-term order books. This can influence market pricing and costs for construction clients, as suppliers reduce their prices in order to be more competitive and secure work.

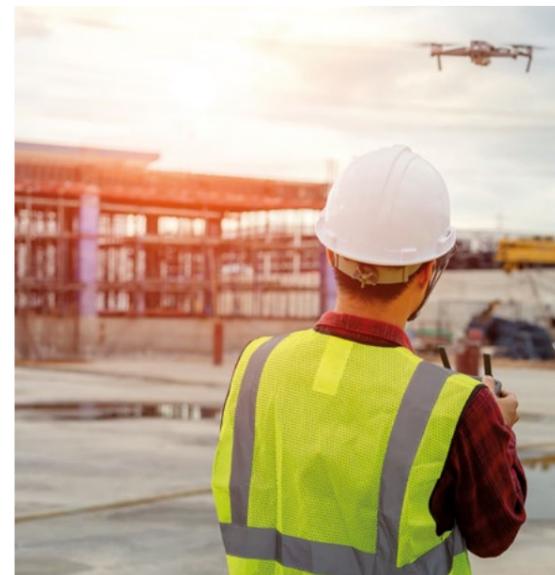
As ever, construction clients remain under pressure to navigate economic headwinds and deliver improved business results. Many asset investors, owners and operators are keenly aware of the pressing need to improve productivity in construction work. Working with the supply chain to make smart decisions, for instance investing in digitalization, can be challenging but can drive improved performance, while providing a product more suited to and desired by customers.

Arcadis' experience is that these investments contribute to productivity and efficiency and deliver enhanced solutions, creating competitive advantage and, ultimately, lighting a path towards long-term value creation.

“Construction clients remain under pressure to navigate economic headwinds and deliver improved business results.”

Enabling client success

Looking ahead in 2019 and beyond, market conditions will present both challenges and opportunities for construction clients. Based on data and discussions with clients around the world, Arcadis believes that the successful construction companies of the future will be the ones that make smart decisions today and invest in three key areas:



1) Innovation

Large swathes of the global construction industry lag behind in terms of focus and investment in innovation. As explored in the 2018 edition of this report, digitalization presents an incredible opportunity for construction companies to drive increased efficiency, lower costs and increased productivity, while improving the end product.

Building Information Modelling (BIM) and expanded use of data analytics are also helping clients design and construct innovative buildings. These highly adaptable and intelligent spaces will help generate the technologies of the future and better meet the needs of their users.

2) End-user benefits

During the process of designing, constructing and operating buildings, it is critical that construction clients keep their eye on the ways in which people will experience the end-product. Rapid urbanization is leading to evermore congested cities, increasing multi-functional demand on space and meaning that buildings will increasingly need to be part of the urban mobility ecosystem.

Solutions that better meet consumer demands, ease customers' pain points and deliver enhanced social value will be well-received by people living in cities.

3) Sustainability

Constructing and operating buildings has a significant impact on the environment, in terms of water and energy use, carbon emissions and waste. International efforts to combat the effects of climate change and to conserve natural resources are creating a higher demand for more sustainable construction projects and buildings with features that will reduce negative impacts on the environment and society.

Increasingly, clients are also looking to incorporate resilience as part of their business strategy and into buildings, so they can better withstand extreme weather events, the effects of climate change and other risks.

The Arcadis International Construction Costs Index 2019

The three most expensive cities remain the same in this year's index, but New York has usurped San Francisco at number one.

The index range for ten most expensive cities has narrowed this year, with the average index value reducing by 3%, when compared to 2018. The reasons for this include a combination of currency and inflationary effects, resulting in these cities becoming closer together in comparative costs for construction.

There have also been some shifts in the ten least expensive cities, partly because new cities have been introduced this year. Additionally, some cities lower down the index have seen incremental increases relative to London over the years. While they remain relatively inexpensive places to build, they are becoming more expensive over time.

This year the average index score for the ten least expensive cities has increased by over 5%, when compared to 2018. A number of these markets have experienced significant regulatory changes, as well as a combination of currency impacts and inflation.

Overall, the total range across the index has decreased by over 10% this year, which suggests a general convergence of construction costs globally.



Key factors influencing city positions in the index

Multiple factors influence a city's position in the International Construction Costs Index. To begin with, some cities are more or less expensive than others. Part of this is what economists call the cost of living in a city, which is the price of goods and services, such as food, taxes, health care and housing. The cost of living also influences another important factor, namely the cost of labor in a city, which has a significant impact on the cost of a construction project.

