Linesight

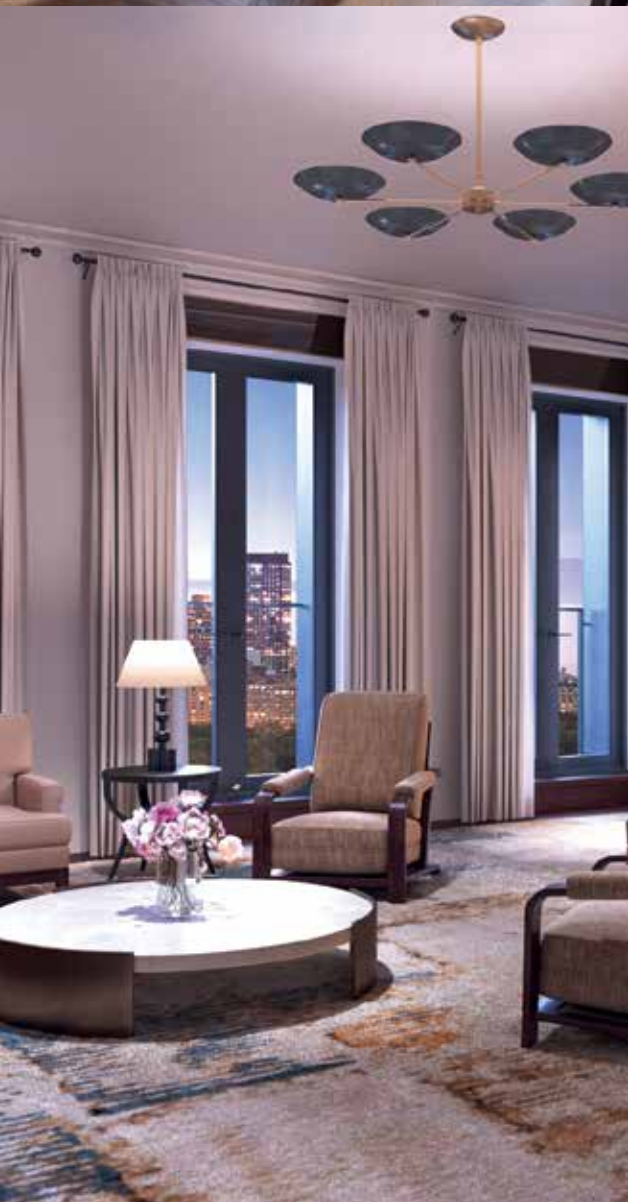
USA Handbook 2019

linesight.com

815 Park Avenue, New York

Architect:
SLCE Architects

Linesight services:
Project Management
Cost Management
Schedule Management



Welcome to the Linesight USA Handbook 2019.

Each year, we bring together all the important indices and trends in construction to give you a comprehensive industry profile. The Handbook represents just part of our global Linesight Knowledge Center, which you can find at:

linesight.com/knowledge-center

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*Updated September 2019

Global Insights

About us


RagingWire
An NTT Communications Company
1150 WALSH

Santa Clara, California

Architect:
Gensler

Linesight services:
Cost Management
Procurement

REVIEW & OUTLOOK:

USA Market Review

Industry snapshot

$808bn

2019 Construction Starts

+3%

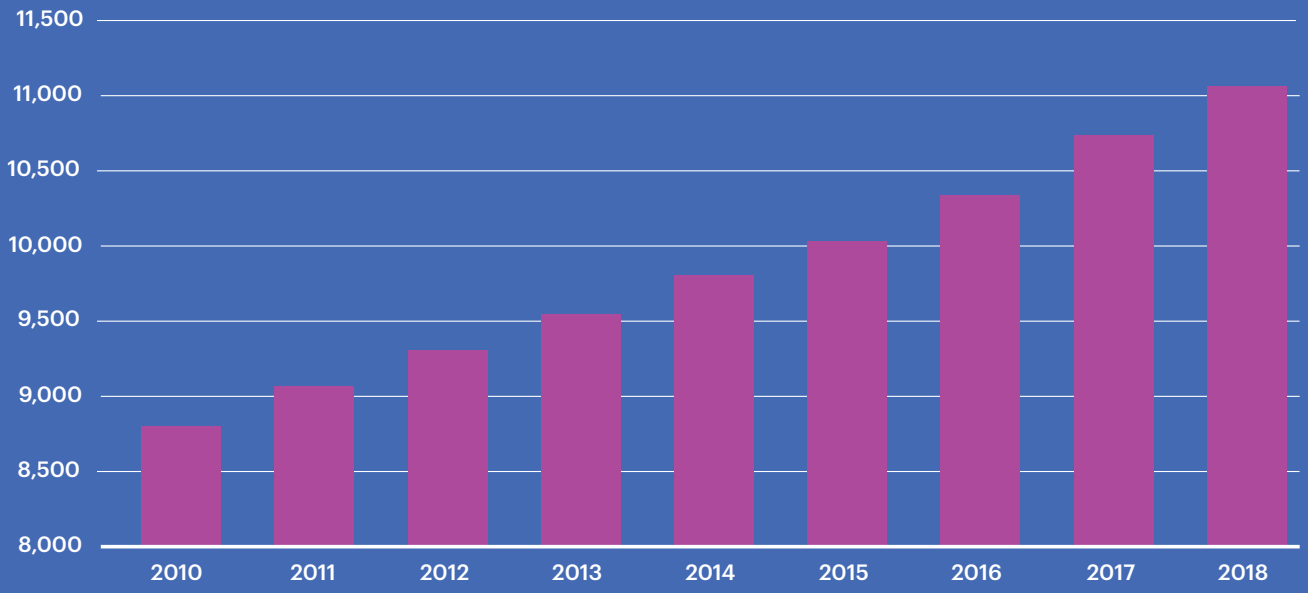
2019 Construction Growth

7,242,000

Number of people employed in sector (2018) 5% of workforce

Annual construction cost index

2010-2018



For index buildup see page 20

US Market Review for 2019*

Patrick Ryan, EVP, The Americas, reviews construction industry performance in 2019 to date and outlines what we can expect for the remainder of the year.

Even slower growth is now projected as we head into the 4th quarter of 2019, which is in line with Goldman Sach's prediction of 2.5% annual growth for 2019. Having said that, some analysists now believe that the final growth figures for 2019 may end up closer to 2.3%.

Further slowdown in GDP growth is expected to continue into early 2020 as a result of the impact of tariffs and softening of investment spending. The path forward for the U.S. economy will depend on whether the Federal Reserve can cut rates enough to stabilize China/U.S. trade tremors. The consensus now seems to be that GDP growth of 1.8% in 2020 is a realistic forecast.

The Business Cycle Index (BCI) model, which uses a range of economic and financial variables to estimate the strength of the U.S. economy and to forecast the probability of recession, is still in "risk-of" territory. Although short-term risks remain low, the BCI model estimates the probability of a U.S. recession in 12 months at 32%, this model is now past the 30% warning threshold and historical data clearly indicates that a recession is looming in the near future.

Deloitte using the Oxford Global Economic Model is predicting that the unemployment rate in the USA will rise by 0.3% in 2020 and remain at a steady rate of 4% through to 2024. On the cost of employment, the forecast is stating that the current 2.9% annual increase in cost will remain the same in 2020 with a decline in the annual growth rate of 0.5% from 2021 onwards. These annual increases in labor costs are against the background of projected Consumer Price Index (CPI) rates of between 1.8 to 1.9% per annum.

The volatility of the stock market is concerning. Mid-July to mid-August saw a drop of 5% in the value of stocks. As Deloitte noted in their Q3 2019 Insight, the reaction of the bond market is more troubling, bond yields have dropped by almost a full percentage point. By mid-August, the 10-year Treasury note was yielding about 1.%.

Factors affecting the construction outlook

2019 construction growth is on target to achieve an increase of 3% year on year, despite the predicted challenges around the availability of both skilled and unskilled labor, which remains a significant challenge for the industry. New construction starts in 2019 are also on target to achieve a 3% increase in volume but even with these moderate increases in construction activity, concern for shortages in the US labor market will soon translate to the stifling of growth in some sectors and/or regions of the country.

The potential escalation of the China/US trade war looms like a dark cloud over the US Construction industry. Cristian deRitis, senior director, Moody's Analytics has an interesting observation in relation to same, "the first round of tariffs [25 percent of $34 billion of Chinese goods] had a negligible effect," he said. "The second round

[$200 billion of goods] will affect more consumer goods but won't push us into recession. A full-scale trade war at $500 billion would hurt us and maybe push a recession". The Bureau of Economics Analysis / Moody's Analytics forecast that there could be an overall negative affect of -1.5% against US National GDP in the event of a full-scale trade war.

As predicted the cost of construction has continued to rise in 2019 and it currently looks like the predicted general rise of 3% will be exceeded this year, with some analysists predicting rise in the cost of non-residential building of greater than 5%. These increases are being driven primarily by the trade tariffs, labor shortages and continued growth, albeit a slower growth rate than previous years.

The residential building market has weakened and the forecast for housing starts is set to decrease as economic growth declines and population growth slows. Housing accounts for approximately 4% of GDP and the forecast decline in activity is not expected to be a major contributing factor to the start of the next recession. will be $808 billion, which is on a par with the $807 in 2018. Furthermore, the report predicts that the major sectors of residential building will be down by 2%, non-residential building will match the 2018 figure of 3.4% and non-building construction will increase by 3%.

There are, of course, other factors, such as rising interest rates, higher material costs and the challenge of finding qualified labor, which will be challenges to the construction industry throughout 2019. However, despite these challenges, we will still have growth in the US economy, some easing of bank lending standards and healthy commercial real estate trends.

These include; investors lining up to pour billions into Opportunity

2019 construction growth is on target to achieve an increase of 3% year on year, despite the predicted challenges around the availability of both skilled and unskilled labor

JPMC 50 Rowes Whaft, Boston

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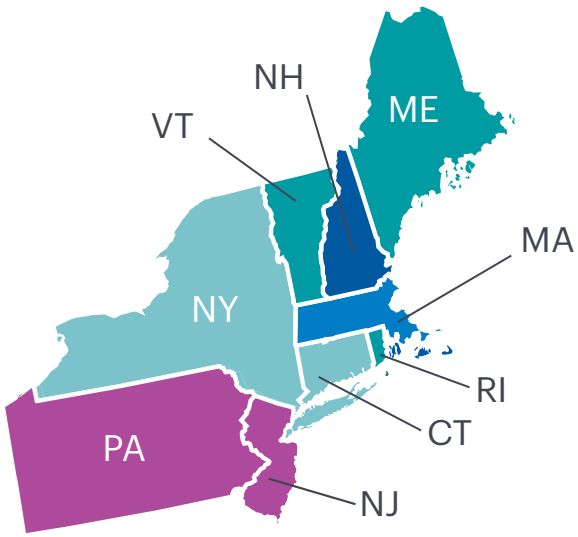
Northeast Regional Snapshot



4.4 to 6.0	3.8 to 4.4	3.6 to 3.8	3.4 to 3.6	2.5 to 3.4

Commercial

Commercial construction is expected to have peaked. There is an expectation of square footage declines in all sectors of commercial building in 2019 due to rising interest rates and higher costs.

