Linesight

Ireland Handbook 2020

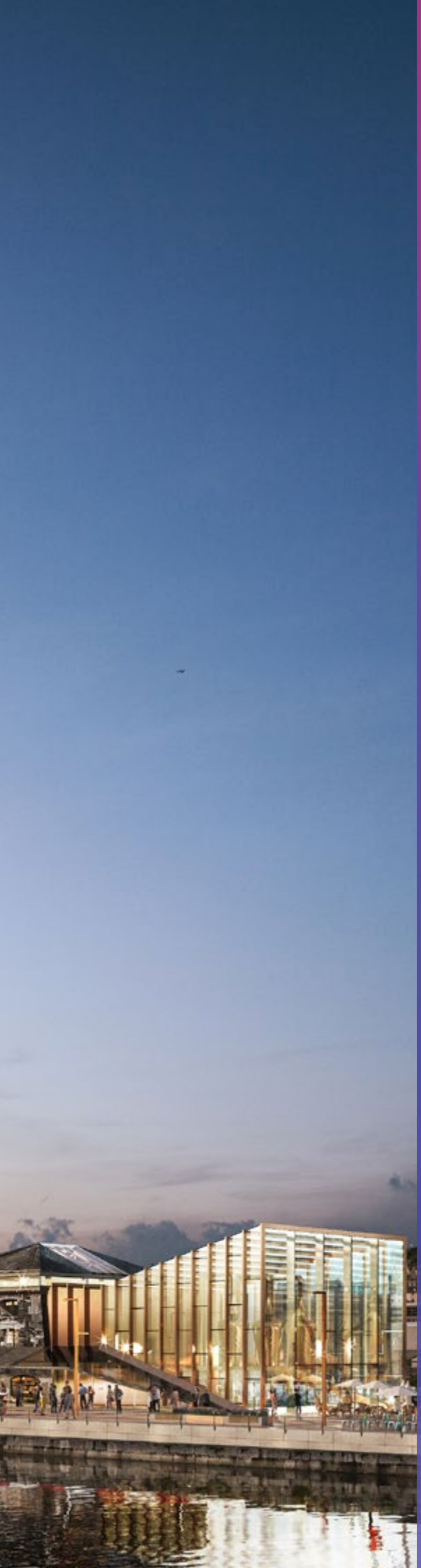
Construction trends and insights

Updated September 2020

linesight.com

Port of Cork, Cork

Architect:
Henry J Lyons
Linesight services:
Cost Management



Welcome to the **Linesight Ireland Handbook 2020.**

Each year, we gather the key indices and trends in Irish construction, giving you the most comprehensive overview of the industry.

For the complete global view, visit the Linesight Knowledge Centre: **linesight.com/knowledge-center**

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Parkgate Street, Dublin
Architect:
Reddy Architecture + Urbanism
Linesight services:
Cost Management

Review and Outlook

Ireland Market Review

Industry snapshot

€18bn

Projected value of construction output in 2020

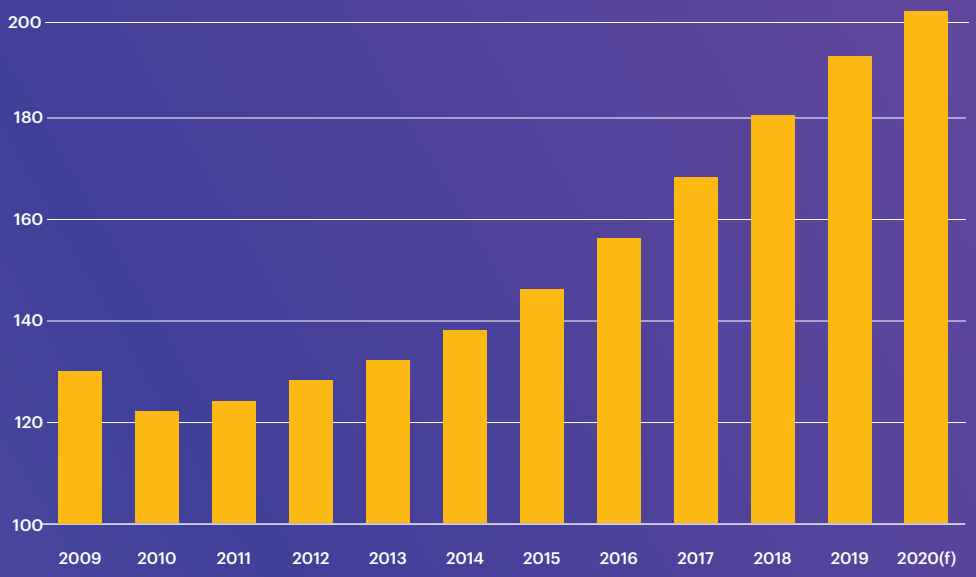
33% reduction

Q2 2020 house completions Y-o-Y

129,000

Number of people employed in construction in Q2 2020

2009-2020(f) Linesight average tender price index



Irish Market Review and Outlook

As we near the final quarter of 2020 and begin to realise the 'new normal' of COVID-19, Stephen Ashe, Director at Linesight, reviews the Irish construction industry performance to date and what we can expect in the coming months.

Economic overview

While the full impact of the COVID-19 pandemic on the Irish economy and the construction industry will take time to emerge, it is already clear that it has been substantial and wide-reaching.

Figures released in early September by the CSO indicate a 6.1% contraction in Q2 2020, constituting the largest quarterly decline on record. However, given the severity of the crisis around the world, that figure is still below the EU average of circa 12%. With the initial expansion estimate for Q1 revised downwards to a contraction of 2.1%, negative GDP growth over two consecutive quarters means that Ireland has entered a recession.

The Government is now operating the national finances with a deficit of **€18.5 billion** and our economy is expected to shrink by **8.5%**.

The Irish Government's budget deficit increased to €9.5 billion in August, as VAT receipts reduced and spending on the likes of income supports related to the pandemic soared. This compares to a deficit of €625 million in the same period last year this time last year, marking a year-on-year deterioration of €8.8 billion. These figures, however large, are to be expected given the scale of the crisis. There are, however, some positive signs in that the cumulative tax revenue is only down 2.5% compared to a year ago, and strong sectors such as technology, pharma and exports continue to perform well.

The Government is now operating the national finances with a deficit of €18.5 billion and our economy is expected to shrink by 8.5%. This is a direct result of the ongoing cost of the pandemic and the government stimulus packages.

Overall employment levels reached 2.36 million in Q4 2019. This number fell to 2.2 million in Q2 2020 (or 1.78 million COVID-19 adjusted). While we are seeing signs of recovery, it should be noted that the duration and outcome of COVID-19 will further

influence these figures, with the hope being that this will be in a positive way.

Additional public investment has been provided in direct response to COVID-19, as well as through the July Stimulus Plan, and public expenditure is planned to increase by 12% in 2021. It is also encouraging to see the Government sticking broadly to the Project 2040 ambitions.

Construction

As outlined in the Build 2020 report prepared by the Department of Public Expenditure and Reform, total investment in building and construction grew by an estimated 11% in 2019 to €27 billion. However, it could decrease by up to 35% in 2020 due to a fall in public and private sector investment, to reach in the region of €17.9 billion. This is a substantial impact on the construction industry, and while we are seeing cautious optimism in terms of existing projects proceeding and new pipeline, a recovery is largely dependent on the duration of the pandemic. As is to be expected, the path to recovery will not be straightforward, and is likely to be interrupted by recurrences and additional waves of the virus.

With construction turnover at €18 billion, it represents 5.4% of total projected GDP for 2020 of €331 billion. This is well below the EU average of 9%, reported by the European Commission.

The Ulster Bank Construction Purchasing Managers Index (PMI), which measures sentiment in the sector, hit an all-time low of 4.5 in April 2020 (less than 50 indicates a contraction). The index rose to 51.9 in June 2020 for the first time in four months, following the significant fall in sentiment in March and April during the height of the COVID-19 restrictions. It then rose marginally to 53.2 in July before falling to 44 in August.

As of 6th September 2020, 10,023 construction workers remained on Pandemic Unemployment Payments, down from 52,118 on 3rd May 2020. With the vast majority of construction sites now back open, we expect these numbers to reduce again substantially. We anticipate construction employment to level out at 148,000, following a dip to 129,000 in Q2 at the height of the pandemic in Ireland, which is a decline of 1,900 on the 2019 numbers.

Construction employment represents a 6.3% share of total employment in the Irish economy, just below the 2018 EU average of 6.8%.

COVID-19 response

The public health measures introduced on 27th March 2020 to halt the progress of COVID-19 required the imposition of restrictions on many areas of our society and economy, including the construction industry. Some measures introduced by the Government included ex gratia interim payments to contractors on public works contracts, to cover certain non-pay fixed costs associated with site closures.

A number of other Government stimulus plans are welcomed, including the enhanced levels of support for the Help to Buy incentive, the Credit Guarantee Scheme, the Pandemic Unemployment Payment, the Employment Wage Subsidy Scheme (which will now run to the end of March 2021) and the temporary reduction in the standard rate of VAT from 23% to 21%.

The Government published the Roadmap for Reopening Society and Business, to ease the COVID-19 restrictions and reopen Ireland's economy. The status of this roadmap is somewhat in flux, as we witness localised lockdowns in some counties. The construction industry and the Construction Industry Federation (CIF) has shown strong leadership in coping with the impacts of COVID-19 through collaboration with the stakeholders, the launch of a training and induction programme, and introduction of standard operating procedures (SOPs) for construction sites.

COVID-19 impact on construction projects

Construction sites re-opened in mid-May having been shut since early April. Within a week of re-opening in excess of 150,000 people undertook the CIF's post-COVID-19 induction programme, which was very much welcomed. The impact of COVID on construction projects varies widely. Key aspects such as the type of project and the stage of the project have a key bearing.

Waterfront South Central, Dublin

Architect:
Henry J Lyons
Linesight services:
Cost Management

Challenges include extension of time claims during the lockdown period and post-lockdown, as a result of the SOPs, supply chain pressures, and additional costs associated with increased welfare/ cleaning regimes on-site.

On a positive note, our own internal project data indicates that construction productivity as a result of the SOPs has not been impacted to the extent that was feared. This highlights the already mature nature of our health and safety standards on Irish construction sites.

While COVID-19 has resulted in additional costs, it should be noted that the fall in construction output has potentially created a more competitive tendering environment, putting downward pressure on contractor margins. Our recent internal project data supports this viewpoint.

Pipeline and outlook

Certain sectors have been severely impacted by the pandemic, in particular, retail and hospitality. Both industries are now focused on survival and adapting to a new reality.

The impact of COVID-19 on the commercial sector remains to be seen, but at a minimum, clients are re-assessing their space requirements and are reviewing options around futureproofing designs. This will allow the occupiers of office space to respond quickly to changes in business practice, such as headcount growth and contraction, new ways of working, social distancing and flexible working.