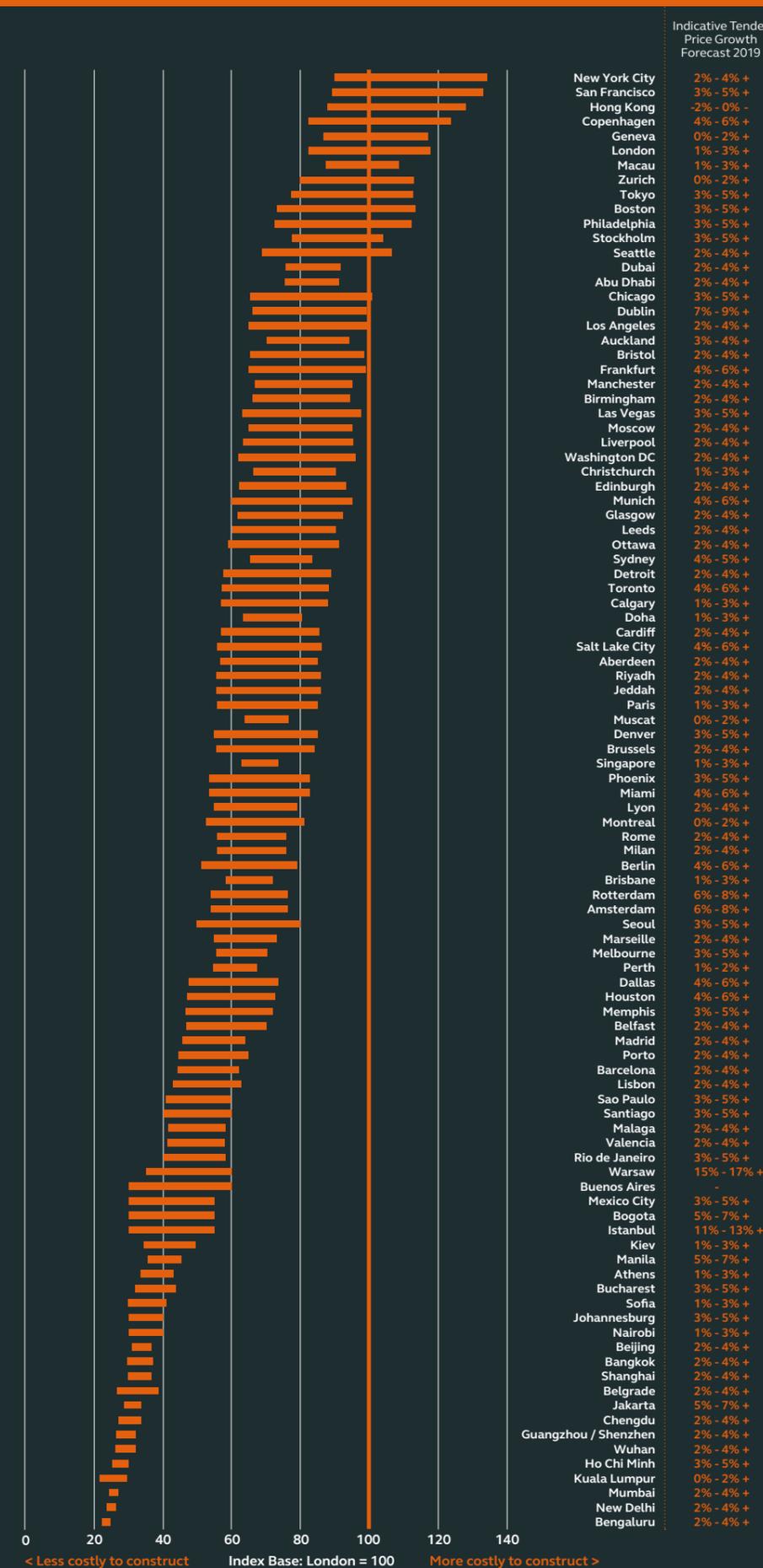
The overall productivity of the construction industry in a location affects costs. In parts of the world where productivity is higher, the relative costs of completing a project will be lower. Additionally, the cost of construction materials is another prominent factor, but globalization means that prices are not just based on location, as more and more globally-sourced materials are available on the market.

A city's position in the index will also be strongly influenced by the quality, complexity and functionality levels that are typical in that city. Where projects are generally of a higher quality and complexity, and where specifications are usually more sophisticated, construction costs will typically be higher. Finally, because the ranking is based on the US Dollar (USD) the strength of the dollar versus the currencies of the various cities is also a key factor in determining the index value.

"In the face of volatility and uncertainty, through innovation and relentless focus on end user needs, construction clients can realize outcomes that are market-beating."

Will Waller
Director - Head of Market Intelligence

International Construction Cost Comparison 2019



The Global Context

Global Economy

The global economy began to cool off in 2018, with growth weakening to an estimated 3.0% for the year. The World Bank expects this slowdown to continue, forecasting 2.9% growth in 2019 and 2.8% in 2020.