Residential

A maturing economy and rising interest rates will add pressure this year, leading to a decline in total housing starts, which is projected for 2019.

New York labor market
+4%

-9%
Residential completions

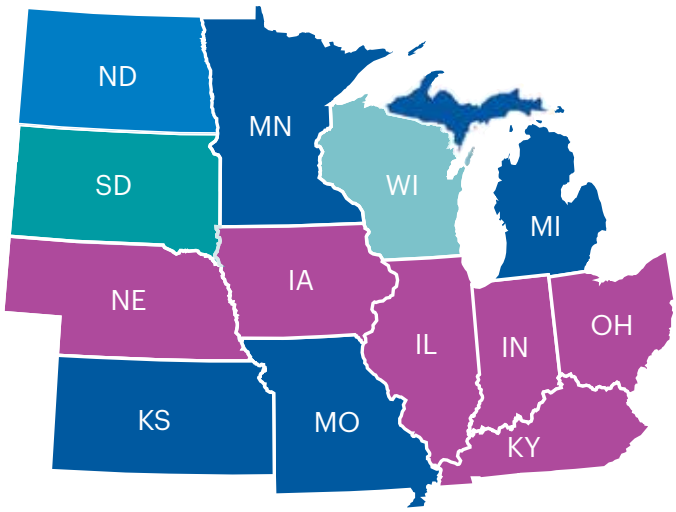
-2%
Non-residential forecast

Non-building construction
+12%

-8%
Commercial and manufacturing

Institutional and other
+4%

Midwest Regional Snapshot



4.4 to 6.0 | 3.8 to 4.4 | 3.6 to 3.8 | 3.4 to 3.6 | 2.5 to 3.4

Residential

Growth in the single-family sector will negate the dampening in the multi-family sector.

Institutional

This sector is predicted to have the largest growth with investment being made in health, educational, institutions and public works projects.

Illinois labor market
+4%

0%
Residential completions

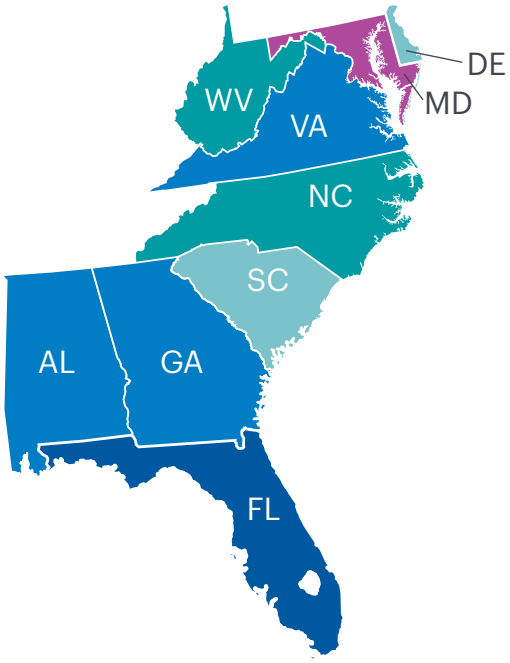
+3%
Non-residential forecast

Non-building construction
-10%

0%
Commercial and manufacturing

Institutional and other
+7%

South Atlantic Regional Snapshot



4.4 to 6.0	3.8 to 4.4	3.6 to 3.8	3.4 to 3.6	2.5 to 3.4

Commercial and Manufacturing

The predicted large drop in the commercial and manufacturing sector is primarily dependent on the trade tariff challenge and the general global economic slowdown.

Industrial

This sector traditionally has been a high growth area with Data Center demand. However, with high construction costs and suitable tracts of land becoming harder to acquire, growth in this sector is predicted to slow.

Virginia and Florida labor market
+4%

-1%
Residential completions

-7%
Non-residential forecast

-8%
Non-building construction

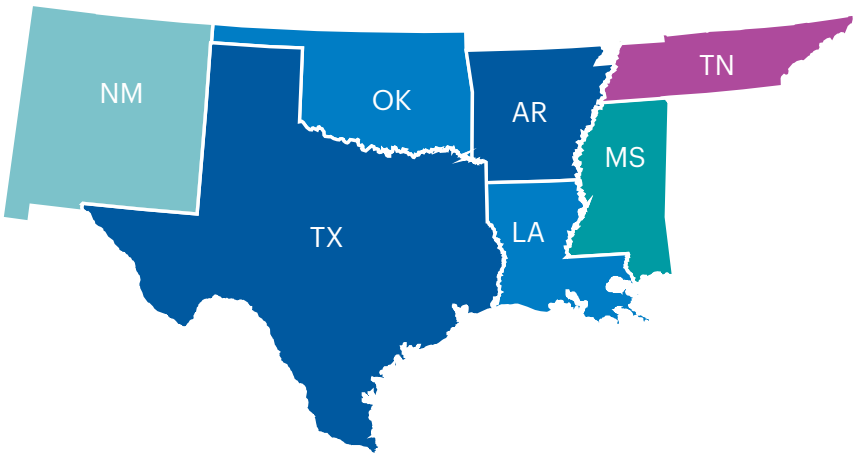
-11%
Commercial and manufacturing

-3%
Institutional and other

"I've had the opportunity to travel abroad and expand my skillset in a dynamic and fast-paced industry. From day one I was welcomed with open arms and made to feel an integral part of the operations team. Since joining I've seen exponential growth across the enterprise including an office expansion in San Francisco. I'm excited to be part of a team that meets challenges head-on and understands the importance of teamwork."

Rory Nunnery
IT Specialist, San Francisco

South Central Regional Snapshot



4.4 to 6.0	3.8 to 4.4	3.6 to 3.8	3.4 to 3.6	2.5 to 3.4

Institutional

Institutional investment is likely to increase this year in industrial, healthcare, and education facilities, which is pushing the forecast to showing growth in this sector.

Non-Building

With investment at state level and with the Federal plan to invest $1.5 trillion in infrastructure, the growth in this sector is expected to rise quite significantly.

Texas labor market
+6%

0%
Residential completions

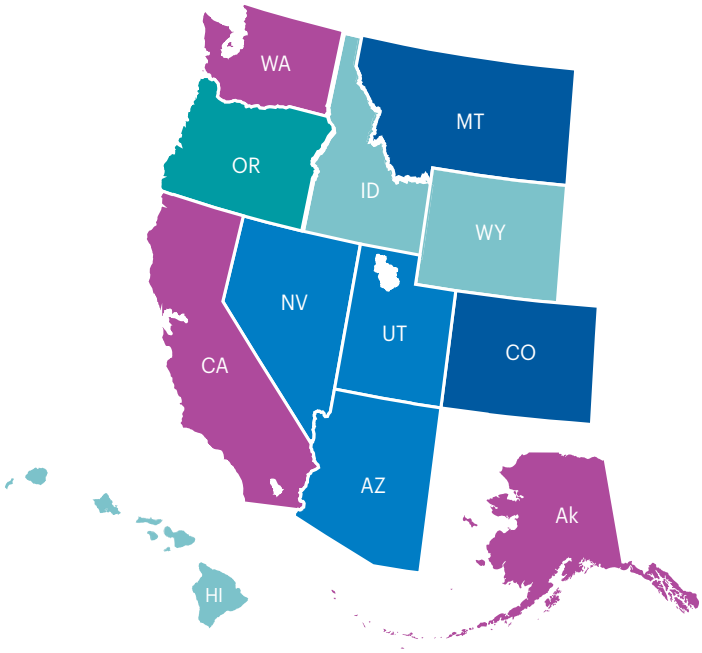
+4%
Non-residential forecast

Non-building construction
+17%

Commercial and manufacturing
+2%

Institutional and other
+8%

West Regional Snapshot



4.4 to 6.0	3.8 to 4.4	3.6 to 3.8	3.4 to 3.6	2.5 to 3.4

Commercial

The Commercial sector remains attractive to investors, with healthy demand for housing and commercial space.

Non-Building

There is a substantial investment program for infrastructure planned in 2019 for the West Coast, particularly in California, which is driving predicted high growth in this sector.

California and Washington State labor market
+5%

-2%
Residential completions

+3%
Non-residential forecast

Non-building construction
+10%

Commercial and manufacturing
+7%

Institutional and other
0%

2. Linesight average American construction costs 2019

Sector	Sq Ft	USD/SF Low	USD/SF High	USD/SF Average
Residential sector				
Low rise apartments	63,000	153	195	174
High rise apartments	335,000	162	208	185
Commercial/office sector				
Low rise – medium rise	160,000	150	191	171
Medium rise – high rise	160,000	145	185	165
Bank	10,000	193	247	220
Pharmaceutical				
Pharmaceutical	65,.000	616	791	704
Pharmaceutical - medical device facility	51,000	754	967	861
Healthcare				
Hospital	250,000	256	327	291
Manufacturing				
Manufacturing facility - 1 story	110,000	104	131	118
Manufacturing facility - multi story	110,000	110	140	125
Micro chip/satellite manufacturing facility	165,000	419	538	479
Parking				
Parking garage - above ground	255,600	61	78	69
Parking garage - underground	67,800	84	106	95
Hotel and leisure/retail sector				
Hotel - low rise	200,000	163	208	185
Hotel - high rise	740,000	155	198	176
Education sector				
University	102,967	166	213	190
Airport				
Terminal	388,000	196	251	224

Notes:

1. All costs are hard costs with no deduction for Tenant Improvement Allowances.
2. Costs based on January 2018 prices.
3. The costs are representative of typical specifications for each type of building and do not account for any site abnormal costs.
4. The costs do not allow for any Professional Fees, FF&E, AV+IT, Security, Moving, external works, landscaping works.
5. All costs include sales tax as appropriate.

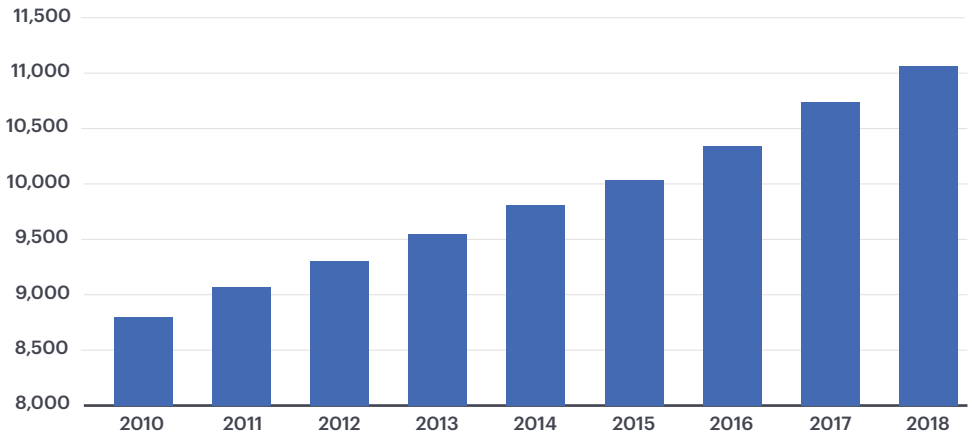
Source: *Linesight*

"I am originally from Taiwan, and came to the US for my Master's and PhD studies. I began my career as an Engineer and migrated into Project Management. I joined Linesight to work on some exciting projects in the Bay area. I feel very lucky to work with such talented people and to be a part of an organization that actively encourages women getting involved in the construction industry."