The investment in the life sciences, pharma and data centre sectors has accelerated as a result of COVID-19, to reflect the requirement for medical supplies and a vaccine, together with the increased demand for cloud services. The warehousing and distribution sector is also experiencing strong demand, reflecting the surge in online purchasing. Institutional residential projects, including PRS, have remained resilient also.

The Goodbody Analytics BER Housebuilding Tracker indicates a 33% year-on-year reduction in house completions in Q2 2020, representing the largest annual decline in house building in eight years. It is noted, however, that figures are beginning to rebound, and the expectation is that the year-on-year reduction will stand at approximately 20% by year end (equating to circa. 16,500 units).

There was a 33% year-on-year reduction in house completions in Q2 2020, representing the largest annual decline in house building in eight years.

Genomics Medicine Ireland, Dublin

Architect:
RKD
Linesight services:
Cost Management

The figures are still less than half of what is required to tackle the housing crisis, with the Central Bank estimating that 34,000 new homes must be built every year for the next decade to meet demand.

Key viability issues in residential development have been highlighted by Linesight and a number of others, including Irish Institutional Property (IIP) and the Society of Chartered Surveyors Ireland (SCSI), and this needs to be addressed urgently.

Other challenges

Brexit

The Brexit transition period ends on the 31st December 2020, and yet trade negotiations with the EU are still ongoing. This lack of direction is further adding to uncertainty, with the true impact unclear until such a point as an agreement is reached or at least a mutually agreeable direction emerges.

Sectoral Employment Orders (SEOs)

A law governing minimum rates of pay in construction will stay in place pending a State challenge to a High Court ruling that declared them unconstitutional. In June, the High Court struck down Chapter Three of the Industrial Relations Act 2015, which allows the Government to make SEOs, setting pay and conditions in building and related industries. The State intends appealing the High Court finding to the Supreme Court, which has the final say on all constitutional issues. If that challenge fails, it will mean that Chapter Three of the Industrial Relations Act 2015 will have no effect, and we may see widespread industrial/strike action.

Apprenticeships

As part of the July Stimulus package, the Government is releasing €100 million to create 35,000 higher education places and revolutionise Ireland's position on apprenticeships. Under this new scheme, employers will receive €2,000 upfront for each apprentice they take on, and a further €1,000 twelve months later if the apprentice is still on their books. The Government will also be rolling out a new apprenticeship scheme for some transition year students and launching a new consultation on the future of the apprentice in Ireland. The aim is to grow the number of new registrations to 10,000 a year over the next five years. This is welcome news in addressing the ongoing challenges around skills shortages.

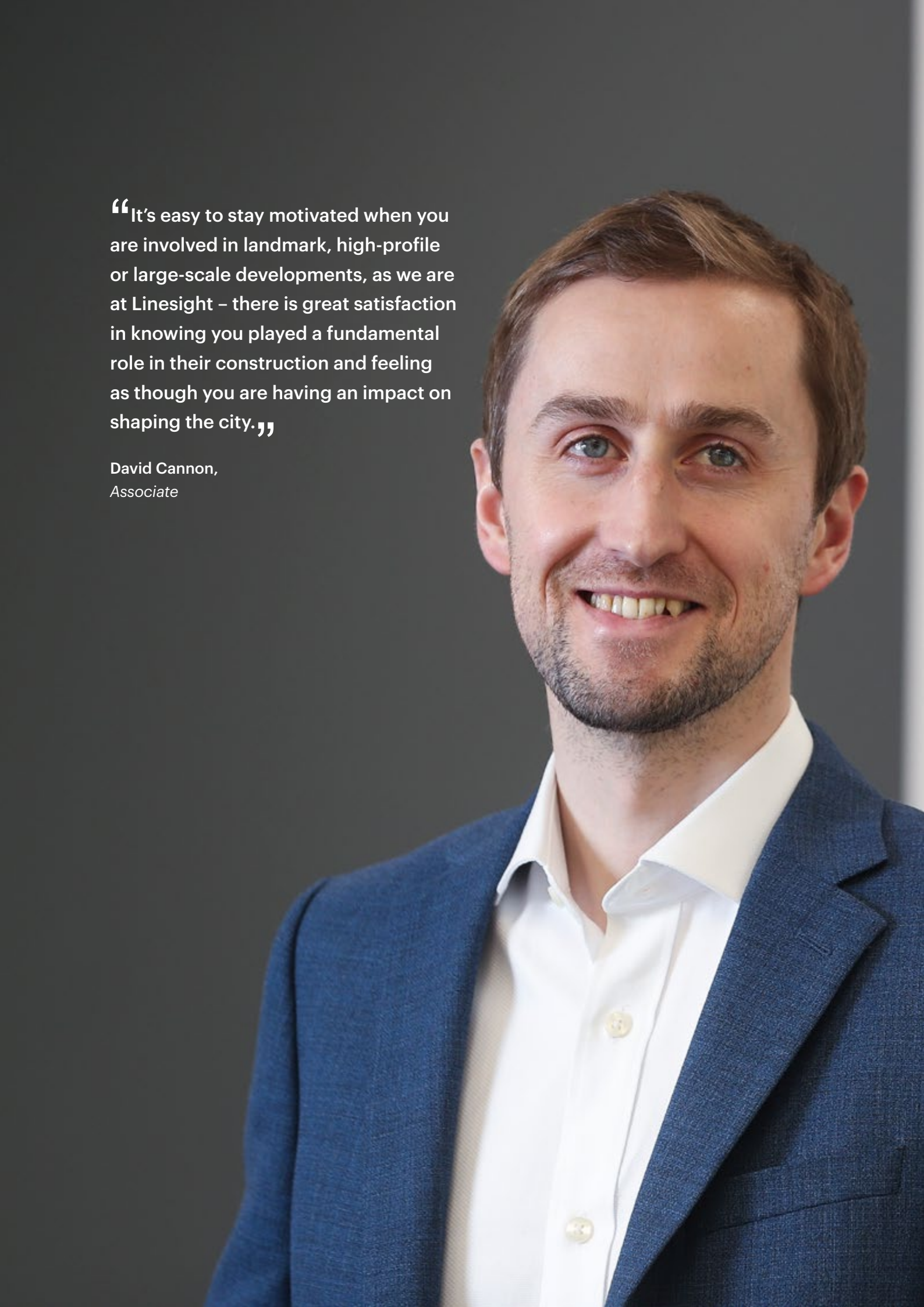
Foreign Direct Investment (FDI)

As an open economy, Ireland is heavily dependent on foreign direct investment, and the corporation tax and employment this brings. A new report from the OECD shows that Ireland receives more of its corporation tax from foreign multinationals than any other jurisdiction in the world. The OECD calculates that foreign multinationals account for 65% of corporation tax receipts here. In light of recent cases, a spotlight has been shone on our corporate tax system and this won't ease anytime soon. As a result of FDI, the performance of the US economy (33% contraction in the months of April, May and June) has a direct impact on Ireland and the EU, and so, the full realisation of its considerable recent decline will be heavily felt.

Summary

In summary, while the outlook may appear to be somewhat bleak at present, there are some positives to be taken from the current market performance in terms of the performance of some sectors, the lesser extent of the declines in some areas than was anticipated and the fact that there is light at the end of the tunnel in terms of the recovery. While it remains to be seen just how long this tumultuous period will remain for, it is promising to see continued activity across the construction industry in Ireland, and the various mechanisms and supports planned to sustain this stability.

Construction employment represents a 6.3% share of total employment in the Irish economy



“It’s easy to stay motivated when you are involved in landmark, high-profile or large-scale developments, as we are at Linesight – there is great satisfaction in knowing you played a fundamental role in their construction and feeling as though you are having an impact on shaping the city.”

David Cannon,
Associate

Ten Hanover Quay, Dublin

Architect:
O'Mahony Pike Architects
Linesight services:
Cost Management

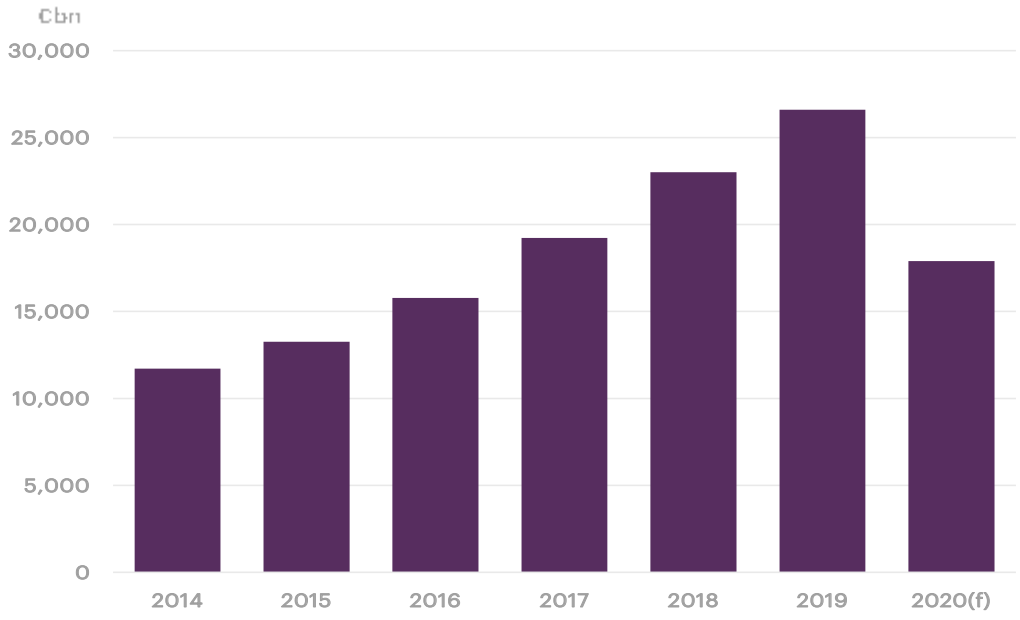
Aloft Hotel, Dublin

Architect:
Nikki O'Donnell Architects
Linesight services:
Cost Management

Throughout the following sections, the * symbol denotes graphs/data last updated in March, and so the impact of COVID-19 is not accounted for in the marked items.