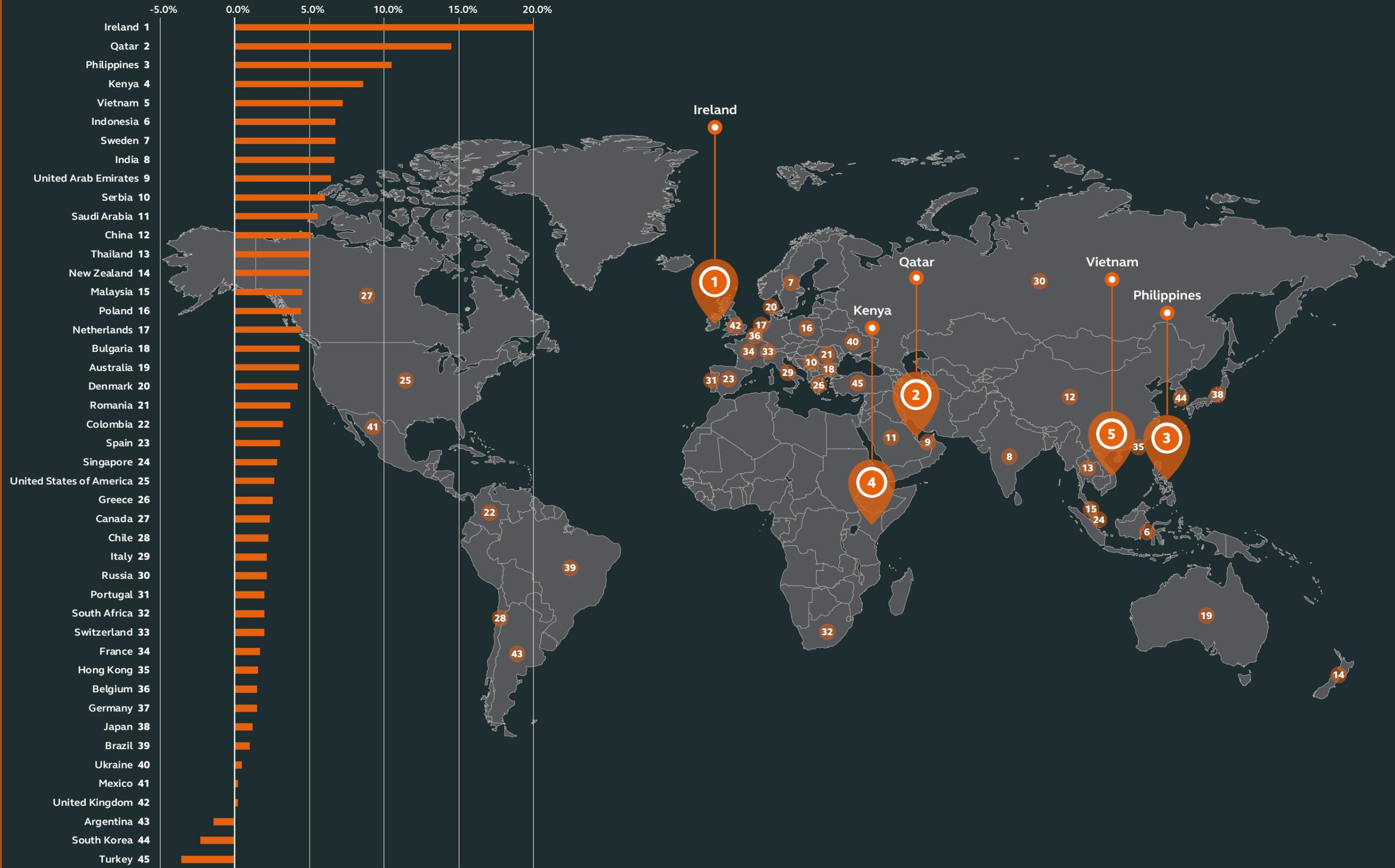
Trade tensions are at the heart of this deceleration, with potential trade disputes dampening economic forecasts. The World Bank estimates that about 5% of global trade flows would be negatively affected by the implementation of all tariffs currently under consideration. This poses a major risk for future economic growth.

Across all sectors of the economy, borrowing money is becoming more difficult and more expensive. Additionally, in some developing countries, debt vulnerabilities are emerging. These factors present an additional potential threat to economic performance.

Nevertheless, broadly speaking, the global economy performed well over 2017 and 2018, with obvious signs of productivity improvements. This could set the stage for stronger-than-expected global economic activity, especially if political volatility subsides.

Evidence suggests that organizations that have leveraged existing and emerging technologies have pulled ahead of competitors. For the construction industry, which has been behind the curve, now is the time to fully embrace advancements in technology, as a means of overcoming global economic headwinds, by boosting productivity and cutting costs.

Forecast construction industry value, real growth 2019. % year on year change.



Sources: Arcadis, CPA and Fitch Solutions

Americas

Brazil

Growth will gain momentum in 2019 and 2020 with 2.1% and 2.4% GDP growth expected respectively.