Lily Mao
Project Manager
San Francisco Office

3. Indices

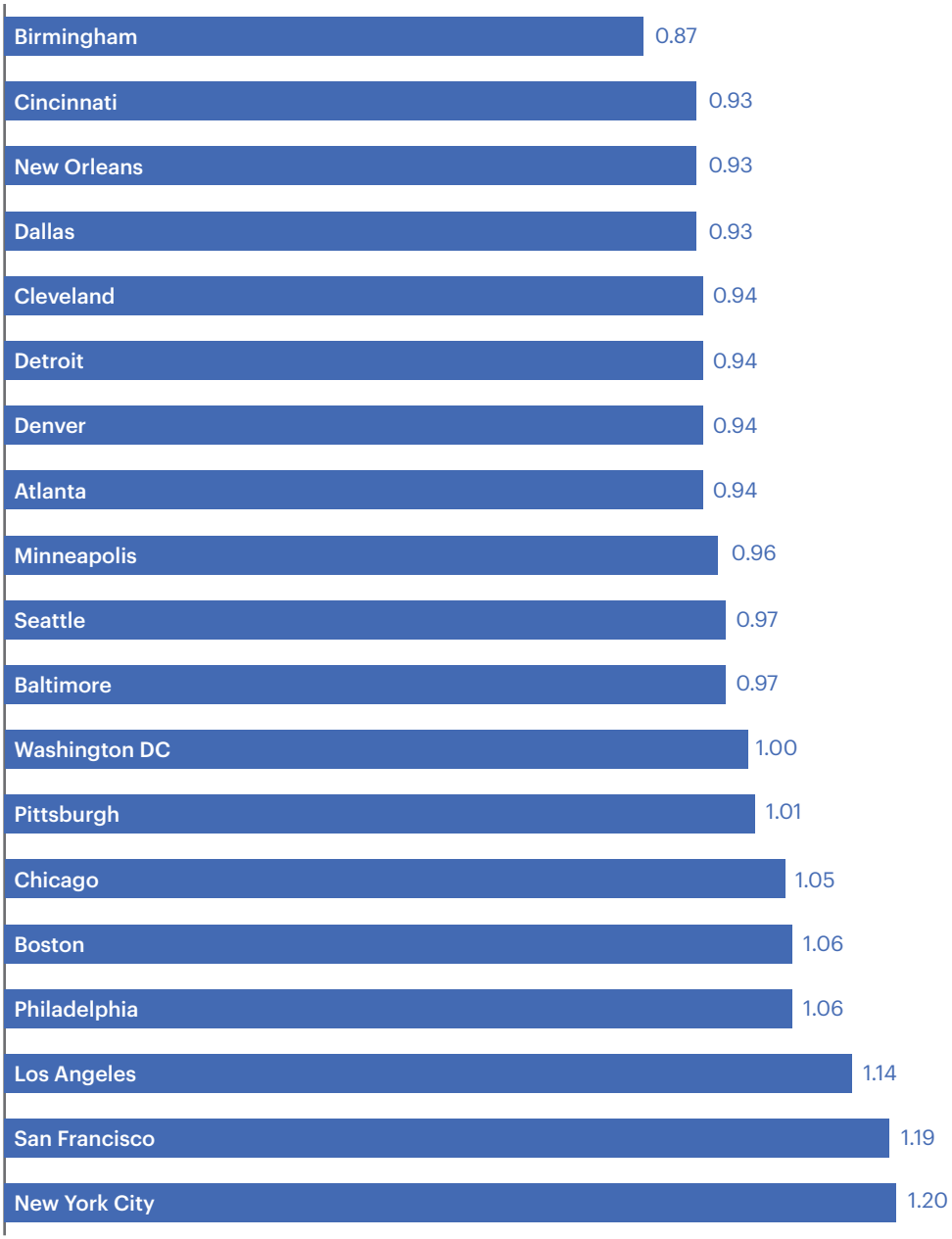
3.1. Annual construction cost index 2010–2018



Source: *Engineering News record*

How ENR Builds Index: *200 hours of common labor at the 20-city average of common labor rates, plus 25 cwt of standard structural steel shapes at the mill price prior to 1996 and the fabricated 20-city price from 1996, plus 1.128 tons of portland cement at the 20-city price, plus 1,088 board ft of 2 x 4 lumber at the 20-city price.*

3.2. US regional building cost index



Source: *Compass 19th Annual Edition*

3. Indices

3.3. Top US firms

Top Mid Western contractor firms
(IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI)

Rank	Firm	Revenue ($ M)
1	Clayco	2,020
2	Turner Construction	1,878
3	Mortenson Construction	1,729
4	Barton Malow	1,654
5	Power Construction LLC	1,200
6	Walsh Construction	1,155
7	Kokosing	1,150
8	Pepper Construction	1,107
9	Miron Construction	967
10	JE Dunn Construction	953

Top Mid Western design firms
(IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI)

Rank	Firm	Revenue ($ M)
1	Burns McDonnell	509
2	AECOM	476
3	HDR	317
4	Stantec	226
5	HNTB	199
6	WSP	179
7	Arcadis North America	160
8	Terracon Consultants	154
9	DLZ Corp	109
10	Kimley-Horn	105

Source: *Engineering News Record*

Top North Eastern contractor firms
(CT, ME, MA, NH, NJ, NY, PA, RI, VT)

Rank	Firm	Revenue ($ M)
1	AECOM Tishman	3,871
2	Turner Construction Co.	2,904
3	Skanska USA Inc	1,971
4	Structure Tone Organization	1,741
5	LendLease	1,655
6	Gilbane Building Co	1,172
7	Hunter Roberts Const Group Inc	1,020
8	China Construction America	822
9	J.T. Magen & Co	787
10	Lechase Construction Services LLC	613

Top North Eastern design firms
(CT, ME, MA, NH, NJ, NY, PA, RI, VT)

Rank	Firm	Revenue ($ M)
1	AECOM	538
2	WSP	303
3	Arcadis North America	181
4	Greenman-Pederson Inc	172
5	Gensler	171
6	STV	161
7	Stantec	152
8	HDR	146
9	Langan	142
10	Arup	138

Source: *Engineering News Record*

3. Indices

Top South Atlantic contractor firms
(DE, DC, FL, GA, MD, NC, SC, VA, WV)

Rank	Firm	Revenue ($ M)
1	Clark Group	2,170
2	The Yates Cos	1,276
3	Turner Construction Co.	1,235
4	Balfour Beatty	1,094
5	Skanska	1,087
6	Choate Construction C.	1,064
7	Archer Western Contractors	898
8	Moss	893
9	Robins & Morton	837
10	Suffolk Construction Co	802

Top South Atlantic design firms
(DE, DC, FL, GA, MD, NC, SC, VA, WV)

Rank	Firm	Revenue ($ M)
1	AECOM	552
2	HDR	307
3	Kimley-Horn	293
4	HNTB Corp	269
5	Stantec Arcadis North America	216
6	Atkins North America	172
7	Arcadis North America	165
8	Terracon Consultants	146
9	RS & H Inc	143
10	WSP USA	130

Source: *Engineering News Record*

Top South Central contractor firms
(Texas and Louisiana only)

Rank	Firm	Revenue ($ M)
1	Zachry Group	2,508
2	Turner Industries Group LLC	2,339
3	Kiewit Corp	1,503
4	Balfour Beatty US	1,294
5	Austin Industries	1,224
6	Strike	1,141
7	The Beck Group	1,016
8	Manhattan Construction Group	962
9	Performance Contractors Inc	950
10	DPR Construction	946

Top South Central design firms
(Texas and Louisiana only)

Rank	Firm	Revenue ($ M)
1	Burns McDonnell	501
2	S & B Engineers & Const. Ltd	374
3	AECOM	335
4	HDR	192
5	Stantec	181
6	Terracon Consultants Inc	167
7	Kimley-Horn	163
8	WSP USA	141
9	LJA Engineering Inc.	140
10	Burrow Global LLC	137

Source: *Engineering News Record*

3. Indices

Top Western contractor firms
(AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY)

Rank	Firm	Revenue ($ M)
1	Sundt Construction Inc	720
2	McCarthy Building Cos	568
3	Las Vegas Building Corp	437
4	DPR Construction	419
5	Core Construction	404
6	Kitchell Corp	378
7	Granite Construction Inc	344
8	Bradbury Stamm	283
9	Kiewit corp	280
10	Chanen Construction	270

Top Western design firms
(AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY)

Rank	Firm	Revenue ($ M)
1	HDR	98
2	Aecom	91
3	Stantec	56
4	WSP USA	47
5	Kimley-Horn	46
6	Carollo Engineers inc	45
7	Atkins, SNC-Lavalin Group	38
8	Burns & McDonnell	37
9	Bohannan Huston Inc	28
10	Arcadis	27

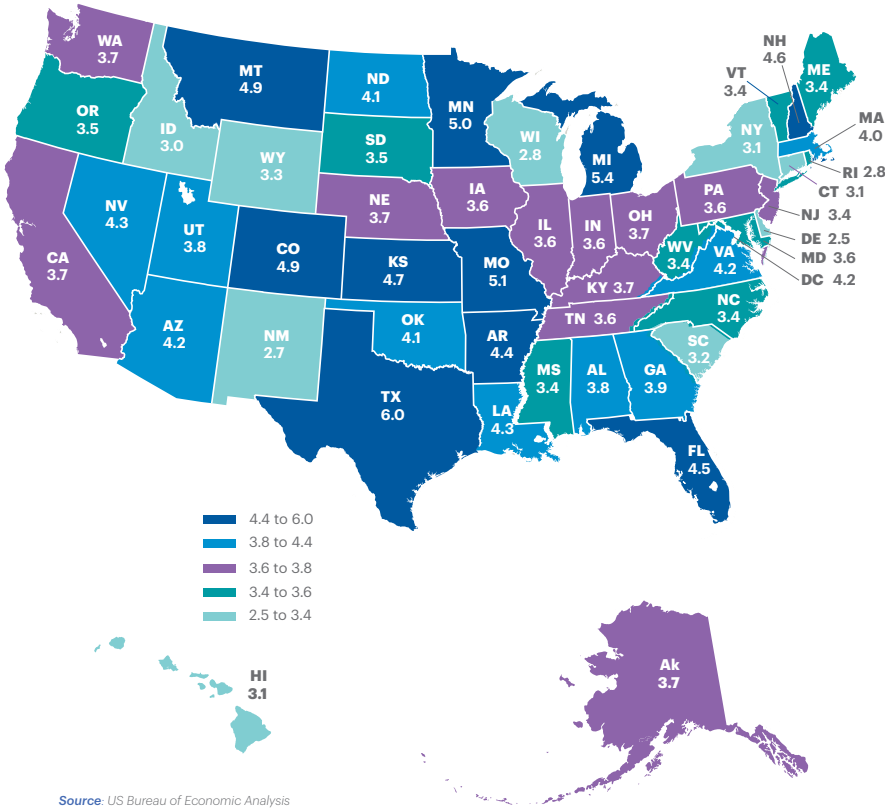
Source: *Engineering News Record*

> “I always wanted to travel and Linesight has made that possible. I’ve worked in the Dublin, New York, and recently joined the San Francisco team. Despite the vast range of projects, cultures, and people, some things always remain a constant - the Linesight culture and enthusiasm. I’ve had such a great opportunity to be part of Linesight’s expansion in the US, and this is only the beginning.”