1. Macro indicators

1.1. Value of construction output 2014-2020(f)



Note: *- Output for 2014 - 2018 from CSO Gross Domestic Physical Capital Formation at current market prices.*
- 2019 number is preliminary.
- 2020 is a forecast from The Department of Public Expenditure and Reform 'Build 2020 Construction Sector Performance and Capacity'

Source: *CSO/Linesight*

1.2. Construction output 2014-2020(f)

	2014	2015	2016	2017	2018	2019	2020(f)
Value of output at current prices (€m)	11,712	13,265	15,782	19,231	23,013	26,603	18,000
Change in value of output (%)	13%	13%	19%	22%	20%	16%	-33%
Construction output as % of GNP	7.20%	6.60%	7.20%	8.20%	9.00%	9.10%	6.13%

Source: *CSO/Linesight*

1.3. Gross National Product (GNP) 2014-2020(f)

	2014	2015	2016	2017	2018	2019	2020(f)
GNP at current prices (€m)	163,741	200,810	219,728	238,135	256,322	274,329	291,886
% change in GNP	8.92%	22.64%	9.42%	8.38%	7.64%	7.03%	6.40%

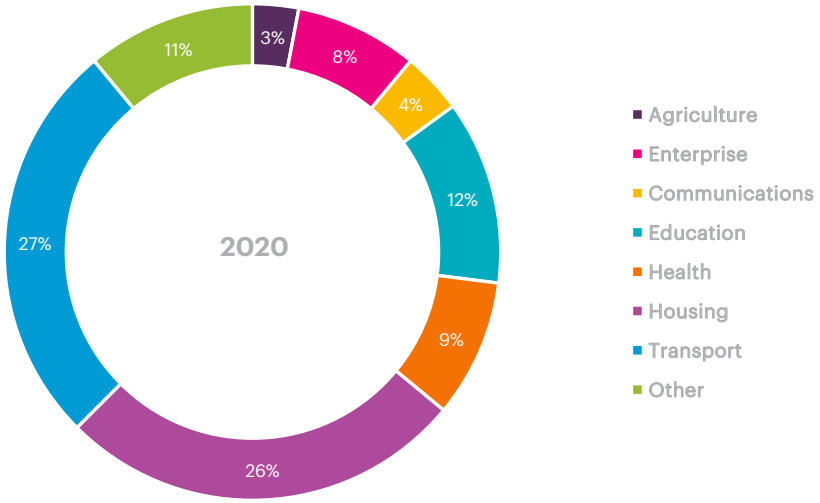
Source: *CSO/ESRI*

1.4. Public capital programme 2019-2022

	2019 €m	2020 €m	2021 €m	2022 €m
Agriculture, food and marine	255	258	265	275
Business, enterprise and innovation	620	630	640	715
Children and youth affairs	32	31	32	33
Communications, climate action and environment	256	297	317	400
Culture, heritage and the gaeltacht	75	76	80	110
Defence	106	113	120	125
Education and skills	941	942	1,006	1,100
Employment affairs and social protection	14	15	16	17
Finanace	25	22	18	19
Foreign affairs and trade	17	13	13	14
Health	667	724	780	825
Housing, planning and local government	2,033	2,079	2,209	2,280
Justice	241	230	208	216
Public expenditure and reform	203	214	223	232
Rural and community development	141	150	152	175
Transport, tourism and sport	1,643	2,058	2,526	2,405
Gross capital expenditure	**7,269**	**7,852**	**8,605**	**8,941**

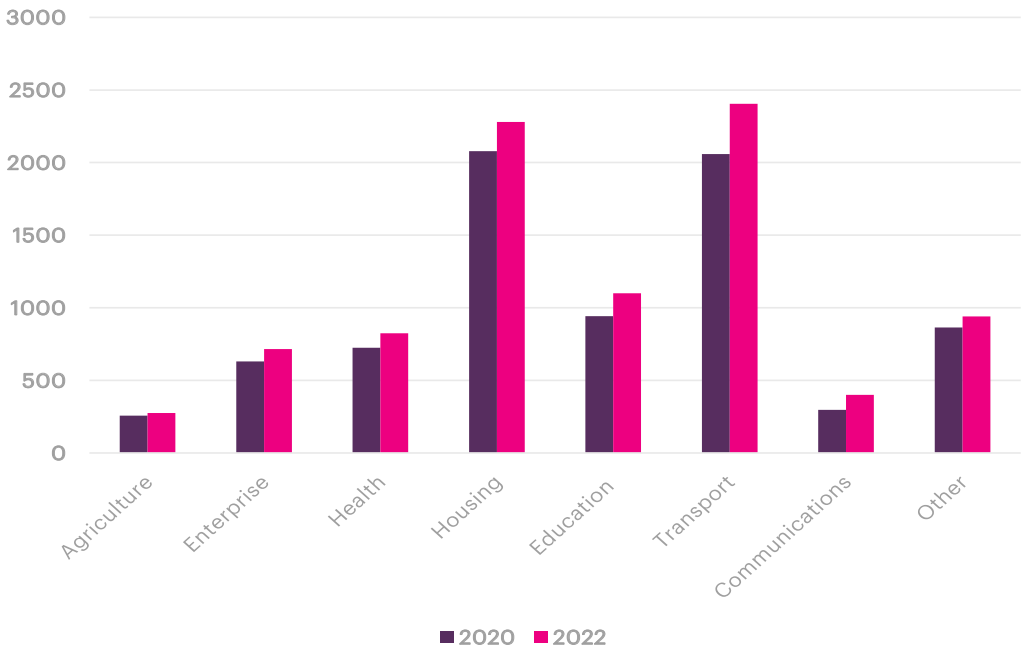
Source: *Project Ireland 2040 | National Development Plan 2018-2027*

1.5. Public capital investment allocation 2020



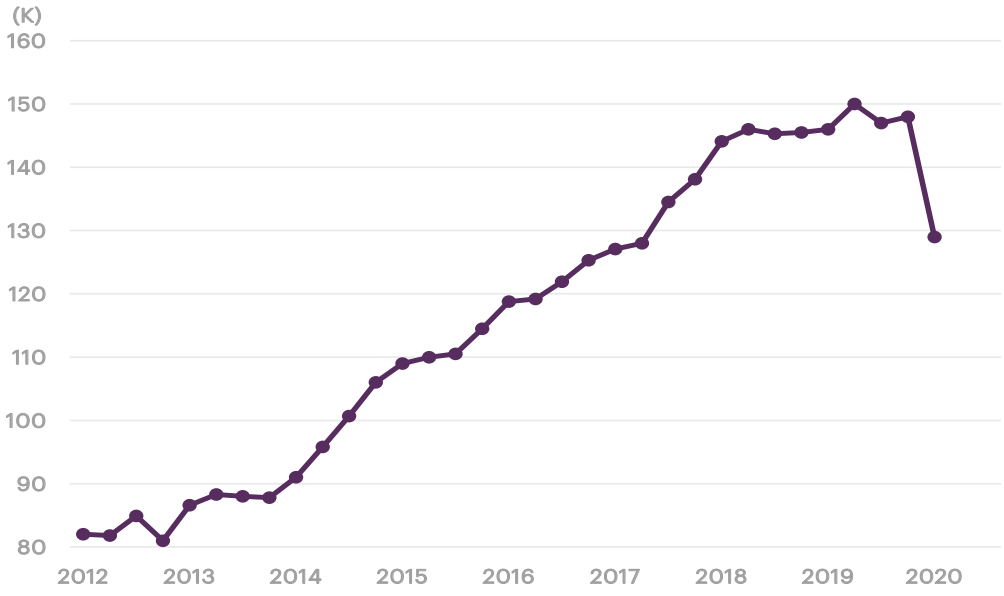
Source: *Project Ireland 2040 | National Development Plan 2018-2027*

1.6. Change in public capital allocations 2020 vs. 2022



Source: *Project Ireland 2040 | National Development Plan 2018–2027*

1.7. Employment in construction 2012-2020

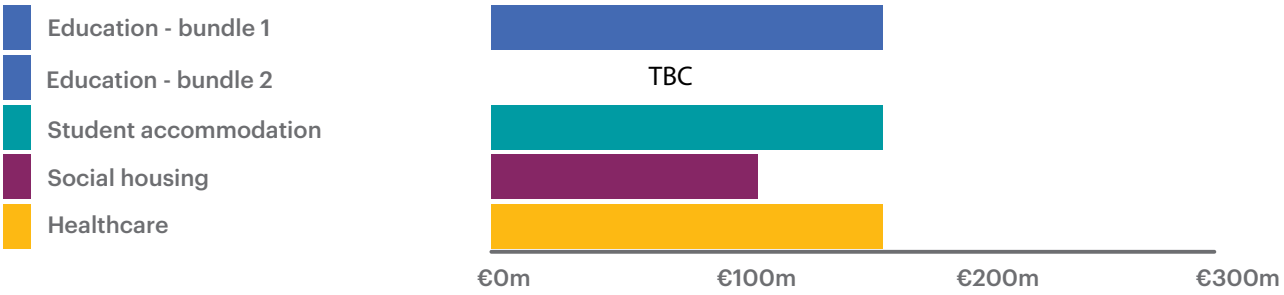


Notes: *The latest figures are for Q2 2020 and we forsee employment in construction returning back to pre COVID-19 levels in Q3 and Q4 2020*

Source: *CSO*

1.8. PPP programme and social housing land initiatives *

PPP programme



PPP programme	Capital value	Details	Status
Education	c.€150m	Higher Education PPP - Bundle 1 - across 6 locations, including Athlone IT, Cork IT, Dun Laoghaire Institute of Art and Design Technology, TUD Blanchardstown, TUD Tallaght and IT Tralee	OJEU
Education	TBC	Higher Education PPP - Bundle 2 - across 5 locations, including Waterford IT, Limerick IT, Letterkenny IT, Galway-Mayo IT and IT Carlow	Pre-procurement
Student accommodation	c.€150m	Provision of on-campus accommodation at Grangegorman DIT	Pre-procurement
Social housing	c.€100m	Bundle 3: Currently being finalised	Pre-procurement
Healthcare	c.€150m	Community nursing units: development of a single bundle of up to 11 sites	OJEU

PPP and concession projects closed
13 major inter-urban motorways/bypasses
9 education PPPs, including 35 schools delivered under 1 pilot scheme and 5 subsequent schemes, DIT Campus at Grangegorman, Maritime College and Cork School of Music
International Convention Centre
Criminal courts complex
Regional courthouses: 7 locations (Cork, Drogheda, Letterkenny, Limerick, Mullingar, Wexford and Waterford)
Primary care centres: 14 sites nationwide
Service areas Tranche 1 and service areas Tranche 2: Athlone, Kilcullen and Gorey
Dublin waste to energy
Property PPP (land swap): Charlemont Street
Social housing: 2 bundles across 14 sites nationwide

Social housing land initiatives (non PPP)	Capital value	Details	Status
Housing	c.€1.5bn	South Dublin County Council : - Kilcarbery (Clondalkin). 1,034 units	PT appointed
		Westmeath County Council :- Brawny (Athlone). c. 550 units	PT appointed
		Dublin City Council :- O'Devaney Gardens (Dublin) c 1000 units	PT appointed
		Dublin City Council :- Oscar Traynor Road (Coolock) c 1000 units	In procurement
		Dublin City Council :- St Michael's Estate (Inchicore). c.650 units	Pre-procurement
		Fingal County Council :- Ballymastone (Donabate) c 1000 units	In procurement

Sources: *National Development Finance Agency, Department of Public Expenditure and Reform*

Fibonacci, Dublin

Architect:
Henry J Lyons
Linesight services:
Cost Management

2. Linesight average Irish construction costs 2020*

The average construction costs table is generated using Linesight's database and sets out typical building construction costs. Our database is the largest construction cost database in Ireland.