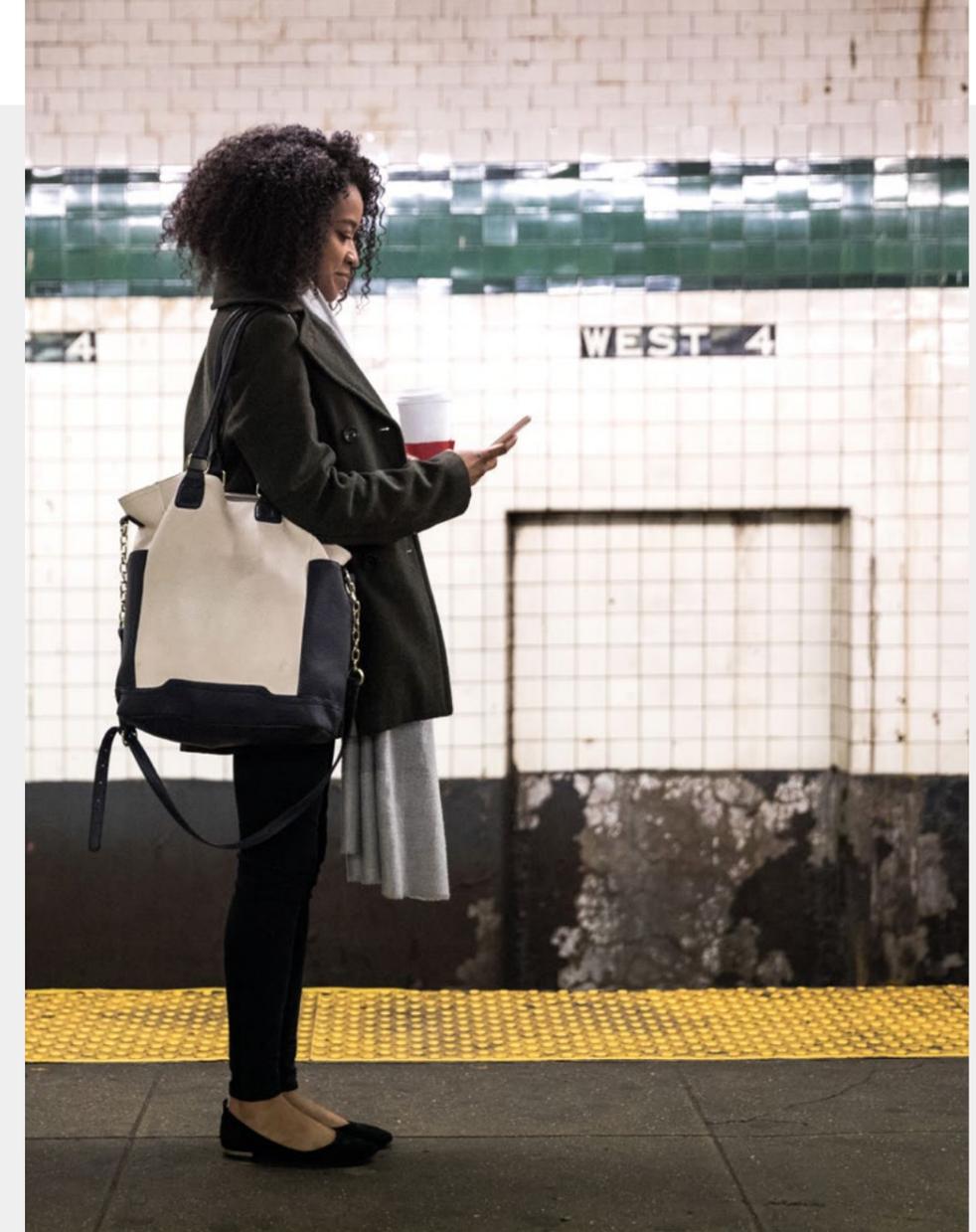
Brazil's construction industry is expected to grow by 1.0% and 1.4% in 2019 and 2020 respectively. This follows three years of contraction in the sector with the industry's value falling by 12% across 2016 - 2018. Chinese investors have played a major role in projects in Brazil.

Construction tender price growth is expected to average 5-6% per year over 2019 and 2020, after a period of tender price deflation in the preceding years.

Canada

Canada's economy is picking up steam with 2.2% and 1.1% GDP growth expected for 2019 and 2020 respectively. The construction industry is expected to grow by 2.3% and 2.0% in 2019 and 2020 respectively. This follows three years of slightly higher growth in the sector. Non-residential construction investment will continue to grow in 2019 and 2020, bolstered by increased government and institutional investment.

Construction tender price growth in Canada is expected to average 3-4% per year over 2019 and 2020.



United States

GDP growth in the US was around 3% in 2018 and will be around 2.5% in 2019 and 1% in 2020, as higher interest rates slow more than just the housing market. In 2018, the US imposed tariffs on steel, aluminum, lumber and a wide variety of Chinese imports, which were quickly matched by domestic suppliers. This has put a squeeze on contractors with fixed-price contracts for projects before buying materials. This could increase development costs by as much as \$1 billion (USD).

Construction materials costs are rising at levels last seen before the Great Recession. There is also a shortage of skilled and semi-skilled workers, which has led to an abundance of unfilled positions on the job market. The US construction market will grow by 2.6% this year and the tender price index will increase by 3-5%. Much of this market growth will likely be within the commercial sector, as technology companies have announced a large push to build data centers over the next five years.

Asia

China

In 2018, China's GDP increased by 6.6%, the lowest figure since 2009. The ongoing trade war with the United States is having an impact on short-term growth, but it could escalate further if not addressed. The Chinese government has been focused on improving the quality of GDP growth, creating more openness to foreign investment and controlling pollution.

The tender price index increased by 3% in 2018. Higher interest rates and hikes in material and labor costs will likely lead to a rise in construction costs over 2019. Construction wages will grow between 3% and 5% this year. Additionally, there are no signs that the government will loosen restrictive policies on housing purchases, bank mortgages or loans in 2019. This and an overall cooling off in the Chinese real estate market may impact the construction sector which is forecasted to grow by 5.9% in 2019. The tender price index will increase by 3-4%.