Lisa McIntyre
Senior Cost Manager
San Francisco Office

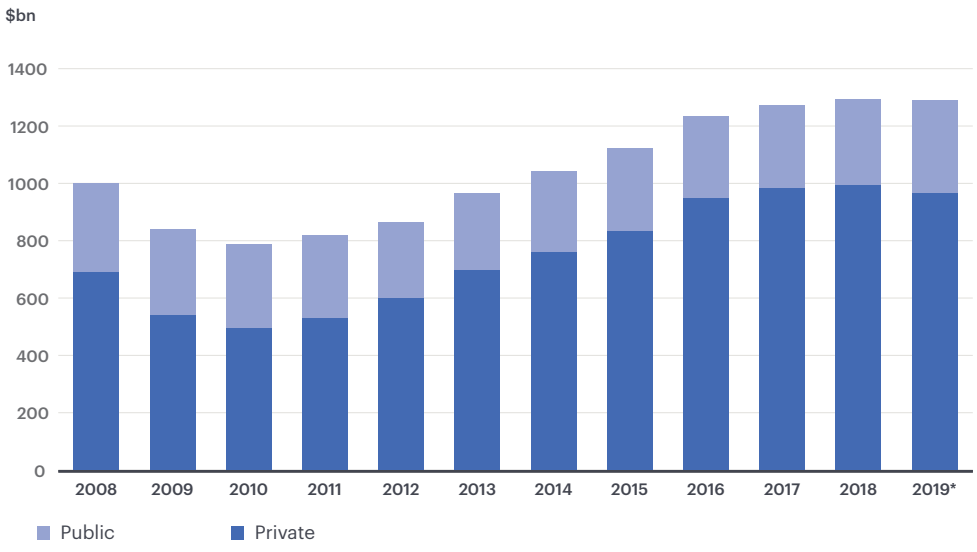
4. Macro Indicators

4.1. Change in GDP% by state Q4 2018–Q1 2019*



Source: US Bureau of Economic Analysis

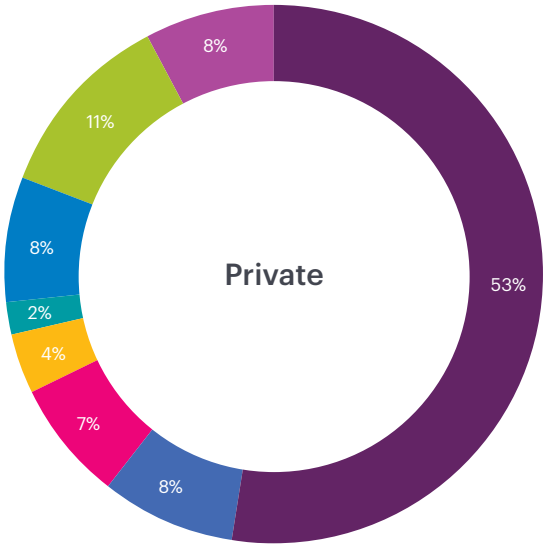
4.2. Value of construction output public / private 2008-2019*



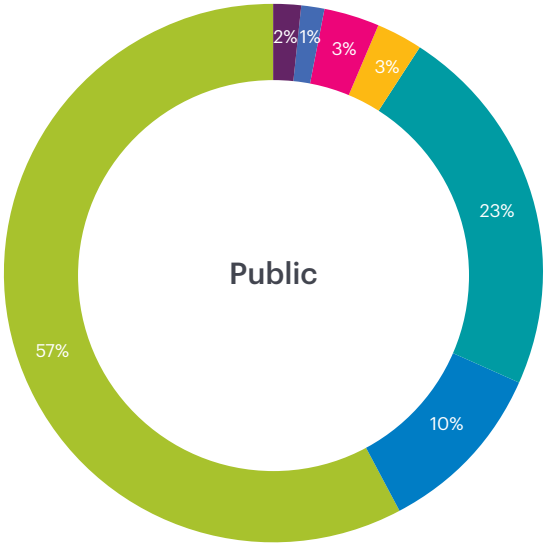
***Note:** *output to year ending July 2019*

***Source:** US Census Bureau*

4.3. US construction by type of work 2019*



Residential	506,734
Commercial	77,899
Office	68,547
Healthcare	35,691
Educational	17,572
Miscellaneous	73,082
Infrastructure	109,830
Manufacturing	72,250



Residential	6,035
Commercial	4,653
Office	10,396
Healthcare	9,070
Educational	73,273
Miscellaneous	33,800
Infrastructure	187,112

Note: *Millions of dollars, to July 2019*

Source: *US Census Bureau*

4.4. Construction GDP by state*

State	$m Q3 2018	$m Q1 2019
United States total	859,722	874,866
Alabama	8,200	8,347
Alaska	2,092	2,143
Arizona	17,659	18,371
Arkansas	47,89	4,876
California	113,230	114,963
Colorado	21,506	21,957
Connecticut	8,447	8,597
Delaware	2,865	2,909
District of Columbia	(D)	(D)
Florida	57,590	58,570
Georgia	26,290	26,821
Hawaii	5,285	5,350
Idaho	5,258	5,298
Illinois	29,683	30,036
Indiana	14,324	14,669
Iowa	8,008	7,885
Kansas	6,400	6,463
Kentucky	8,566	8,750
Louisiana	13,979	13,927
Maine	2366.6	2368.4
Maryland	18,000	18,261
Massachusetts	21,407	21,703
Michigan	21,766	22,183
Minnesota	15,252	15,522
Mississippi	4,160	4,190
Missouri	11,807	11,967
Montana	2,980	2,980
Nebraska	3,446	3,492
Nevada	8,962	9,391

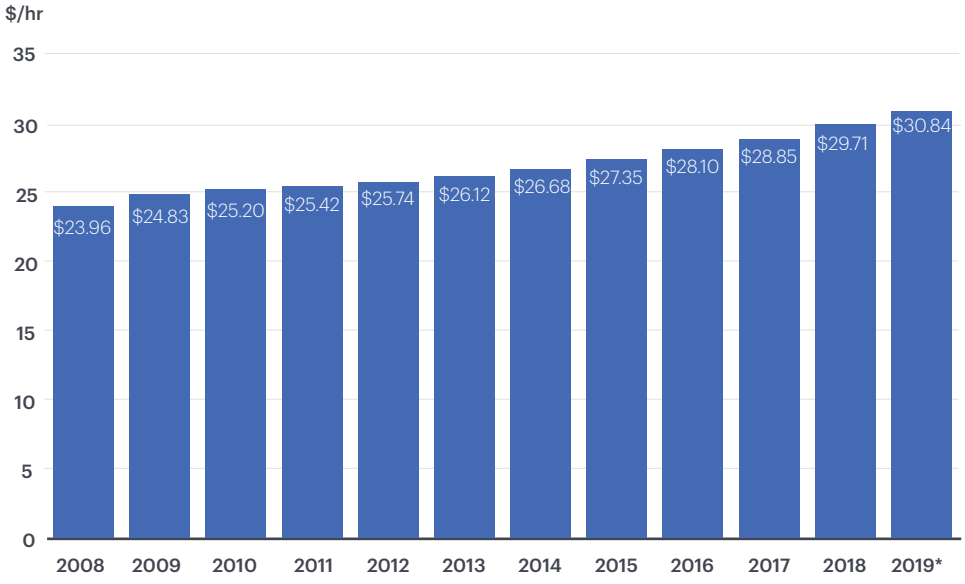
State	$m Q3 2018	$m Q1 2019
New Hampshire	2,629	2,687
New Jersey	23,314	23,740
New Mexico	3,892	4,011
New York	52,373	53,861
North Carolina	22,320	22,686
North Dakota	3,317	3,468
Ohio	25,487	25,870
Oklahoma	7,449	7,618
Oregon	11,408	11,636
Pennsylvania	33,395	34,092
Rhode Island	(D)	(D)
South Carolina	11,764	11,928
South Dakota	2,022	2,091
Tennessee	14,629	14,799
Texas	96,686	98,300
Utah	11,232	11,358
Vermont	1,143	1,151
Virginia	21,717	22,200
Washington	25,110	25,304
West Virginia	5,034	5,172
Wisconsin	14,201	14,504
Wyoming	2,218	2,276
New England	(D)	(D)
Mideast	(D)	(D)
Great Lakes	105,461	107,262
Plains	50,250	50,888
Southeast	199,038	202,265
Southwest	125,686	128,300
Rocky Mountain	43,194	43,869
Far West	166,087	168,787

Source: *US Bureau of Economic Analysis*

"I joined the Linesight New York team in June of 2018 and it's been a truly rewarding experience. I'm currently working as a scheduler for a key account, this type of responsibility and involvement with high-profile projects in New York is challenging but the management and my colleagues are always there to support, guide and encourage."

Roberto Bustos
Senior Planning Scheduler,
New York

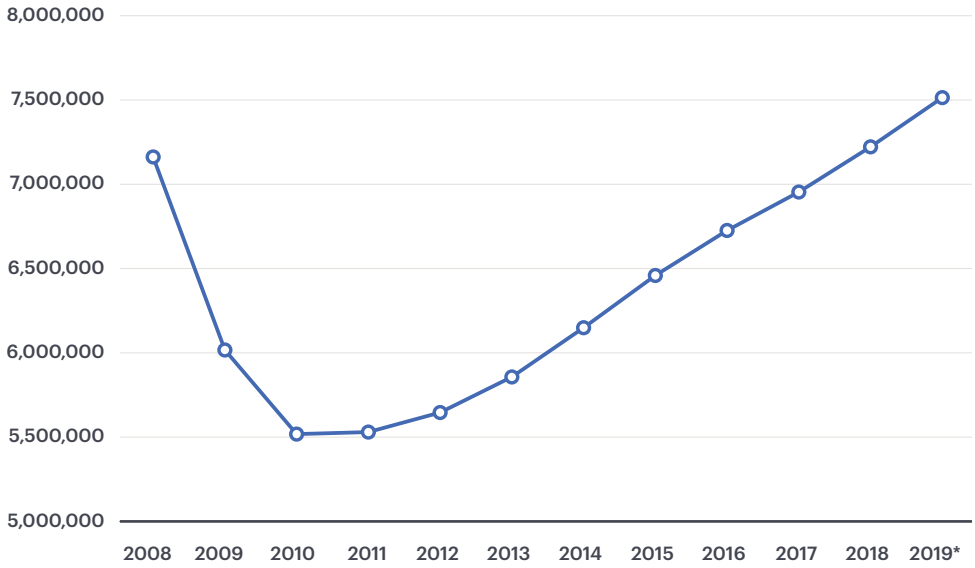
4.5. US earnings in construction 2008–2019*