Building type	Cost range 2020			M&E (inc. @)
Commercial offices				
Suburban, naturally ventilated				
Shell and core	€1,650	€2,250	*per sq.m.*	*10-15%*
Developer standard	€1,900	€2,500	*per sq.m.*	*15-20%*
Extra for air conditioning	€250	€500	*per sq.m.*	-
City centre, air conditioned				
Shell and core	€2,200	€3,200	*per sq.m.*	*15-20%*
Developer standard (CAT A)	€2,600	€3,700	*per sq.m.*	*25-30%*
Office fit-out				
95% open-plan, no catering	€650	€950	*per sq.m.*	*20-30%*
75% open-plan, limited catering	€850	€1,200	*per sq.m.*	*20-30%*
60% open-plan, full catering	€1,200	€1,800	*per sq.m.*	*25-35%*
Corporate HQ	€1,900	€2,400	*per sq.m.*	*25-35%*
High-tech industrial				
Shell and core	€1,400	€1,900	*per sq.m.*	*20-25%*
Fit-out	€1,000	€1,850	*per sq.m.*	*25-45%*
Residential				
Estate house (approx. 100sq.m.)	€1,350	€1,800	*per sq.m.*	*10-20%*
Purpose-built student accommodation (incl. FF&E)	*€2,700*	*€3,200*	*per sq.m*	*10-20%*
Apartments - suburban/city edge				
BTR - 4-8 storey (incl. FF&E)	*€2,100*	*€2,500*	*per sq.m.*	*15-20%*
BTS - 4-8 storey	*€1,900*	*€2,300*	*per sq.m.*	*15-20%*
Apartments - Urban				
BTR - 5-8 storey (incl. FF&E)	*€2,250*	*€2,750*	*per sq.m.*	*20-25%*
BTR - 12-15 storey (incl. FF&E)	*€2,450*	*€3,050*	*per sq.m.*	*20-25%*
BTS - 5-8 storey	*€2,150*	*€2,650*	*per sq.m.*	*15-20%*
BTS - 12-15 storey	*€2,350*	*€2,950*	*per sq.m.*	*20-25%*
Co-living	*€2,600*	*€3,200*	*per sq.m.*	*20-25%*
Shopping centres				
Anchor unit	€950	€1,200	*per sq.m.*	*10 -15%*
Unit shops	€1,200	€1,850	*per sq.m.*	*10-15%*
Mall	€2,150	€3,850	*per sq.m.*	*20-25%*
Retail fit-out	€1,700	€2,400	*per sq.m.*	*25-30%*

Building type	Cost range 2020			M&E (inc. @)
Site development business parks				
Roads and primary services	€225,000	€720,000	*per hectare*	-
Warehouses				
Without offices	€800	€1,050	*per sq.m.*	*8-12%*
With 10% offices	€950	€1,500	*per sq.m.*	*10-15%*
Healthcare				
Tertiary care	€4,900	€5,800	*per sq.m.*	*35-40%*
Acute teaching hospital	€4,200	€5,000	*per sq.m.*	*35-40%*
General hospital	€3,850	€4,600	*per sq.m.*	*30-35%*
Nursing home	€2,400	€3,300	*per sq.m.*	*20-25%*
Car park				
Surface	€1,500	€1,900	*per space*	-
Multistorey	€13,000	€25,700	*per space*	-
Undercroft	€16,100	€23,000	*per space*	-
Single-level basement	€22,000	€43,000	*per space*	-
Double-level basement	€28,000	€58,000	*per space*	-
Basement (no car parking)				
Bicycle storage general	€1,300	€2,400	*per sq.m.*	-
Shower and changing facilities	€1,750	€3,100	*per sq.m*	-
Plant space (excl. plant)	€1,200	€2,300	*per sq.m*	-
Education				
Primary-level (DoES)	-	€1.490*	*per sq.m.*	*10-15%*
Second-level (DoES)	-	€1,490*	*per sq.m.*	*15-20%*
Third-level	€2,400	€3,500	*per sq.m.*	*20-25%*
Leisure				
Hotel building 3-4* (incl. FF&E)	€2,400	€3,300	*per sq.m.*	*25-35%*
Hotel building 5* (incl. FF&E)	€3,000	€5,150	*per sq.m.*	*30-40%*
Aparthotels	€2,750	€3,800	*per sq.m.*	*25-35%*
Restaurant	€2,300	€3,550	*per sq.m.*	*25-30%*
Cinema	€1,850	€3,050	*per sq.m.*	*20-30%*
Sports hall	€1,300	€2,000	*per sq.m.*	*10-15%*
Swimming pool	€2,950	€4,100	*per sq.m.*	*30-40%*
Municipal				
Fire station	€2,700	€3,300	*per sq.m.*	*15-25%*
Prison	€2,800	€3,650	*per sq.m.*	*20-30%*
Courthouse	€3,700	€4,650	*per sq.m.*	*20-30%*

Notes:

1. *The above costs are correct as of the beginning of March 2020 and as such, do not account for the impact of COVID, which is yet to be fully realised as the situation continues to evolve.*
2. *Costs are based on January 2020 prices, and based on gross floor area. Average costs as indicated should not be used for insurance valuation purposes. The costs are representative of typical valuations for each type of project. Unique designs or challenging sites may not be within the cost range shown. The rates shown are average construction build only and do not include VAT, professional fees, any other soft costs, or allow for future inflation.*
3. *The building costs noted above for the various building types are exclusive of site development costs and external works, which can vary significantly based on the specific site.*
4. *The costs associated with brownfield sites can vary significantly and the building costs above exclude abnormal contamination.*
5. *The basic building costs above exclude basement construction costs. Should a basement be required, this should be costed separately.*
6. *Costs per car parking space assume a large, efficient car park layout providing a gross 28-34sq.m. per car parking space. Note that this relates to pure car parking areas, and additional basement spaces such as bicycle parking, plant rooms, shower and changing facilities are not accounted for, and should be costed separately.*

** Current basic building cost (BBC) limit includes VAT, but excludes external works, fitted furniture and abnormal cost provisions.*

“Although I studied general quantity surveying in college, Linesight has given me the chance to focus on MEP by joining our dedicated team. The scale of projects that we work on really appeals to me – I’m getting the chance to work on large-scale, complex projects for world-leading clients, with the opportunity to gain experience abroad as well.”

Manli Hu,
Cost Manager

3. Indices

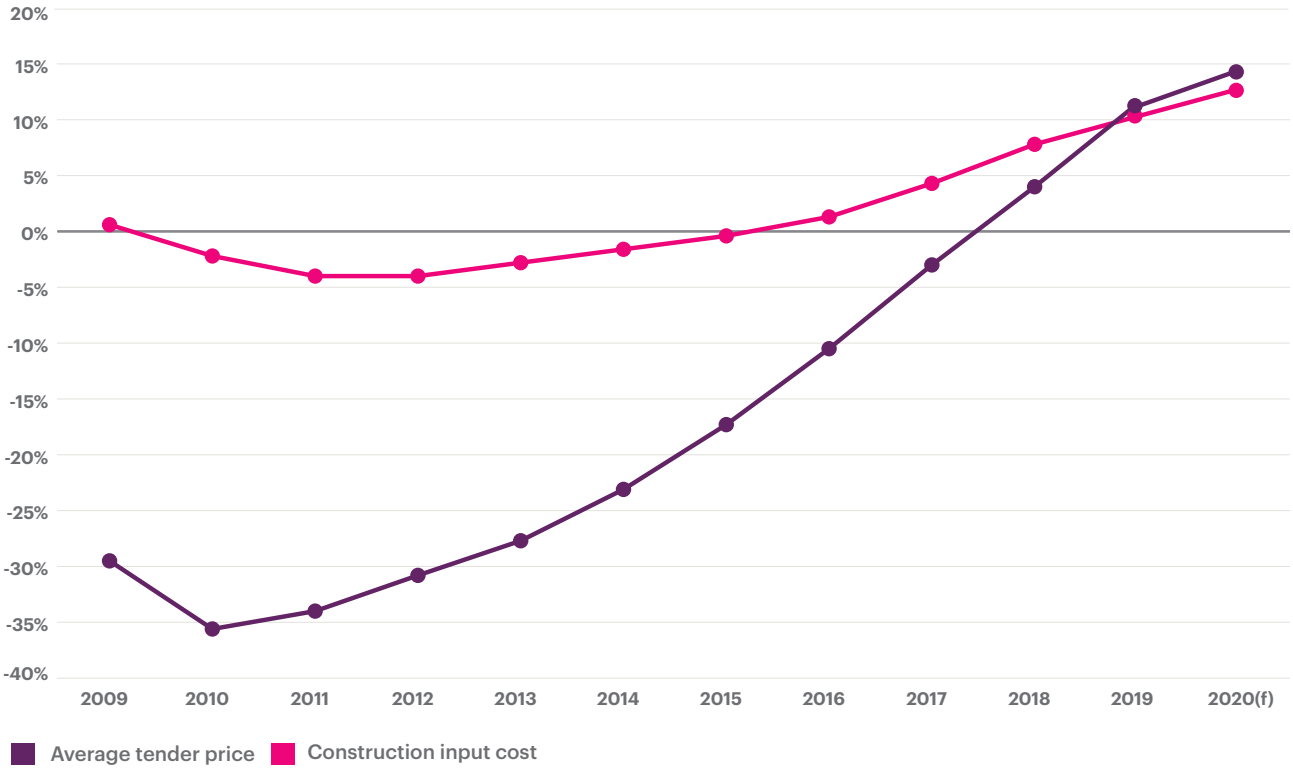
3.1. Linesight tender and cost indices

The graph below illustrates how construction tender prices and the input cost of labour and materials diverged considerably following the collapse in construction from 2007 to 2010. Up until year end 2019, reflecting the gradual recovery of the construction industry, tender price increases have considerably outpaced those of construction input costs. Linesight's research highlights that on average, tender prices rose by approximately 6.5% in 2019, a moderation of the 7.5% recorded by Linesight for 2018.

When we issued our Handbook in early March 2020 (pre-COVID economic impact), we projected that tender inflation for the year would be 5.4%. Inflation was trending as projected for the first three months of the year, but the pandemic has had a mixed impact on tender prices. The type, sector and size of the project, together with the timeline for starting and completing work on-site, have a strong bearing on the quantum of the impact involved. Linesight's research indicates that the uplift in tender costs associated with COVID-19 has been more than offset by an increasingly competitive tendering approach by contractors. This is due to concern around the impact of the current economic uncertainty on the quantum of work available for tendering in the short to medium term, as reflected in the drop in construction output.