Hong Kong

Hong Kong's economy showed continued growth over 2018, with its GDP rising by around 3%. Hong Kong's construction industry has some core challenges including a relatively low technology adoption rate, a shortage of land and a pressing need to improve productivity levels. The price of steel increased from a market low in 2016, and the price of sand has seen a sharp rise since an industry low in 2017.

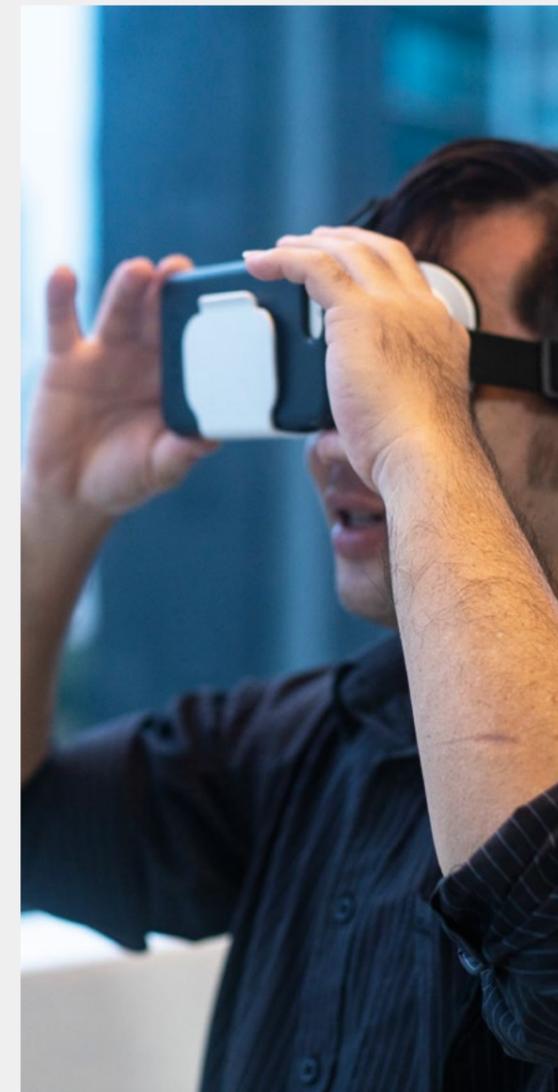
Hong Kong's tender price index decreased by just over 4% in 2018. The price for other core construction materials will remain stable over 2019. Hong Kong's construction market will grow by 1.5% this year. The tender price index will likely decrease between 2-0%.



Malaysia

Malaysia's GDP grew by 4.7% in 2018, down from 5.9% the year before. The price of construction materials was stable in 2018, except for steel, which decreased slightly. As of January 2019, the minimum wage was increased, a move which will influence labor costs. In 2019, the construction sector will grow at a slower pace, due to major revisions around mega infrastructure projects and a general slowing down of global construction projects.

The Malaysian government's allocation of over \$362 million (USD) for affordable housing, may well stimulate industry growth this year. The Malaysian construction market will grow by 4.7% in 2019, as well as a slight increase of 0-2% in the tender price index.



Singapore

In 2018, Singapore's GDP grew by 3.2%, which is down from 3.9% for 2017. There are signs that economic growth is slowing, due to trade conflicts and volatile financial markets. The construction sector's GDP shrank by 3.4% last year, primarily due to a slowdown in public sector activities. Prices for key construction materials remained stable over 2018 and key construction material prices are expected to rise in 2019. Labor costs remain quite high in Singapore.

One factor that will likely have a major influence on the market is the government's push to transform the construction industry with Integrated Digital Delivery (IDD). IDD will connect stakeholders in construction projects, mandate the adoption of Building Information Modelling (BIM) and establish the Singapore Virtual Design and Construction Guide.

The construction market in Singapore will grow by 5% in 2019, and the tender price index to increase by 1-3%.