Notes: *Average earnings per hour. *Average earnings in August 2019*

Source: *Bureau of Labor Statistics*

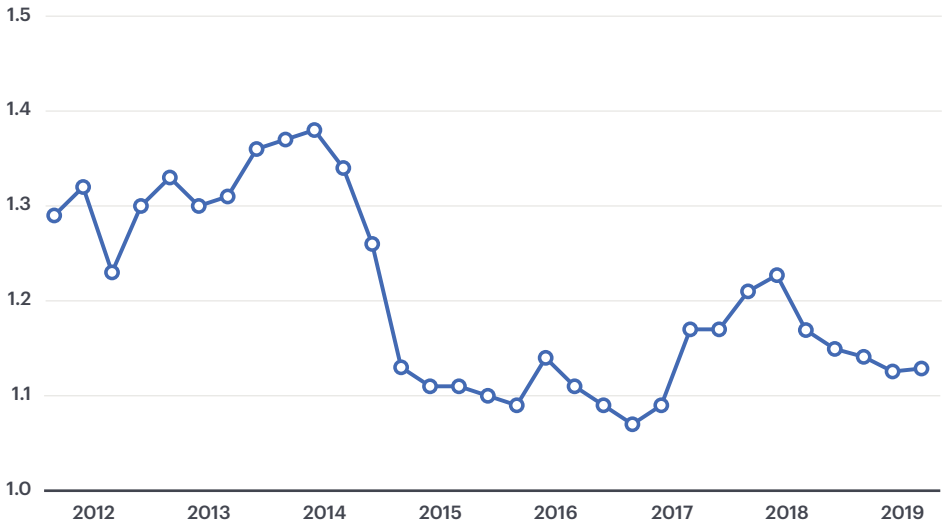
4.6. Employment in construction 2008–2019*



Note: **Employment in construction in August 2019*

Source: *Bureau of Labor Statistics*

4.7. Euro vs dollar 2011–2019*



Source: *European Central Bank*

Guinness Open Gate Brewery and Barrel House, Baltimore

Architect:
Design Collective

Linesight services:
Cost Management
Project Management

REVIEW & OUTLOOK:

Global Insights

Global Market Review

Trade dispute between the world's two largest economies has the global economy holding its breath in anticipation of the outcome.

Although the deadline has recently been extended, the potential outcome in the current US-China trade dispute continues to cast a shadow over global economic prospects. The IMF has reduced its global growth projection for 2019 by 0.2 percentage points since its projection in October 2018. When asked what had changed since October at the World Economic Forum Annual meeting in Davos, Christine Lagarde (Managing Director of the IMF) responded that it is the level of risk and the acceleration of the pace at which risks are materializing.

The reduction to 3.5% growth in 2019, is largely due to weaker performances in Europe and Asia, specifically relating to trade tariffs between the US and China, and Brexit. However, as Lagarde points out, it is still growth, albeit a little more modest than previously predicted.

US set to break record despite slowdown

The strong performance of the US economy is expected to continue in 2019. The financial results for 2018 were delayed due to the partial government shut down in January, however figures show that significant growth in the first three quarters were balanced by a significant slow-down in the fourth quarter.

Commentators are expressing the view that the beneficial impact of tax reforms introduced by the Trump administrations are fading. Nevertheless, the economy is in a strong position and the Federal Reserve has indicated that it intends to implement moderate rate hikes in 2019 and 2020, in order to keep the economy from overheating amid rising inflation and a rapid decline in unemployment. If the current expansion in the US economy continues past July 2019, it will have broken the previous record of a decade of expansion, which was set by the tech boom in the 1990s.

The US appears to be on track for this by avoiding overheating and financial imbalances - the classic causes of recessions. President Trump is determined to follow through on his campaign promise to end unfair practices with trading partners - late in 2018 he reached agreement on the replacement of the NAFTA, now known as the USMCA (United States-Mexico-Canada Agreement). Earlier in 2018, he turned his attention to China, citing unfair trade practices and theft of intellectual property. China then made a counterattack, and hence we have a trade war on our hands.

China to increase public spending

The Chinese economy, the second largest in the world, is expected to slow down further in 2019. The Government had been implementing a plan to reduce debt and risky lending. However, in response to the trade war, they are switching policy and tending towards a stimulus package of more fiscal spending, reducing the amount of money the bank needs to hold in reserve at the central bank and thus freeing up money for additional lending; building a resilient domestic market and stabilizing economic growth and monetary easing in order to enhance growth.

Europe still in flux

In Europe, uncertainty around Brexit still dominates. Business investment and domestic consumption in the UK is likely to remain subdued while the issue of Brexit is unresolved. A no-deal Brexit will likely cause a serious economic shock, while leaving the EU with a deal could result in a boost in investment and consumer sentiment, which has been subdued for the last number of years. Germany, the largest economy in the eurozone, is dealing with a softening of private consumption, and introduction of new automobile fuel emission standards have resulted in a weak industrial production.

Meanwhile, France is dealing with 'Gilet Jaunes' or the 'Yellow Vest' movement, and after 10 weeks the protests are finally showing signs of receding. However, what was previously viewed as an unorganized movement is morphing and changing, and the final shape it takes could be of political concern. In Italy, weak domestic demand and higher borrowing costs together with concerns about sovereign and financial risks have dampened domestic demand.

Ireland is set to see continued strong growth, which will shield it somewhat from the slowdown in the global economy. However, labor shortages, pressure on public services and rising prices caused by this strong growth present major challenges for Government and businesses alike. The outlook is overshadowed by the prospect of a hard Brexit, which would negatively impact on Ireland's growth, with rural Ireland being particularly impacted.

The GCC continues to diversify

Oil prices have been volatile thanks to swings in supply, and OPEC has agreed to cut production with a view to returning prices to US$70 a barrel later in 2019. However, the GCC economy continues to improve, with a period of increasing interest rates and the prospect of stable oil prices. In particular, Saudi Arabia continues with its diversification plans as part of its 'Vision 2030' plan. And while the geopolitical situation remains a concern, improved economic dynamics are offsetting these concerns.

The governments continue their drive to reduce the economies' dependency on oil prices, and thus we have seen a trend of mergers and acquisitions, particularly in the banking sector. These M&As are seen as an opportunity to improve economies of scale and scope, and to improve market share in the global markets.

The governments are also focusing on continuing to attract foreign direct investment, which is stimulating economic growth and boosting investor confidence in the region. The UAE has made some significant investments in technology, and in particular renewable energy, with the ambition to have 44% of its energy requirements provided through renewable resources by 2050.

Its investment in infrastructure continues, as it prepares for Expo 2020, which is providing a stimulus for the regional construction industry. While FDI investment in the UAE is expected to significantly increase with recent investment law provisions, relaxation of visa rules and other business-friendly reforms also appear poised to both attract qualified foreign workers. However, Egypt is expected to be the region's top performer in 2019, followed by Iraq. Iran will contract again in 2019 as US sanctions continue.

In Israel domestic demand should continue to support economic growth this year. Private consumption will likely benefit from a lower tax burden and still-favorable financial conditions. New gas and oil-related projects are expected to boost fixed investment growth. On the other hand, regional tensions remain a key downside risk and cloud the outlook.

The Chinese economy, the second largest in the world, is expected to slow down further in 2019.

Asia Pacific remains robust

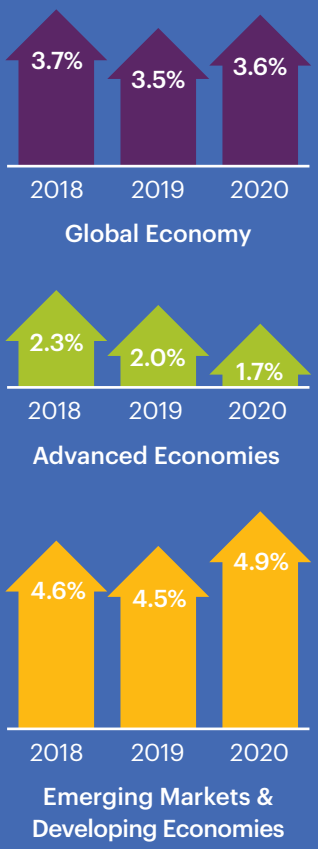
A recent press release by the Singapore's Ministry of Trade and Investment noted that its economy is, like many other global economies, expected to slow in 2019. The manufacturing sector, in particular electronics and precision engineering, is experiencing difficulties due to weakening global demand for semiconductors and associated equipment. While other sectors, such as wholesale trade, transportation and storage finance and insurance are expecting to moderate in growth, in line with the global economy. The information and communications, health and social services sectors are expected to remain resilient due to demand for IT and digital solutions. The construction industry is expected to see a pick-up after three consecutive years of contraction. Politically, there is speculation that general elections will be held this year to take advantage of the still-strong domestic growth and heightened public morale following bicentennial commemorations.

Remarkably, the Australian economy has gone 27 years without a recession. While there are risks to the economy, it is expected that business investment, rising exports of commodities and Government spending will likely offset the contracting housing sector, subdued consumer spending and devastating drought.

Employment growth is strong, as the Australians consistently add more jobs than needed to accommodate the growth of the working-age population, resulting in reduced unemployment rates and participation rates increasing to the highest level on record. In addition to increased production capacity from LNG plants, the Australian resource sector is also seeing increased activity from the Chinese in response to the US tariffs, in iron ore and coal particularly, though this cannot be relied upon in the longer term. Thus, growth in 2019 should be moderate.

Kim Hegarty
Associate Director

Growth projections



Source: *International Monetary Fund*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GLOBAL INSIGHT

How capital projects are responding to Life Sciences market trends

Global healthcare spending continues to increase dramatically and is projected to reach in excess of US$10 trillion by 2022.

This investment is driven in large part by the global increase in life expectancy, improved access to medicines and the growth of non-communicable diseases - most prominently cancer, heart disease and diabetes.

Contrary to popular perception, the Life Sciences sector covers a lot more than just pharmaceuticals. Beyond the top-tier pharmaceutical firms we all hear about, the core Life Sciences subsectors include medicine manufacturing, electromedical apparatus manufacturing, medical equipment and supplies manufacturing, and biological and chemical research and development.

In this diverse and highly-specialized group, one thing these businesses have in common is major capital requirements. Here are five trends that are shaping today's Life Sciences sector — and how they're affecting associated capital projects.

Cost is key

The life sciences industry as a whole continues to experience mounting pricing pressures, increasing access to drugs globally, growth in new innovations and therapies, and uncertain trade policies.

These forces are causing the industry to become more cost-focused. This increased focus is particularly evident in the industry's capital investments, which tend to be much more targeted than they were just a few years ago. For instance, the rush to build more factories has been replaced by a more patient approach, wherein companies are waiting until they have a new product that has gone through all phases of clinical trials and all levels of regulation before they commit to building a new facility.

Outsourcing non-core responsibilities

The outsourcing of key responsibilities is also becoming more common. For example, many life sciences companies have capital projects planned all over the world, meaning they will be spending a tremendous amount of capital over the next few years. However, these companies are simultaneously re-thinking their role in project delivery, choosing to focus more on the core operations of researching, manufacturing and selling their products. So, while their construction is increasing in number and size of projects their staffing is actually going down. This trend is most obviously manifested in the smaller in-house engineering and construction staffs we see today.

That doesn't mean that life sciences companies are eliminating their in-house capital management personnel entirely. Rather, many companies are moving to a hybrid execution model, leveraging a combination of internal and external resources. Overall though, the trend is clearly towards outsourcing project management responsibilities.