In light of this, Linesight's updated projection is that tender inflation for 2020 is likely to fall in the range

Annual percentage change 2009-2020(f)



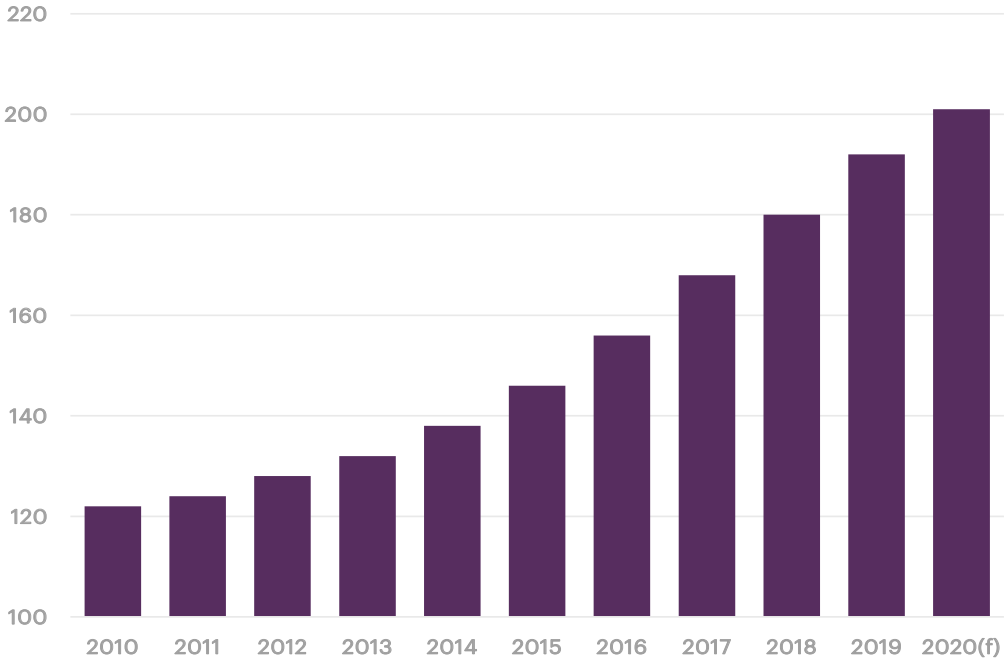
Source: *Linesight*

of 3% to 3.5% (accounting for the impact of COVID). We are likely to see increased focus on contractor selection in terms of financial capacity and also capacity to deliver.

The percentage increases above reflect a national average, and there will be variations, both upwards and downwards, to these average increases across different regions, locations and project types.

We anticipate that construction output will recover in 2021, and with that, we anticipate some moderate tender inflation adjustment to reflect this. It highlights the importance of budgeting for future inflation when evaluating proposed construction projects. Linesight is happy to advise on specific projects, taking factors into account such as project types and their location.

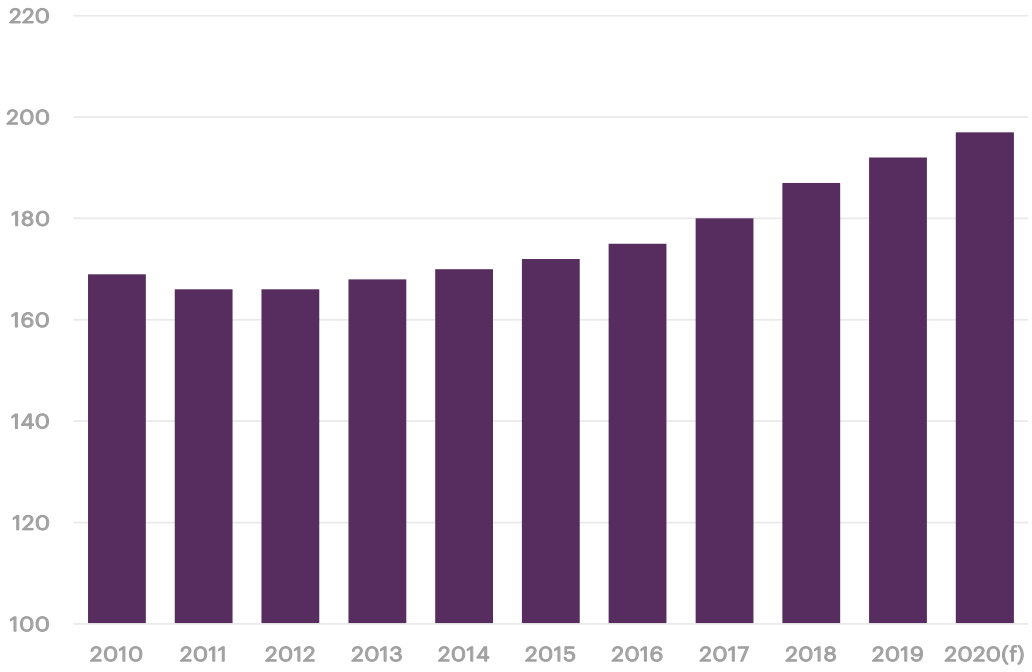
3.2. Linesight tender price index 2010-2020(f)



Note: *The Linesight tender price index is an average view of changes in tender prices across different locations, project types and project sizes. It is intended to provide general guidance only and should not be used for any other purpose. Please contact us for specific advice about construction inflation related to specific projects.*

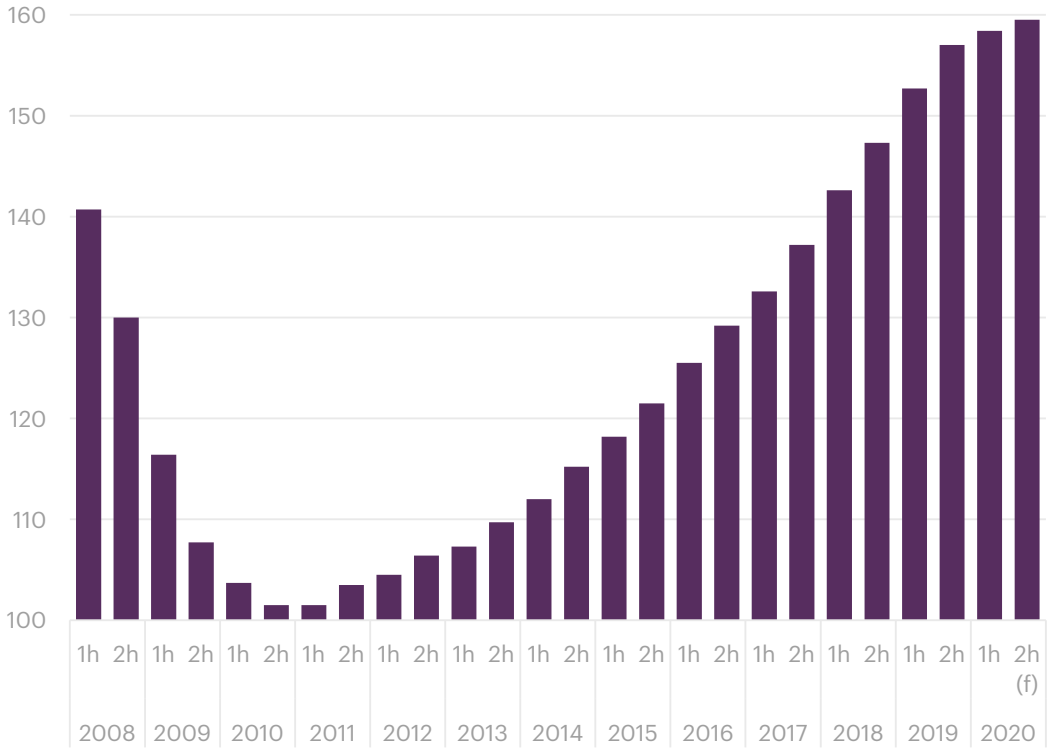
Source: *Linesight*

3.3. Linesight construction cost index 2010-2020(f)



Source: *Linesight*

3.4. SCSI tender price index 2008-2020(f)

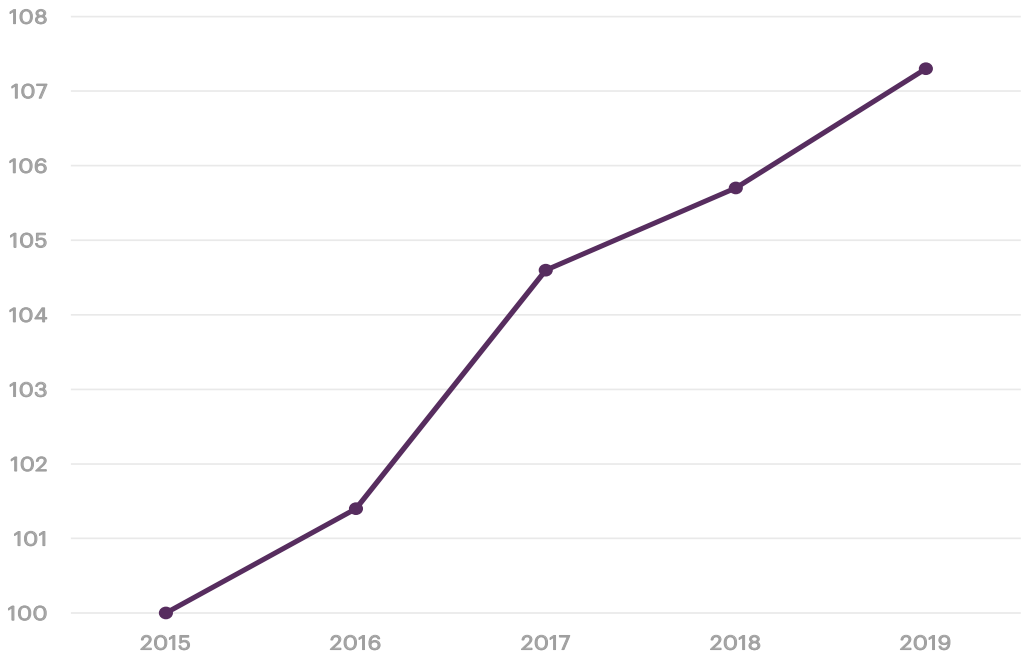


Source: *Society of Chartered Surveyors Ireland*

“There is a keen focus on continuous professional development, and for me, gaining experience across multiple sectors has been a great opportunity to diversify my skillset and progress my career. I started in civils and infrastructure, and have since been actively involved in large-scale commercial, student accommodation and residential projects, where I provide cost advice and guidance to both public and private sector clients.”