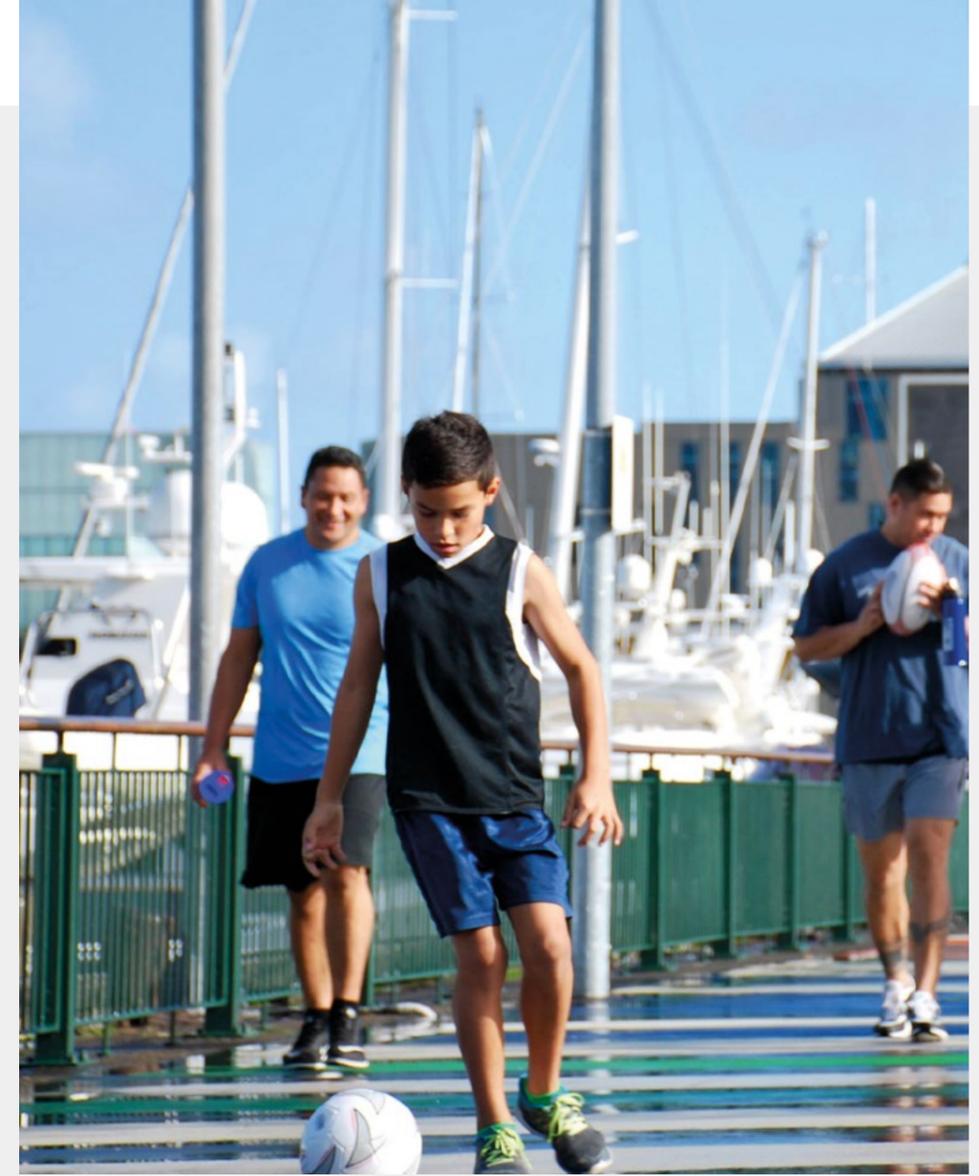
Australia Pacific

Australia

The Australian economy continues to lose momentum. In 2018, GDP growth was 3.1% and this is expected to drop to 2.9% in 2019. Cost pressures remain high on an industry-wide basis, across the whole of Australia. This is due to several factors including a robust demand for construction materials, a lack of market competition, skills shortages, increasing energy and labor costs and elevated supplier prices, due to strengthening commodity prices.

At the end of 2018, construction activity levels fell at their fastest rate in nearly four years, largely driven by a steep decline in the residential sector, particularly in Sydney and Melbourne. The recent Federal Budget has a considerable focus on ongoing infrastructure expenditure of more than \$7 billion (USD) per year over the next four years. The infrastructure boom, therefore, continues to drive much of the non-residential construction activity.

Australia's construction market is expected to grow by 4.3% in 2019 and the tender price index should increase by 2-4%.



New Zealand

The New Zealand economy lost some steam towards the end of 2018, although momentum should be recaptured in the course of 2019. GDP growth in 2018 was 2.9% and will remain at roughly this level for 2019.

Construction market growth is expected to slow again through the early 2020s for a variety of reasons, including a decline in population growth and the current construction cycle reaching its peak. Net annual immigration has fallen below 62,000 for the first time since 2015, the direct result of a recent restructuring of immigration policies. Over time, this may affect the construction industry if labor shortages and wage increases come into play.

Historically, there has been little competition in New Zealand, in terms of building materials, primarily due to its geographic isolation. This led to significant material price hikes in recent years, particularly for timber.

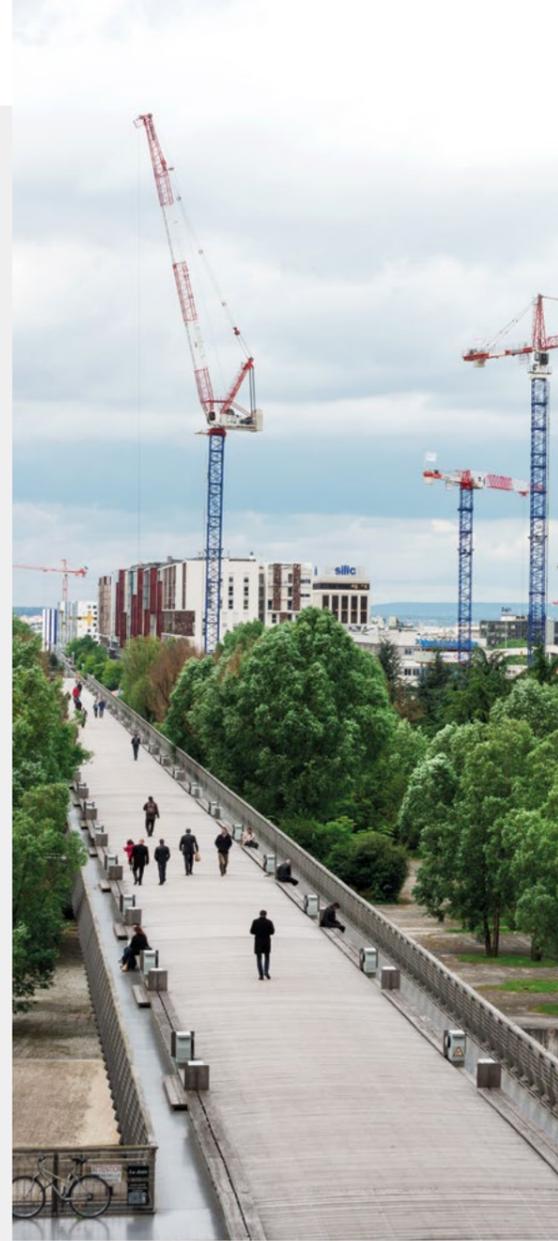
New Zealand's construction market should grow by 4.9% this year and the tender price index is expected to increase by 2-4%.