Expanding regulations

Regulations in the manufacturing of pharmaceutical products will continue to rise, as global regulators share information across borders and the entire industry relentlessly pursues product safety.

People are ingesting what is being manufactured, and the facility, its equipment, products and even the air quality in the rooms have got to be safe. Meeting these requirements means going through extensive testing and documentation. The process of commissioning and qualifying a facility to demonstrate safety and compliance to governmental regulatory agencies is already time- and resource-intensive, and as regulations continue to increase, so will this phase of a project.

New drugs and biologics

Another trend is heavy investment on behalf of many pharmaceutical companies in the research, development and manufacturing of biologics and other new cancer drugs.

Spending on new cancer drugs alone is expected to grow by more than 50% over the next few years, and the production of biologics, in particular — drugs that are derived in some way from living organisms, and have revolutionized the treatment of many cancers and chronic conditions such as multiple sclerosis, arthritis and rheumatoid arthritis, Crohn's disease and other auto-immune diseases — is expected to skyrocket over the coming several years.

Companies are waiting until they have a new product that has gone through all phases of clinical trials and all levels of regulation before they commit to building a new facility.

However, biologics and cancer treatments are expensive and time-consuming to research, test and produce, often taking many years and billions of dollars of investment before they hit the market.

Industry consolidation

Mergers and acquisitions continue to dominate headlines in the Life Sciences sector, with big pharma hunting for the next generation of medicines against declining returns on R&D. There has already been a large amount of consolidation in the industry, and experts are projecting that the larger mergers are likely to settle down. Consolidation among mid-sized manufacturers, however, especially among companies looking to take the lead in next-generation therapies or acquire producers that complement the company's core, will be the trend.

The life sciences industry continues to adapt and evolve to market conditions, a growing global population, increased regulations, stiff competition and various cost pressures. In this complex and dynamic industry, capital projects are a microcosm of healthcare's broader challenges.

Nigel Barnes,
Director

Jeff Peragallo,
Director

Mergers and acquisitions continue to dominate headlines in the Life Sciences sector, with big pharma hunting for the next generation of medicines against declining returns on R&D.

GLOBAL INSIGHT

How to build a data center and keep the lights on

Data centers have gone from being almost hardly noticed to one of the most important pieces of infrastructure in the global digital economy. They host everything from financial records to Netflix movies.

As a result, data centers have become a multibillion-dollar industry, precisely because their role is so important. Designing, building and supporting data centers requires strategic planning and careful construction, in order to keep clients' mission-critical data secure and available 24/7 - regardless of what it is.

There are many factors that must be addressed when designing and building a data center. For starters, it's all about power - finding it and managing it.

Finding the power

Data centers require an incredible amount of electricity to operate, and this electricity often requires the direct intervention of regional utilities in order to work. Energy infrastructure needs to be shifted, power lines need to be run and redundancies need to be established. The most secure data centers have two separate feeds from utilities, so that if something happens to one of the lines — like an unexpected squirrel attack — the center doesn't immediately lose all of its functionality.

Coordinating that takes a lot of effort, and often the clout of a large corporation in order to get anywhere. But even the big players need to check the policies of utilities and local governments in any area in which they are planning on building a data center, to make sure that they will be able to do establish those inputs. Because without that redundancy, data centers can be vulnerable to power outages that could result in not only the loss of critical customer data, but also a negative impact on the brand of the data center owner.

The price and availability of that power are also incredibly important considerations because a data center is going to be a large draw at all times. With a significant amount of power going into computing, and even more going into cooling computers down, it's no surprise that data centers are using more than 1.8 percent of the power of the entire United States. Again, companies planning data centers need to work with local governments and utilities for subsidies and deals that can make that energy easier to afford.

Keeping the lights on

Much of the support infrastructure in data centers is focused on making sure that their power cannot be interrupted. According to research by the Ponemon Institute, the average cost of a data center outage in 2016 stood at $740,357, up 38% from when the report was first developed in 2010. That's $8,851 per minute of lost revenue and unproductive employees ("e-mail is down, time to play Fortnite!"). A great deal of engineering attention has therefore been paid to keeping data centers operational in any kind of crisis.

Uninterruptible power supplies (UPS) - powerful batteries that can start providing power almost instantaneously - are critical for this effort. They ensure that in an emergency, power comes back on in milliseconds, instead of seconds or minutes that could result in the loss of data or functionality for thousands of computer systems. But most UPS systems don't serve as backup power for long. They simply don't have the kind of power storage capacity that it takes to power a data center for more than a matter of minutes. In order to keep data centers fully running without utility power, data center operators usually turn to large diesel-powered generators, stocked with 24-48 hour of fuel at all times, in case they're needed.

All of this redundancy is required because of the incredible amount of energy that data centers use. But the other key factor in a data center's success is the efficiency with which that energy is used. That starts with the organizational strategy used for cooling.

Staying cool

Data centers are carefully planned structures. Every square foot needs to contribute to the wider goals of powerful and efficient computing. You can't just slam server racks together, because their placement needs to fit in with the cooling system used to prevent overheating.

Data centers run hot, and today's advances in High-Performance Computing (HPC) mean that they are using as much as five times more energy than they used to. This makes a cooling solution one of the most important decisions that a data center operator can make.

In order to keep data centers fully running without utility power, data center operators usually turn to large diesel-powered generators, stocked with 24-48 hour of fuel at all times.

By far the most common data center cooling method involves airflow, using HVAC systems to control and lower the temperature as efficiently as possible. These systems typically use:

- **Aisle arrangement** - an organizational strategy where hot and cold air is directed with the placement of server racks. Cold-air intakes are directed towards air-conditioning output ducts, and hot-air exhausts are directed towards air-conditioning intakes. This is used to isolate hot and cold environments in the data center and make controlling airflow and temperature easier. Containment systems, whether physical barriers or plenums under the racks, are also used to separate the hot and cold aisles, to prevent temperature mixing and energy inefficiencies.

- **Rack placement** - placement of components and computing systems is also an important factor in cooling, because proper placement can prevent hot air from being dispersed into problematic areas. When you are creating a controlled environment for temperature and airflow, you need heat to be dispersed into the right zone (usually one side of the server rack). It's important, therefore, to prevent that hot air from being blasted out of the top of the server rack, even though that is often the hottest part. Placement of components on the server rack is a key way of combating this. Placing the heaviest - and hottest - components on the bottom of the rack makes it much more difficult for the heat to travel all the way to the top of the server rack to be dispersed. This, in combination with blanking panels, helps to prevent heat from moving into the wrong area and making the cooling solution less efficient.

- **Blanking panels** - another simple, yet elegant solution that data center operators have been using for years, these simple plastic barriers are placed in empty spots in servers, covering areas where heat may leak out.

- **High levels of monitoring** - monitoring is, of course, incredibly important with a system as complex as a data center. Small problems can cause thousands of dollars in energy inefficiencies because of the 24/7 nature of data center operation. This is why machine learning and AI are becoming tools that data center operators use to monitor and manage their data center environments every minute of every day. Companies like Google are using AI to optimize data center efficiency and cool its data centers autonomously. The system makes all the cooling plant tweaks on its own, continuously, in real-time, delivering savings of up to 30% of the plant's energy annually.

Rise of liquid cooling

While liquid cooling has historically been the domain of enterprise mainframes and academic supercomputers, it is being deployed more and more in data centers. More demanding workloads driven by mobile, social media, AI and the IoT are leading to increased power demands, and data center managers are scrambling to find more efficient alternatives to air-based cooling systems.

The liquid cooling approach can be hundreds of times more efficient and use significantly less power than typical HVAC cooling systems. But the data center market is still waiting for some missing pieces of the puzzle, including industry standards for liquid-cooling solutions and an easy way for air-cooling data centers to make the transition without having to manage two cooling systems at once. Still, liquid cooling will likely become the norm in years to come, as the growing need for more efficient cooling shows no signs of slowing.

Other critical success factors

- **Security** - Security is critically important in any space that contains that much sensitive data, and this needs to be considered in a data center's construction. Data centers often have multiple layers of security, requiring key cards and sometimes biometric information in order to gain access.

- **Cable management** - Constructing a successful data center requires the establishment of a cable management system that will be easy to manage and upgrade going forward. This is less a safety issue and more so a key consideration in avoiding an organizational nightmare. Data center operators across the globe know the painful difficulty of trying to reign in cable management issues once they start getting out of control.

Building a data center is about executing an extremely complex plan, with input from experts in wide-ranging fields. Firms thinking about building their own data center should consult with experts who have dealt with their specific difficulties before, to make sure that all of these core areas can be built without incident. Modern data centers are planned down to the last wire on Building Information Management (BIM) applications and similar software, so that the outcome is as guaranteed as possible before the first wall is erected. Data centers are key arteries of the digital economy, funneling the data of the modern economy between consumers, companies, governments and citizens. That takes a lot of energy!

Steven Cooke
Managing Director Americas

The data center market is still waiting for some missing pieces of the puzzle, including industry standards for liquid-cooling solutions andan easy way for air-cooling data centers to make the transition without having to manage two cooling systems at once.

GLOBAL INSIGHT

How is sustainability impacting the built environment?

Sustainability is the process of maintaining change in a balanced environment, in which the use of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

For many in the field, sustainability is defined in terms of three interconnected domains or pillars: environment, economy and society. Economy and society are constrained by environmental limits.

Sustainable building (aka green construction or green building) refers to both a structure and the application of processes that are environmentally responsible and resource efficient through a building's life cycle. This extends from planning to design, construction, operation, maintenance, renovation and demolition.

There are several associated built environment goals; to design future projects to minimize energy and water consumption, as well as wastewater production; incorporate sustainable design principles into capital investment decisions; base capital investment decisions on life cycle cost, including the cost of known future expenditures.

Positive impacts

Sustainability in buildings refers to their ability to be environmentally responsible throughout their life cycle, from planning and design through to operation and maintenance. It is based on energy use, water use, indoor environmental quality, material selection and the building's effect on the site, while also addressing the efficient and use renewable energy sources to lower greenhouse gas emission.

1. Reducing waste, pollution and degradation of the environment
2. Efficiently using energy and water, along with other resources
3. Protecting occupant health and productivity

Ultimately, and intuitively, a greener and more efficient design and operation has less impact on the environment, as well as minimizing harmful effects on human health and the environment. Beyond new developments, existing buildings need to be upgraded to be more energy efficient and use renewable energy sources to lower greenhouse gas emission.

The economic and social benefits associated with green building, as listed below, are also significant.

Economic benefits:

- Reducing operating costs
- Improving occupants' productivity
- Creating market for green products

Social benefits:

- Improving quality of life
- Minimizing strain on local environment
- Improving occupants' health and comfort
- Promote a better planet
- Sustain environment without disrupting natural habitat

LEED and WELL certification:

LEED is the most widely used green building rating system in the world, with a LEED-certified building offering considerable cost savings to owners, in terms of maintenance costs over the building's life cycle. LEED sustainability standards for design have now become a part of architectural design on a standard level, leading to the next level of occupant wellbeing, with the new WELL Building Standards. WELL is a performance-based system for measuring, certifying and monitoring features of the built environment that impact human health and well-being through seven concepts. The below seven concepts are pillars upon which sustainability relates to the human side of a building:

- Air
- Water
- Nourishment
- Light
- Fitness
- Comfort
- Mind

In addition, innovation is a key consideration, in terms of promoting the continuous advancement of WELL and allowing project teams to achieve higher certification levels. There are five innovation features that each count as an optimization for any of the project types.

nZEB

The European construction industry is facing into somewhat unknown territory in the coming years as a result of the EU Energy Performance of Buildings Directive.