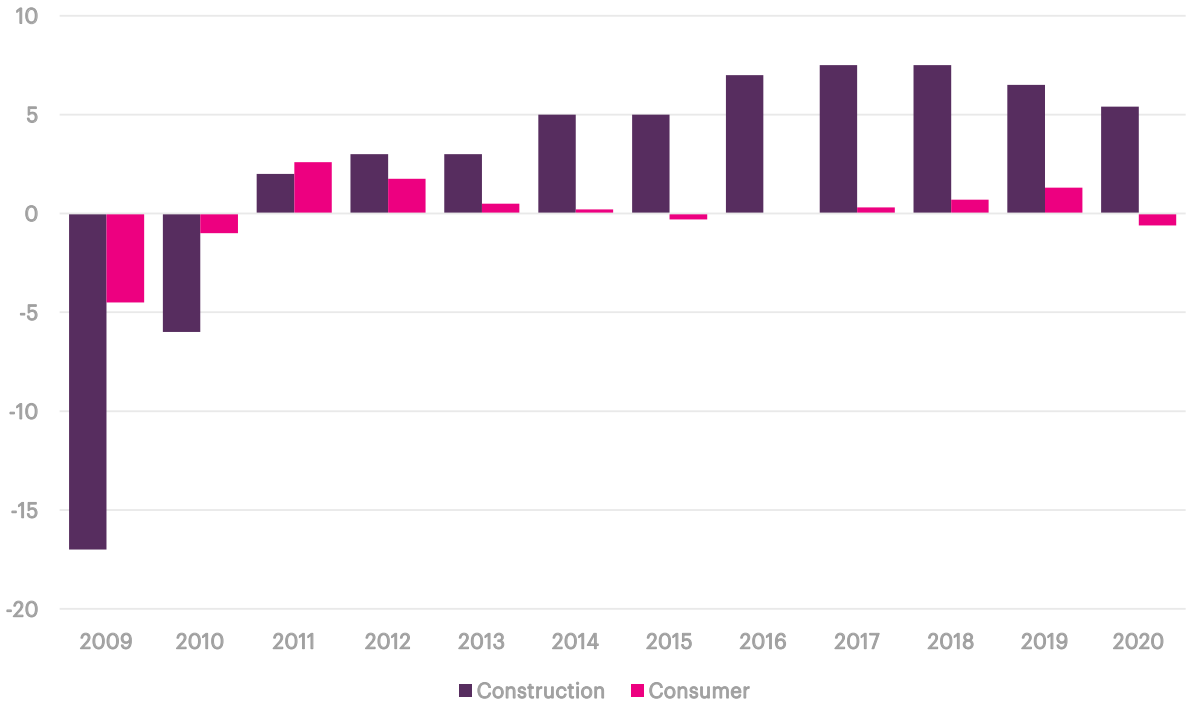
Chris McCarry
Associate

3.5. Wholesale price index building materials 2015-2019 *



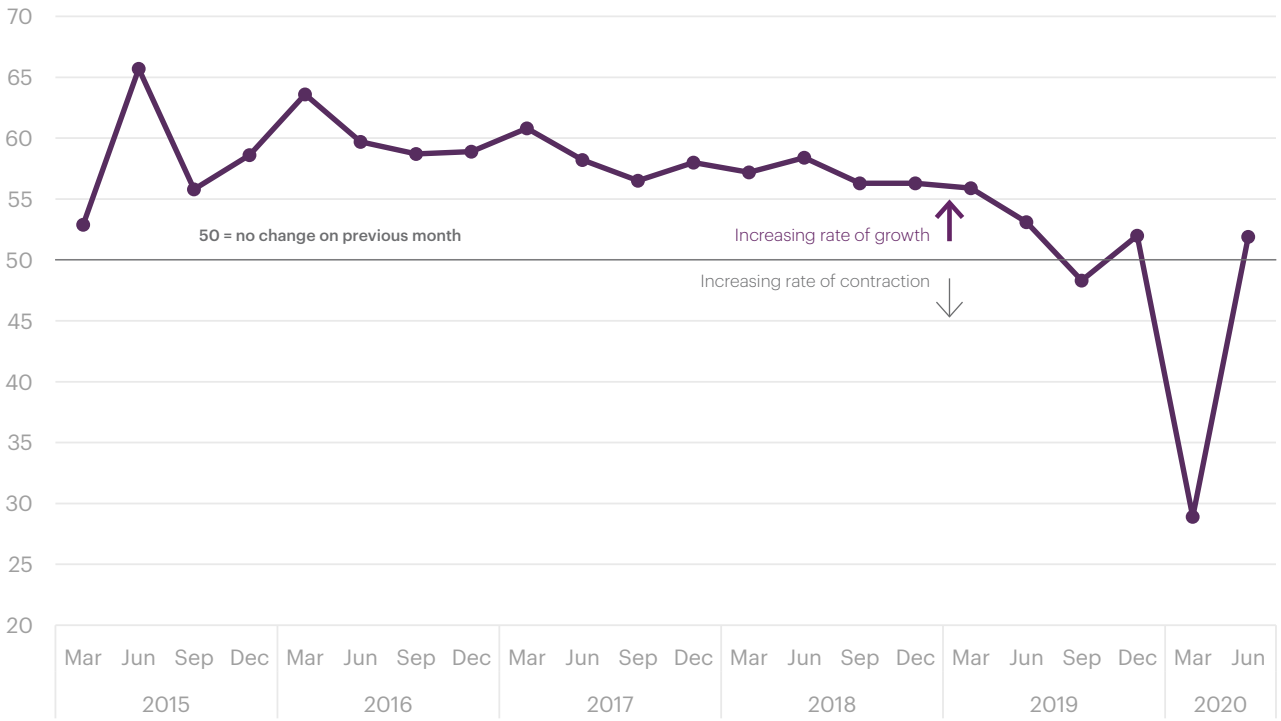
Source: *CSO*

3.6. Consumer vs. construction price inflation 2009-2020



Source: *CSO/Linesight/IMF*

3.7. Construction Purchasing Managers' Index



Ulster Bank Construction PMI	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20
Total activity *(graphed above)*	57.5	58.4	56.3	56.3	55.9	53.1	48.3	52.0	28.9	51.9
Housing	60.3	60.4	58.0	56.0	60.8	58.4	52.9	51.8	32.4	55.8
Commercial	58.0	62.0	59.2	58.5	55.5	52.8	47.6	53.6	28.2	50.9
Civil engineering	53.5	49.3	46.5	45.5	43.7	42.3	42.1	43.1	25.2	43.4

Source: *Ulster Bank*

"For me, the attraction to Linesight was down to the global reach and getting to be a part of a fast-paced, expanding global organisation. The flat structure is one of my favourite aspects of the business – I directly liaise with senior management regularly, and have the opportunity to learn from my colleagues with vast experience."

Alan Dunphy,
Digital Marketing Coordinator

“As a graduate, I wanted to work with the foremost cost consultancy in the country, and the opportunity to work abroad through Linesight’s graduate programme was a real plus. I spent two years in San Francisco at the beginning of the business' tenure over there, which was fantastic.”

Jack Lonergan,
Senior Cost Manager

4. Main and subcontractors' turnover *

4.1. Irish main contractors' turnover *

2019 rank	2018 rank	Contractor	Est global	Est Irish	Actual global
			2019 €'m	2019 €'m	2018 €'m
1	1	John Sisk & Son Limited	€1,415.00	€730.00	€1,172.80
2	2	BAM Contractors Limited	€610.00	€535.00	€524.00
3	4	John Paul Construction Limited	€438.00	€372.00	€390.00
4	6	PJ Hegarty & Sons Limited	€435.00	€415.00	€290.00
5	3	Bennett Construction Limited	€400.00	€310.00	€405.00
6	7	Collen Construction Limited	€375.00	€260.00	€270.73
7	10	Walls Construction Limited	€287.00	€287.00	€190.32
8	8	Roadbridge Limited	€273.00	€204.75	€239.00
9	5	JJ Rhatigan & Co Limited	€252.40	€252.40	€243.34
10	9	Mac Group	€220.00	€154.00	€129.00
11	11	Ardmac Limited	€159.78	€65.20	€156.74
12	12	Flynn Management & Contractors Limited	€145.00	€142.00	€133.60
13	13	StructureTone Limited*	€140.00	€140.00	€123.00
14	14	Wills Bros Limited	€116.73	€61.39	€89.02
15	17	Duggan Brothers (Contractors) Limited	€98.85	€98.85	€62.97
16	-	Conack Construction Ltd	€80.30	€80.30	€43.26
17	25	Elliott Group	€75.82	€56.86	€36.01
18	16	Townmore Construction	€74.00	€55.00	€70.00
19	23	Vision Contracting Limited	€53.16	€53.16	€36.17
20	21	Purcell Construction Limited	€52.57	€52.57	€35.62
21	19	Monami Construction Ltd	€51.20	€51.20	€58.10
22	24	MMD Construction Cork Limited	€48.31	€48.31	€31.32
23	22	Clancy Construction Limited	€42.36	€42.36	€40.07
24	27	Mythen Construction Limited	€28.00	€28.00	€26.59
25	28	Townlink Construction Limited	€27.00	€27.00	€21.00

Note: *Ranked on global turnover, which refers to turnover related to the Irish business*
**StructureTone Limited overall global turnover is €5.25bn*

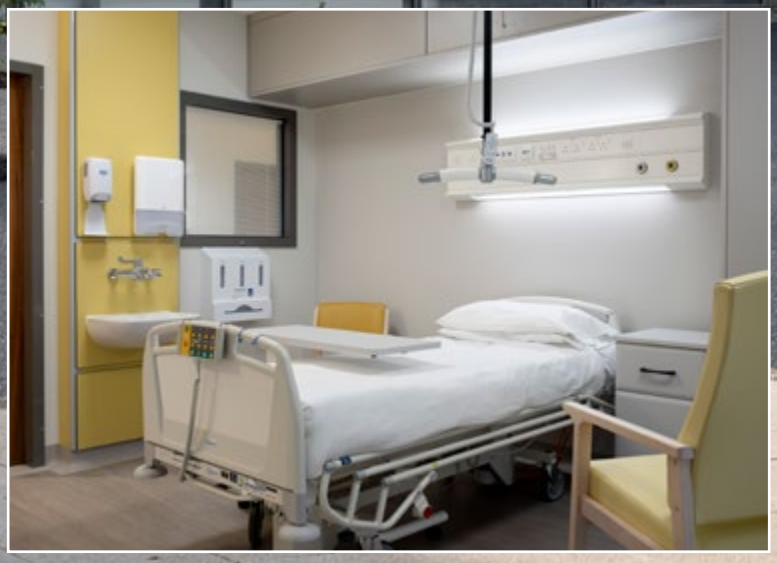
Source: *Individual companies auditors, Companies Registration Office*