Europe

France

In 2018, France's GDP grew by 1.5%. GDP growth is expected to reach 1.3% in 2019 and 1.5% in 2020, supported by lower inflation and fiscal measures taken by the government. Construction companies are facing higher prices for commodities and energy, as well as increased labor costs, however, due to fierce competition, they struggle to pass on those price hikes. This has curbed tender price inflation. There is a slowdown in residential construction, with output expected to contract by about 0.5% in 2019. Non-residential construction is expected to increase but growth in this area is also slowing.

The French construction market is on course to grow by 1.7% in 2019 and the tender price index is expected to increase by around 2-4%.



Germany

The Germany economy experienced GDP growth of more than 2.2% in 2018. This will cool off to around 1.4% for 2019. Construction volume has risen by almost 9% since 2014. The price of construction materials is on the rise, as is the price of labor. This has contributed to an accelerated increase in construction prices.

The German construction market will grow by 1.5% in 2019 and the tender price index will increase by around 4-6%.

Netherlands

GDP growth in the Netherlands was 2.5% in 2018 and will be around 1.5% in 2019. Economic growth will likely taper off further towards 2021. The Dutch construction market continues to deliver sustainable and stable growth conditions, supported by continued investments in the energy, transportation and built environment sectors. There are signs that projects are becoming less affordable for construction clients.

There is a continued focus on delivering major housing programs, to help mitigate the effects of housing shortages, as well as on projects supporting resiliency and the energy transition. There is also a focus on green and renewable resources.

As a result of the strong conditions, the tender price index for the Netherlands will increase by 4.5 - 6.5% in 2019.



Poland

Though Poland's economy is experiencing a slowdown, GDP growth in 2018 was 5.1% and will be around 4.8% for 2019. The price of construction materials and labor costs are both on the rise.

Poland entered 2019 on the heels of moderate deceleration in construction output. Also, profits are slipping at many of the construction companies listed on the stock exchange.

Poland's construction market is expected to grow by 4.5% in 2019. The tender price index should increase by around 15%.

United Kingdom

The UK maintains a strong global reputation as an attractive place for investors. For the second year in a row, the UK has the top spot in Forbes' 2019 Best Countries for Business rankings. GDP grew by 1.4% in 2018 and the forecast for 2019 is also 1.4% GDP growth.

UK construction output continues at a historically high level, which has perpetuated capacity constraints and deliverability challenges. However, the rate of growth is forecast to slow. The Construction Products Association (CPA) expects the construction market to grow by 0.2% and 1.6% in 2019 and 2020 respectively.

The tender price index is expected to grow by 2-3% in 2019.



Middle East

Saudi Arabia

GDP grew by 2.2% in 2018 but may nearly double to as much as 4% in 2019. Preparations for Vision 2030 continue apace, with site-based construction activity seeking to achieve the initial timelines stated for many keynote projects. Demand for Saudi nationals to work on important infrastructure projects is contributing to wage inflation in the construction market but it is also stimulating more Saudis to become engineering and architectural professionals.

The Saudi construction market is expected to grow by 5.5% over 2019 and the tender price index should increase by around 2-4%.



The United Arab Emirates

The UAE's GDP grew by 2.8% in 2018 and this year may jump to 3.5% growth. The price of lending in the Emirates continues to rise, which has placed the financial viability of certain projects under scrutiny by the government and commercial developers. This led to a dramatic increase in projects being placed on hold or cancelled during 2018 and this cautionary trend will likely continue throughout 2019.

The government's focus, throughout 2019, will remain on the delivery of existing commitments associated with Expo2020 and other priorities. This will increase volume but is not expected to have a significant impact on the market.

The UAE's construction market is likely to grow by 6.4% in 2019 and the tender price index is expected to rise by 2-4%.

Smart decisions **creating long-term value**

Combining deep market knowledge with in-depth data on the world's construction markets and the use of digital tools supports smart decision making. This allows greater predictability of outcomes, removes waste and generates value, now and over the entire asset lifecycle. This is how construction clients can gain a competitive advantage.