WELL is a performance-based system for measuring, certifying and monitoring features of the built environment that impact human health and well-being through seven concepts: air, water, nourishment, light, fitness, comfort and mind.

Under this Directive, all new buildings constructed in member states will be near zero energy buildings (nZEB) by December 31, 2020, and new buildings owned and occupied by public authorities must be nZEB after December 31, 2018. As the industry is still at the very early stages of nZEB, we maintain that until such time as the current projects are further progressed, analyzed and completed, the cost of construction for achieving ZEB on a variety of projects will not be fully known. It is envisaged that it will be 18-24 months before the true cost data is realized.

One of the key design parameters that will significantly impact cost is the requirement to achieve 20% of a building's energy requirements through renewables. The most commonly adopted renewables to achieve the nZEB requirements on projects to date are photovoltaics (PVs), air-source heat pumps (ASHPs), and combined heat and power (CHP).These renewables, combined with the utilization of LED lighting, low specific fan power (SPF) on ventilation equipment such as air handling units (AHUS), and an efficient building envelope, seem to be the key elements that are being scrutinized and attested when endeavoring to achieve nZEB requirements. The industry has made significant progress prior to the roll out of nZEB. International clients now all demand their properties to be LEED Gold certified as a minimum, with many now targeting Platinum. This will significantly close the gap in achieving nZEB.

In summary, the age-old adage that the smallest changes can make a big impact rings true in the case of sustainability – the seemingly small measures implemented in green building processes are making all the difference. However, the importance of education, training, and the encouragement of occupant to implement best management practices for optimal sustainability cannot be underestimated.

Frances Graham,
Project Director

International clients now all demand their properties to be LEED Gold certified as a minimum, with many now targeting Platinum. This will significantly close the gap in achieving nZEB.

GLOBAL INSIGHT

Labor Market USA

Over the last number of years, the fact that the construction industry is facing a global skills shortage and a dwindling trade labor force has been well-documented.

In 2008, almost all jobs were affected by the economic downturn and many left their chosen field to find employment elsewhere. Typically as the job market and employment rates begin to rise, so too does the work force. However, those who performed skilled trades seemed to move on and not return, thus leaving a shortage. This is also exacerbated by two fundamental issues that stem from over ten years ago and have had a ripple affect into today's market – the youth of today are not interested in the work and those performing it are getting ready to retire.

Nowadays, if you ask anyone under the age of thirty about taking home economics, small engine repair, mechanical drawing, electrical shop etc., they will probably tilt their head sideways in confusion. This is because these classes and so many others have been phased out. According to the Forbes article, 'The Death of Shop Class and America's Skilled Workforce', California has been eliminating shop classes since 2012 and LA had eradicated it from the Los Angeles Unified School District (LAUSD) by 2013. Moreover, according to surveys by RIDGID, American high schools are now preparing students for four-year colleges and focusing on skills geared towards white collar careers. With our education system focusing on removing vocational curriculums and reappropriating students' future concentrations, it is no wonder that tomorrow's labor force is becoming less diversified.

On the opposite end of the spectrum, a considerable proportion of those who have stayed in the industry are getting ready to retire. In 2013, Forbes referenced the EMSI report which identified that 53% of skilled-trade workers in the US were 45 years and older, and 18.6% were between the ages of 55 and 64. That's almost three quarters of the trade-labor population, and that was seven years ago. What makes this more striking is that the Bureau of Labor Statistics has projected standard growth of 7-10% for major trades such as carpenters, plumbers, electricians, sheet metal workers, masons etc. However, as of next year, 16% of the trade workforce is projected to retire, 22% projected by 2023, by 2028 a 28% figure is expected, and by 2033, 47% are expected to have retired. Mathematically, this means that even with a projected standard growth, more individuals will be leaving the industry with a lackluster number backfilling the jobs.

The shortage of labor is now widely felt. The McKinsey Global Institute's 2017 Analysis anticipated an increase in real estate and infrastructure investment, leading to a higher demand for construction laborers and skilled trades. Unsurprisingly, the prediction was correct and all trends now point to an uplift in construction demand, while Staffing Industry Analysts (SIA) are clearly identifying that skilled trades are listed as the toughest to recruit as of January 2019.

What does this mean for the industry as a whole and its future? With an estimated US$700 billion-dollar commercial spend estimated for this year in the US, it stands to reason that if the labor isn't there then labor prices will continue to rise, and delays in projects and ultimately in national growth will start to manifest. Business owners will feel the pinch, potentially leading to outsourcing, building less, or getting innovative (solutions such as Artificial Intelligence) to handle the estimated workloads.

With our education system focusing on removing vocational curriculums and reappropriating students' future concentrations, it is no wonder that tomorrow's labor force is becoming less diversified.

Ironically, we have seen this coming. In 2017, California spent upwards of US$206 million on a campaign to revive the reputation of the vocational education. But this does beg the question – would this have been needed if they didn't drop 'shop class' in the first instance?

Those of us in the industry certainly can benefit from the amount of work coming today. But when the last of the baby boomers turn 65 in 2029, we will have to hope that initiatives and innovations are in place to compensate for the loss of skills that developed America as we know it today.

Ryan Porter,
Senior Project Manager

In 2017, California spent upwards of US$206 million on a campaign to revive the reputation of the vocational education.

GLOBAL INSIGHT

Off-site manufacturing

Construction lags behind other industries in terms of investment in research and development, and consequently the rate of innovation is slow.

However, the emergence and acceptance of Off-Site Manufacturing (OSM) at scale in the UK and USA in recent years signifies a shift that has the potential to significantly change the way buildings are designed and constructed. This shift comes at a time when the design process is undergoing significant change, with increased digitization in the industry and manufacturing processes, and the increasing use of BIM modelling.

Speed of delivery is a key element in addressing the housing shortage, and off-site manufacturing (OSM) plays a fundamental role in achieving this.

While OSM expertise existed in Ireland in advance of the economic downturn, it contracted significantly during the economic crash. But it is re-emerging in recent years, with manufacturers established in Galway, the Midlands and Northern Ireland.

The opportunities for OSM in BTR are proven by its successful adoption in markets such as the UK, and this success is attributable to three key characteristics – repeatability, standardization of design and speed to market.

Funding and cash flow

The funding and cash flow model for OSM differs from traditional on-site construction. Traditionally, payments are made for works completed to an acceptable standard on-site, with occasional payments for materials vested securely off-site.

The cost of entry associated with the OSM model is high, with significant up-front investment in manufacturing facilities, materials and labor required by the supplier. Current funding and cash flow models will have to change to address the risk that goes with this level of up-front financing. There needs to be better alignment between developers and suppliers, with early investment in research to develop and certify systems before they can go into manufacture. Inevitably, this will result in risk transfer towards the funder, with early financial commitment required well in advance of modules being delivered to and installed on-site. Pre-planning design costs are also likely to be higher. In the UK, construction information needs to be approximately 60% complete at planning stage for OSM, as against 35% in traditional building.

Risk

A critical issue with OSM is that very significant responsibility lies in the hands of a single entity – the module supplier. The timely delivery of modules is fundamental to schedule and project success - therefore, the traditional risk profile of a construction project needs to be examined to ensure there is fair apportionment of risk. Ultimately, this will mean the client taking a greater level of risk than in the past, when this was passed to the Tier 1 contractor and down the supply chain.

Successful adoption of OSM requires a high degree of collaboration, and early engagement between all parties, down to the supply chain, from the beginning of the design stage.

- Early supply chain involvement ensures that the building is designed for ease of manufacture and installation on-site
- The apportionment of risk is fundamental in establishing and maintaining this collaborative working environment.

Standards and insurance

OSM can produce a higher quality finished product than traditional construction. A high standard of workmanship is only part of the story; the insurance industry needs to have comfort that the risks with OSM are known, defined and addressed. This issue has been tackled in the UK by the establishment of BOPAS (Buildoffsite Property Assurance Scheme).

Through a durability and maintenance assessment undertaken by BLP Insurance, formal process accreditation and a web-enabled database of details on assessed building systems and registered/warranted properties, BOPAS provides assurance to the lending community that innovatively constructed properties will be durable enough for resale for a minimum of 60 years. It would be very beneficial to the Irish OSM market if BOPAS accreditation is embraced.

Early design process

Traditionally, a very proactive and iterative approach has been taken to Cost Management, including the tendering of selected subcontract packages while the main construction works are on-site, engaging in value engineering exercises to optimize cost/value, and addressing overruns at various stages throughout the design and construction life cycles.

The cost of entry associated with the OSM model is high, with significant up-front investment in manufacturing facilities, materials and labor required by the supplier.

With OSM, a significant number of these opportunities occur early in the design process and cannot be re-evaluated once the modular system goes into production. This requires a change in approach to design management, and recognition that a significant aspect of the traditional change management process will not exist once design is released to manufacture.

Engaging experienced planners, design and manufacturing partners who understand the early-stage value management process, and have the expertise to evaluate options and value in a structured and timely way, is key to the success of the process.

On-site advantages

There is no doubt that OSM is a more efficient form of construction than traditional build, benefitting from the digitization of construction, and leveraging available technologies to streamline the design and construction process.

An emphasis on the decision-making process during the early design stages pays dividends once the development is approved and goes to manufacture.

The most significant benefits of OSM on-site include:

- Construction works undertaken in a controlled factory environment - improved quality, working conditions and efficiency, and health and safety
- Speed to site - modules are complete internally when delivered to site. Build time on-site is fast, with Buildoffsite estimating that it is up to 60% quicker than traditional construction
- Rapid build time is particularly effective in city center sites, reducing on-site time and construction disruption
- Labor force on-site is significantly reduced, requiring a small, experienced crew to locate modules and connect services
- Waste reductions of up to 80% are reported by the Financial Times, with a 95% recycling rate
- Fewer mistakes are made, the work is more repetitive and snagging is greatly reduced
- The requirement for early decision-making reduces the risk of delays on-site and additional costs, as there is more certainty and less scope for change.

In a recent editorial published by the Financial Times, John Fleming, founder and chairman of Tide Construction is quoted that he is "convinced that Britain is on the brink of a modular revolution, predicting that 30 to 40% of construction will be built off-site within the decade." Tide is currently building two of the tallest modular buildings in the world in London, at 38 and 44 storeys each.

It is only a matter of time before the OSM revolution is embraced by the Irish development industry.

Kevin Kinsella,
Director

There is no doubt that OSM is a more efficient form of construction than traditional build, benefitting from the digitization of construction, and leveraging available technologies to streamline the design and construction process.


DEMAG
DEMAG

Our values

Over the years we have developed a way of working that ensures quality and consistency in how we operate. Our five core values inform what we do and how we do it:

Partnership

We are focused on our clients' goals and work closely with them to achieve the best possible results. We believe in collaboration. When we share our experiences and combine our expertise, we can achieve great things.