4.2. Irish services subcontractors' turnover *

2019 rank	2018 rank	Contractor	Est global	Est Irish	Actual global
			2019 €'m	2019 €'m	2018 €'m
1	1	Mercury Engineering Group	€900.00	€155.00	€770.00
2	2	Jones Engineering Group	€620.00	€310.00	€443.00
3	3	Dornan Engineering Limited	€330.00	€90.00	€347.69
4	4	Winthrop Engineering Limited	€302.99	€172.49	€186.01
5	5	Designer Group Engineering Contractors Limited	€261.88	€138.79	€204.96
6	6	Kirby Group Engineering Limited	€245.50	€179.21	€165.68
7	8	Suir Engineering Limited	€161.00	€146.00	€122.00
8	7	Specialist Technical Engineering Services (STS Group)	€155.50	€61.38	€145.87
9	13	King & Moffat Building Services	€69.20	€36.80	€46.10
10	9	L. Lynch & Co. Limited	€60.00	€60.00	€78.95
11	11	B.M.D & Company Limited	€44.20	€44.20	€49.07
12	17	DMG Engineering Limited	€36.65	€36.65	€25.53
13	10	Lynskey Engineering Limited	€35.00	€23.45	€32.00
14	16	LMC Energy Solutions Limited	€33.40	€33.40	€25.78
15	19	CJK Electrical Limited	€30.52	€30.52	€23.57
16	18	Tritech Engineering	€21.04	€21.04	€25.16
17	21	Rockwell Engineering	€13.00	€13.00	€16.28
18	22	T Bourke & Co. Limited	€10.30	€10.30	€15.08

Note: *Ranked on global turnover, which refers to turnover related to the Irish business*

Source: *Individual companies auditors, Companies Registration Office*

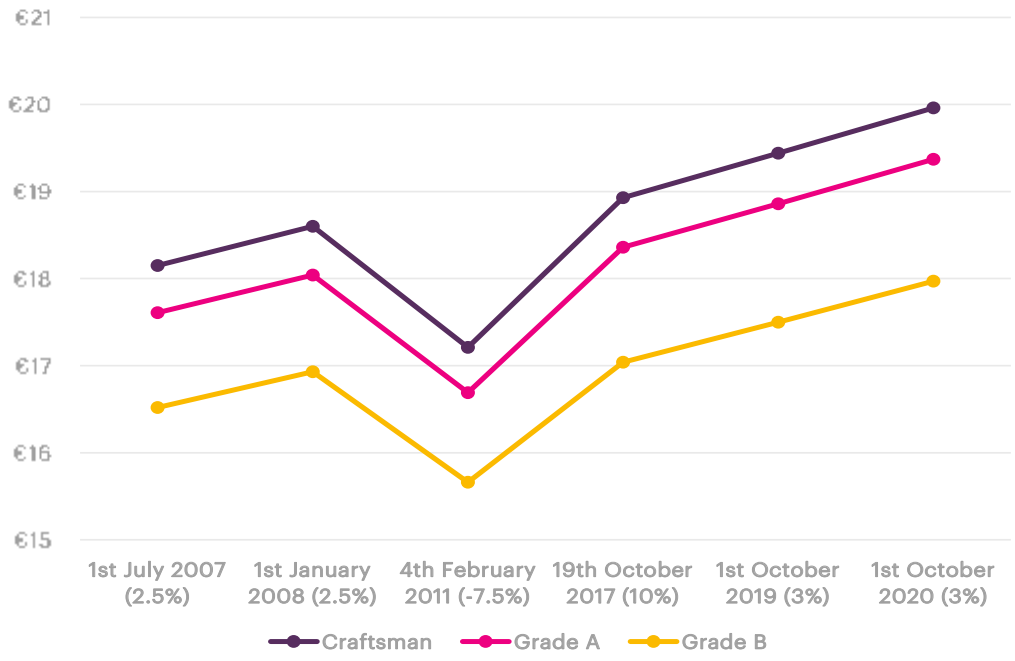


Peamount Healthcare, Dublin

Architect:
Scott Tallon Walker
Linesight services:
Cost Management, Procurement and Risk Management

5. Wage rates and charges *

5.1. Basic hourly wage rates *



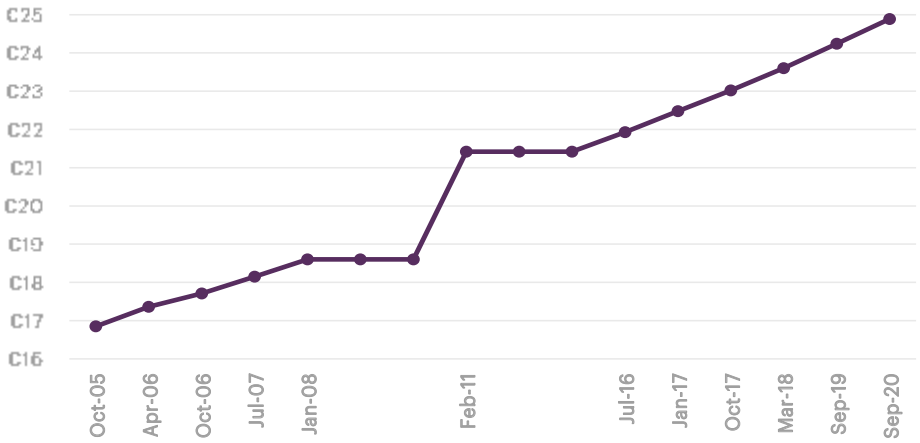
Date of wage rate change	Craftsman	General operative	
		Grade A	Grade B
1st July 2007 (2.5%)	€18.15	€17.61	€16.52
1st January 2008 (2.5%)	€18.60	€18.04	€16.93
4th February 2011 (-7.5%)	€17.21	€16.69	€15.66
19th October 2017 (10%)	€18.93	€18.36	€17.04
1st October 2019 (3%)	€19.44	€18.86	€17.50
1st October 2020 (3%)	€19.96	€19.37	€17.97

Apprentice rates		
Year	% craft rate	
1	33.30%	€15.33
2	50%	€15.80
3	75%	€16.12
4	90%	€16.52

Note: *An hourly rate of pay of €14.52 will apply for two years after entrance to the sector to all new entrant operative workers who are over the age of 18 years and entering the sector for the first time*

Source: *Registered Agreement for the Construction Industry/Sectoral Employment Order 2020*

5.2. Basic hourly wage rates - mechanical *

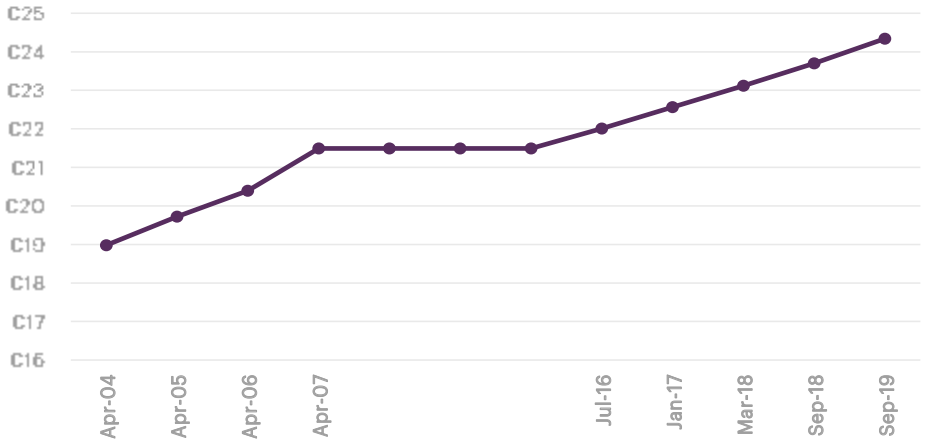


1st October 2005	€16.85	1st July 2016	€21.93
1st April 2006	€17.36	1st January 2017	€22.48
1st October 2006	€17.71	1st October 2017	€23.02
1st July 2007	€18.15	1st March 2018	€23.60
1st January 2008	€18.60	1st September 2019	€24.24
4th February 2011	€21.42	1st September 2020	€24.89

Note: *There is still an outstanding pay claim by the unions of 1 hours travel per day which is a 12.8% increase. This is working its way through the state's IR facilities at present*

Source: *CIF/MEBSCA*

5.3. Basic hourly wage rates - electrical *



1st April 2004	€18.98	1st January 2017	€22.56
1st April 2005	€19.72	31st March 2018	€23.12
1st April 2006	€20.39	1st September 2018	€23.70
1st April 2007	€21.49	1st September 2019	€24.34
1st July 2016	€22.01		

Note: *No further agreements as of yet.*

Source: *CIF/ECA*

5.4. Planning charges 2020 *

Class of development	Charge
Most building types	€80 or €3.60 per sq.m., whichever is greater
New houses	€65 for each dwelling
House alterations	€34
Golf courses	€50 per hectare
Outline planning permission	75% of full planning permission charge

Maximum scale of charges for planning applications	
Full application most building types	€38,000
Outline application most building types	€28,500
Retention application	€125,000

Source: *Local planning authorities*

5.5. Fire certificate charges 2020 *

option 1

Type of application

Making application as per status quo

Charge

€2.90 per sq.m.
up to a maximum of €12,500

option 2

Type of application

A seven day notice

Charge

€5.80 per sq.m.
up to a maximum of €25,000

option 3

Type of application

A revised fire safety certificate application

Charge

€2.90 per sq.m.
up to a maximum of €12,500

option 4

Type of application

A regularisation fire safety certificate application

Charge

€11.60 per sq.m.
up to a maximum of €50,000

Source: *Local planning authorities*

“There’s an open-door policy with management, and always someone you can turn to for advice and support. I really enjoy working with so many passionate and knowledgeable professionals in an open environment, in which communication and productivity are vibrant.”