Innovation

Masdar Building, home of the Graphene Engineering Innovation Centre (GEIC)

Arcadis helped the University of Manchester develop the Masdar Building, the new home of GEIC, a state-of-the-art, technical facility, which is a testing ground for graphene, a cutting-edge material that some say is the building block of the future. Arcadis' project and cost management experts used data and industry insights to deliver this extraordinarily adaptable facility within the confines of specific funder obligations.

Masdar Building - GEIC is a bespoke solution for graphene research. The building needed to be highly versatile to accommodate the many different applications of graphene: desalination, super energy efficient batteries, and advanced bio sensors, to name only a few. The spaces are open plan with no ceilings and exposed services to allow easy adaptation. The servicing strategy has a loop arrangement, allowing central gases to be easily accessed with exhaust and extract links directly from the corridors. This offers maximum flexibility when changing uses and bringing in new tools and equipment, required by Industry partners.

Masdar Building GEIC is a dynamic workspace, where the world's innovators collaborate and test pilot products for the future.



End-user benefits

International Trade Center - Shanghai

Arcadis is supporting the revitalization of Shanghai's business district by providing quantity surveying services for the construction of the International Trade Centre (ITC) in the Xujiahui commercial hub in Puxi. The mega-structure will deliver numerous benefits for the people of Shanghai. Various commercial activities will be included in one complex to deliver social value and new customer experiences.

ITC will be comprised of office space in two skyscrapers (220 meters and 370 meters), a mall, a 6-star hotel and nine connecting bridges to surrounding buildings. The building will also have links to three metro lines that will provide users with access to every part of the city. Tapping into an industry-leading cost database and a wealth of experience benchmarking projects in mainland China, Arcadis provided estimates and expert advice to improve the design solution and construction methods. ITC is expected to be completed in 2023.

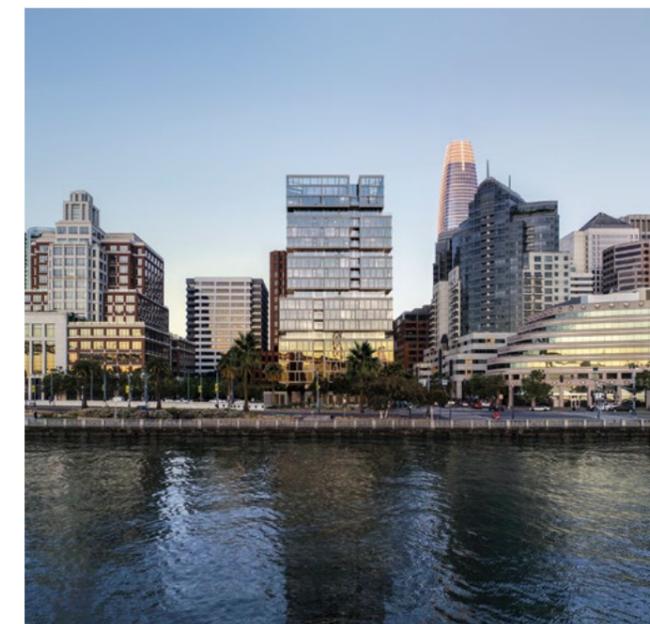
Sustainability

One Steuart Lane - San Francisco

Arcadis is working with SRE Group - a subsidiary of China Minsheng Investment to help deliver this building. One Steuart Lane is a 67-meter tall tower, which will contain 120 residential units on 20 floors in the heart of San Francisco. There is a target of recycling or diverting from landfills at least 75% of construction waste.

Once completed, this will be a LEED Gold condominium. The project will include 278 square meters of roof-mounted solar thermal collectors for water heating and the building will collect grey water to provide 100% of its toilet water and on-site irrigation.

Arcadis advised on the pre-construction phase and is continuing to advise in the delivery phase.



Methodology

Arcadis developed its comparative cost comparison index for 100 cities, covering 20 building functions, based on a survey of construction costs, review of market conditions and professional judgement from its experts globally. An indicative range of average prices by building function was built – a low and high mark – for each city. These figures were converted into US Dollars (USD). Next, the figures were subjected to additional analysis and indexed against the price range for London, using this as the index base. The value of 100 was assigned to the middle point in London's price range and this was made the baseline for comparing the cost ranges for the other cities. Then the other city price ranges were plotted on a graph, relative to that baseline.

The index incorporates local specification data used to meet the various building functions and market needs. As a result, the index is a comparison of the relative costs of delivering the same building functions in each city. Differences in building specification standards can vary significantly across parts of the world, but the index does not account for these distinctions. Additionally, purchase power parity is not taken into account.

The construction cost data used in this index was current in Q1 of 2019. The exchange rate indications were current on 6 March 2019.

Disclaimer

This report is based on market perceptions and research carried out by Arcadis, a design and consultancy firm for natural and built assets. This document is intended for informative purposes only and should not be construed or otherwise relied upon as investment or financial advice (whether regulated by any financial regulatory body or otherwise) or information upon which key commercial or corporate decisions should be taken.

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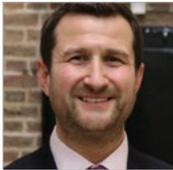
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About Arcadis

Arcadis is the leading global Design & Consultancy firm for natural and built assets. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. We are 27,000 people, active in over 70 countries that generate €3.3 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.

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