Progress

We believe in always moving things forward and finding better ways of working. We're not just focused on what we do but also on what we can achieve. We are driven by success – for our clients, our partners and each other.

Integrity

We are fair, open and ethical in everything we do. We challenge things we believe to be wrong and are open to being challenged by others. We take pride in the quality, accuracy and independence of our work.

Resourcefulness

We work around the world, in diverse sectors and for clients with distinct ambitions. This requires us to act effectively and creatively in new and complicated situations. We rely on our individual and collective abilities to resolve any challenges we may face.

Long-term view

We believe in working sustainably, and so we build enduring relationships with our clients and partners. We work together in a way that is respectful and considerate of each other and the wider society in which we live.

Our culture

Our **bold ambition, honesty** and **confidence to deliver,** together with our commitment to cultivating **meaningful relationships** is what sets us apart.

Our distinctive culture has always played a key role in our success. As a business we want to be intentional in maintaining and working within the principles of our distinctive culture.

Own and empower

We have a highly developed sense of responsibility for identifying problems, finding solutions and executing with excellence. As individuals and teams, we are free (and encouraged) to exercise our judgement to reach our goals.

Connect for good

We are team players, collaborating globally and locally to deliver exceptional results. We encourage and nurture relational rather than transactional business relationships, continuously building a totally inclusive working environment.

Embrace clarity

Our emphasis is on direct communication - our preference is always face-to-face, or to pick up the phone. We express ourselves clearly, honestly and effectively in our communication. We are pro-active in inviting and providing actionable feedback.

Lead by example

We believe in mentoring as a way to strengthen and develop ourselves and provide the resources, environment and flexibility required. We practice 'reverse mentoring' between junior and senior employees - every single person in Linesight has something to teach.

Bold ambition

We continuously develop our global team, with a shared drive and ambition to deliver exceptional results. We believe success is winning unreserved recommendations for exceptional work and impact. We always work with an eye on the future, whilst delivering on our commitments and objectives.

"Having spent a few years in Linesight's Dublin office, I wanted to gain international experience and widen my field of expertise, specifically with large data center projects. I joined the Linesight team in San Francisco, which has given me the opportunity to evolve both personally and professionally and achieve my career goals."

Eunice Figuera
Cost Manager
San Francisco Office

What we do

Our services are tailored for your project, delivering maximum efficiency from inception to completion. We specialize in key areas, to provide faster project delivery, greater cost efficiency and maximum value.

Project Management

Delivering project success through strategic planning and stringent controls.

Cost Management

Ensuring better value for money at every stage of the construction process.

Program Management

Managing a network of projects simultaneously in order to deliver program success.

Project Controls

Controlling every aspect of a project to ensure maximum performance and long-term success.

Procurement

Adopting the most appropriate strategy to suit both public and private sectors.

Supply Chain Management

Providing efficient logistic strategies to streamline the delivery of equipment and services.

Health and Safety

Assuring compliance, and providing design teams and clients with expert advice and independent review.

Consultancy

Providing professional, hands-on advice and guidance throughout every stage of your project.

Planning and Scheduling

Controlling every aspect of a project to ensure maximum performance leads to long-term success.

2018 A year in review

JANUARY

We launched our Purpose Built Student Accommodation (PBSA) Report at a private symposium in Dublin.

FEBRUARY

Patrick Ryan, Managing Director USA East Region, joined the panel at the Enterprise Ireland Leadership 4 Growth Program, at the Consulate General of Ireland in New York.

MARCH

Celebrating International Women's Day across the globe. Our colleagues in Dubai showing their creative side!

JULY

Paul Brady took part in the Etape Du Tour, an annual amateur race on one stage of the Tour de France.

AUGUST

Richard Joyce, Managing Director, Linesight Ireland, celebrated 30 years in Linesight!

SEPTEMBER

14 members of the Linesight team from around the globe took on the formidable 700km Paris2Nice cycle, in aid of the Youth Foundation.

APRIL

Shay Dahan, Director of our Israel operations, ran 500km across Israel in eight days to raise funds for Krembo Wings, a youth movement for children with special needs.

MAY

Des O'Broin became the fifth member of the Linesight team to be appointed President of the Society of Chartered Surveyors Ireland (SCSI).

JUNE

The appointment of our new Country Director for India coincides with the opening of our new office in Mumbai.

OCTOBER

Linesight's USA Management Team have first Regional Summit in San Francisco.

NOVEMBER

We marked the launch of our Build-to-rent (BTR) research report, with a breakfast briefing in Dublin that drew in over 70 high-profile industry stakeholders.

DECEMBER

A number of our colleagues celebrated passing the APC to become Chartered Quantity Surveyors.

Working with you wherever you are

With staff located across the Americas, Europe, MENA and Asia Pacific, our reach is truly global. We have delivered projects in over 40 countries and are always exploring new areas of opportunity. We offer first-class consultancy on major projects across 13 specialist sectors, and have developed a broad portfolio of innovative projects in every region.

- Commercial Development
- Commercial Fit-Out
- Data Centers
- Education
- Food and Beverage
- Healthcare
- High-Tech Industrial
- Hospitality
- Life Sciences
- Residential
- Retail
- Student Accommodation
- Transportation and Infrastructure

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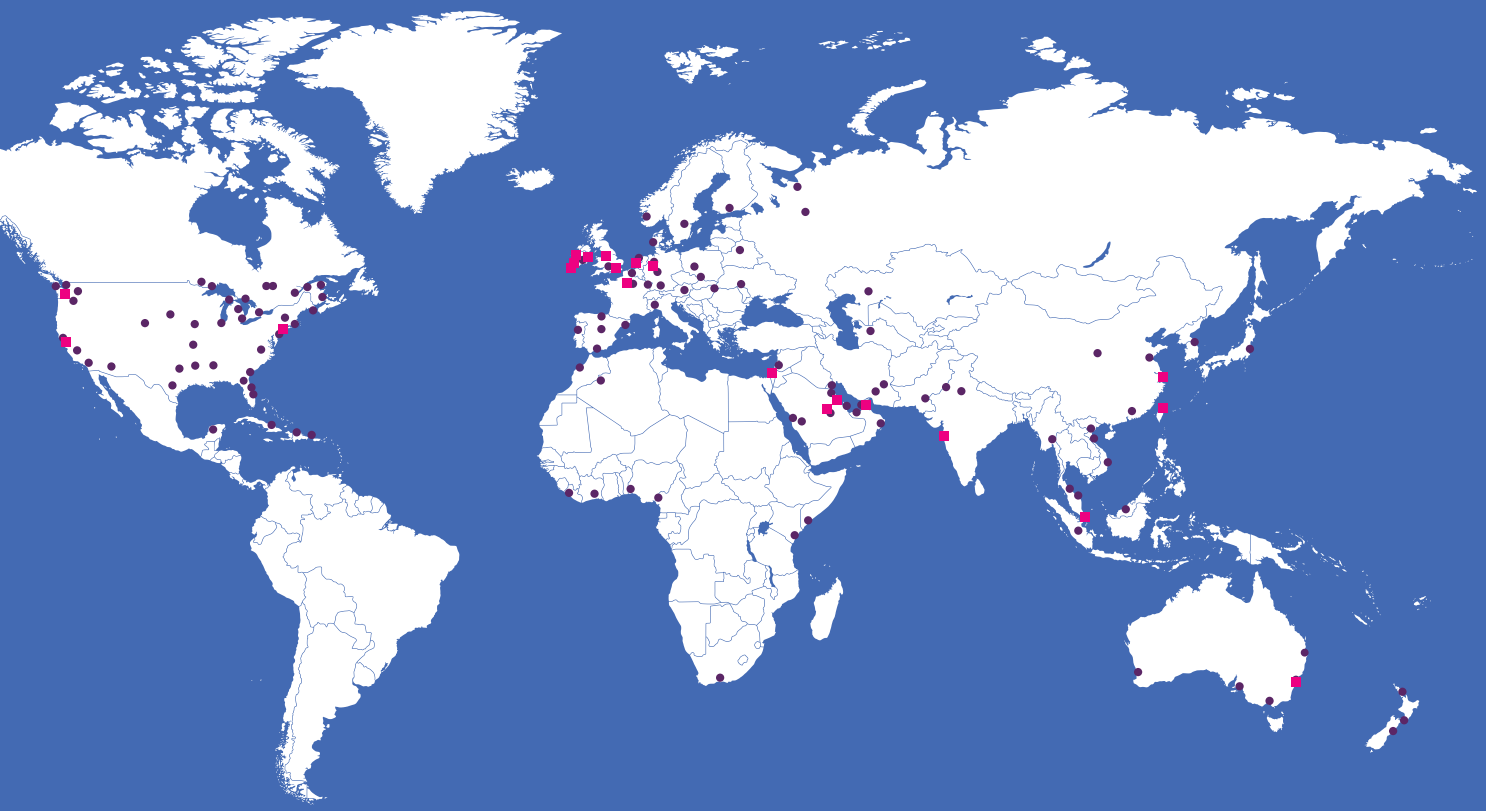

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21 offices

150+ project locations

Confidential Client HQ, New York

Design Architect:
HJ Lyons

Architect of Record:
Vocon

Linesight services:
Cost Management
Project Management

Contributors

Nigel Barnes is Director of Life Sciences EMEA at Linesight. Based in London, Nigel has over 30 years' experience in capital project execution, from inception to start up, for both the client and consulting sectors for large bluechip process manufacturing companies.

Damien Coffey is a Director of Project Management at Linesight. Based in San Francisco, Damien has over 35 years' experience across a variety of sectors working on a diverse range of projects, including data centers, mixed-use and leisure developments.

Declan Comer is an honors graduate and a Chartered Quantity Surveyor. Based in San Francisco he has extensive experience working in Asia and the US across a range of sectors.

Michelle Cooke is Marketing Manager for the USA, based in San Francisco. She has over 20 years experience in B2B services marketing working in Europe, MENA and the USA.

Steven Cooke is EVP, Americas. He is a chartered surveyor with 20+ years professional experience. Steven has worked around the world advising major multinationals on their capital expansion programs and leads operational and strategic growth for the Americas.

Frances Graham is a Project Director at Linesight. Based in New York, Frances has over 35 years' experience in the architecture and construction industry. With significant experience in the Retail sector, she holds the LEED AP Interior Design and Construction credential, as well as being well-versed on WELL.

Kim Hegarty is an Associate Director at Linesight, providing cost management services across a variety of sectors. Based in Dublin, Kim is a Chartered Surveyor with over 25 years' industry experience with particular experience in commercial projects, both shell and core, and fit-out.

Kevin Kinsella is a Director at Linesight, providing project management services across a variety of sectors, including Commercial, Education and Retail. Based in Dublin, Kevin has over 30 years' professional experience in project management.

Jeff Peragallo is Director of Life Sciences USA at Linesight. Based in New York, he has over 30 years' experience in the Life Sciences sector with a unique blend of technical knowledge and commercial Life Sciences experience.

Ryan Porter is a Senior Project Manager in our New York office. He has an honors Bachelor's degree in Architectural Technology and has a range of specialist skills including Building Information Modeling (BIM), Leadership in Energy and Environmental Design (LEED).

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