Grace McConnell,
Associate

Marshall Yards, Dublin

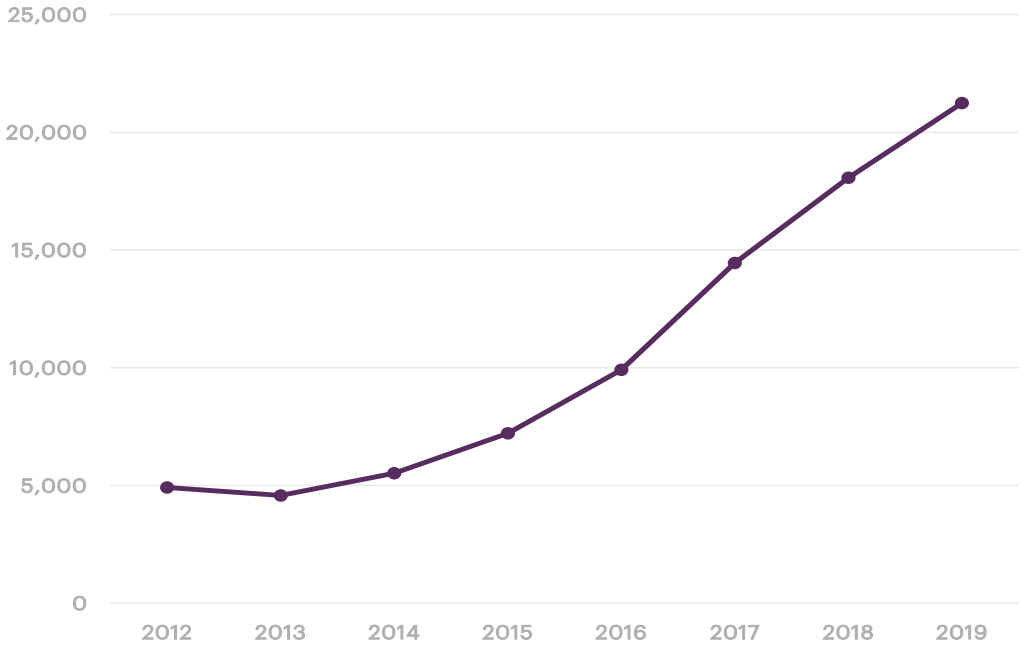
Architect:
O'Mahony Pike Architects
Linesight services:
Project Management

“It’s a thoroughly professional company, but with a family feel. You get a sense that you are an integral part of the business and not just a number, and it’s made clear that the company will invest in you and support you in your ambitions.”

Tim O'Callaghan,
Lead Cost Manager

6. Housing

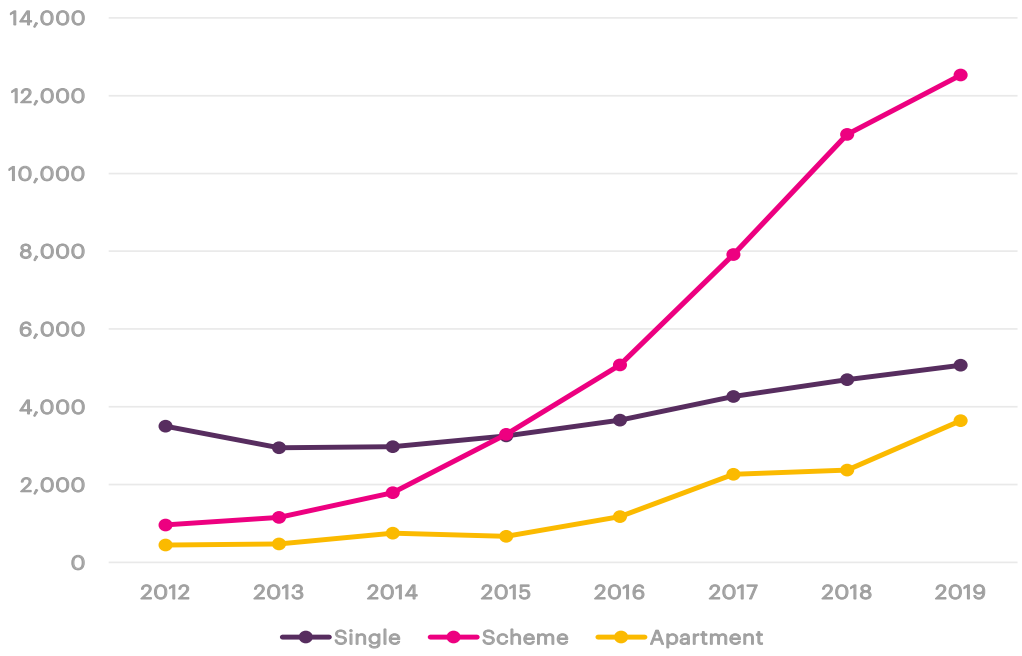
6.1. Annual housing completions 2012-2019 *



Year	Single	%	Scheme	%	Apartment	%	Total
2012	3,501	71.29%	964	19.63%	446	9.08%	4,911
2013	2,947	64.42%	1,155	25.25%	473	10.34%	4,575
2014	2,975	53.91%	1,795	32.53%	748	13.56%	5,518
2015	3,252	45.05%	3,294	45.63%	673	9.32%	7,219
2016	3,660	36.91%	5,078	51.22%	1,177	11.87%	9,915
2017	4,269	29.55%	7,913	54.78%	2,264	15.67%	14,446
2018	4,699	26.00%	11,001	60.87%	2,372	13.13%	18,072
2019	5,068	23.85%	12,529	59.00%	3,644	17.15%	21,241

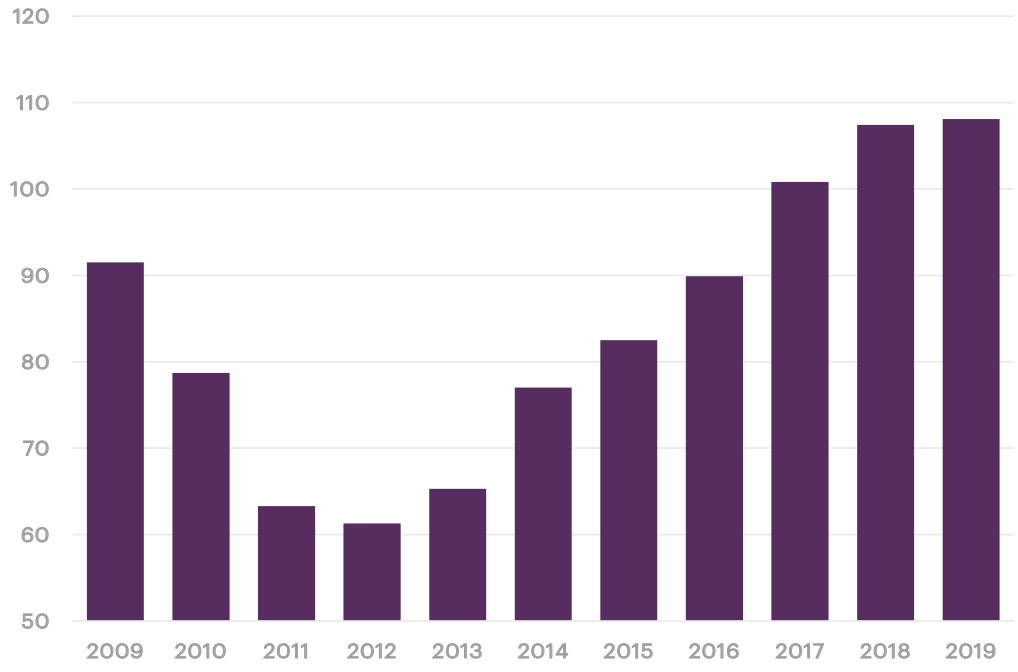
Source: *CSO*

6.2. New housing completions by type 2012-2019 *



Source: *CSO*

6.3. Residential property price index 2009-2019 *



Source: *CSO*

Project Royal, Dublin

Architect:
Henry J. Lyons
Services:
Cost Management,
Project Management,
Health and Safety
Management

6.4. SCSI house rebuilding costs 2019 *

			Rebuilding cost						
House type	**No. of bedrooms**	**Typical size**	**Dublin area**	**Cork area**	**Galway area**	**Waterford area**	**Limerick area**	**North West area**	**North East area**
Terraced town house	2	70sq.m. (753 sq.ft.)	€2,193sq.m. €204 sq.ft.	€1,814sq.m. €168 sq.ft.	€1,732sq.m. €161sq.ft.	€1,650sq.m. €153sq.ft.	€1,744sq.m. €162 sq.ft.	€1,435sq.m. €133sq.ft.	€1,741sq.m. €162sq.ft.
	3	95sq.m. (1023sq.ft.)	€2,091sq.m. €194 sq.ft.	€1,709sq.m. €159 sq.ft.	€1,662sq.m. € 154 sq.ft.	€1,571sq.m. €146sq.ft.	€1,662sq.m. €154sq.ft.	€1,356sq.m. €126sq.ft.	€1,639sq.m. €152sq.ft.
Semi-detached	3	95sq.m. (1023sq.ft.)	€2,181sq.m. €203 sq.ft.	€1,732sq.m. €161sq.ft.	€1,709sq.m. €159sq.ft.	€1,594sq.m. € 148sq.ft.	€1,674sq.m. €156sq.ft.	€1,368sq.m. €127sq.ft.	€1,718sq.m. €160sq.ft.
	4	118sq.m. (1270 sq.ft.)	€2,125sq.m. €197sq.ft.	€1,709sq.m. €159sq.ft.	€1,628sq.m. €151sq.ft.	€1,560sq.m. €145sq.ft.	€1,616sq.m. €150sq.ft.	€1,356sq.m. €126sq.ft.	€1,594sq.m. €148sq.ft.
Detached	4	118sq.m. (1270 sq.ft.)	€2,125sq.m. €197sq.ft.	€1,767sq.m. €164sq.ft.	€1,674sq.m €156sq.ft	€1,605sq.m. €149sq.ft.	€1,697sq.m. €158sq.ft.	€1,368 sq.m. €127 sq.ft.	€1,661sq.m. €154sq.ft.
Detached bungalow	4	146sq.m. (1572 sq.ft.)	€2,057sq.m. €191sq.ft.	€1,721sq.m. €160sq.ft.	€1,604sq.m. €149sq.ft.	€1,503sq.m. €140sq.ft.	€1,697sq.m. €158sq.ft.	€1,322sq.m. €123sq.ft.	€1,616sq.m. €150sq.ft.

Garage: *Total rebuilding costs range from €14,443 for a single attached garage to €25,983 for a double attached garage. This table is a guideline based on a typical, speculatively built, estate-type house in the Dublin, Cork, Galway, Waterford, Limerick, Northwest and Northeast regions. These figures are September 2019 figures. See important notes below.*

1. The figures shown in the table are a ***minimum*** *base cost guide for your house insurance.*

2. The figures assume a basic quality specification with normal foundations, timber frames or brick/block walls, concrete tiled roof, concrete ground floor and timber first floor, softwood flush doors and hardwood double-glazed windows, painted plaster to walls, plastered ceilings, standard electrics and central heating. The sum insured should be increased to allow for better-than-average kitchen fittings, built-in wardrobes, finishes and any other items not normally included in an estate-type house.

3. House contents, such as carpets, curtains, furniture, etc., are not covered by the figures.

4. No allowance has been made for the cost of outbuildings or patios. The figures do, however, allow for a concrete path around the house, for driveway repairs, regrassing and fencing.

5. The figures allow for demolition costs, professional fees incurred in reinstatement and VAT at 13.5% on building costs, as well as 23% on professional fees.

6. The amounts included for professional fees have been calculated to cover the following services: building surveyor/architect - prepare working drawings and specification, and administer the building contract; chartered quantity surveyor - invite and examine tenders, process payments and agree final account; engineer - advice on structural issues. Fees associated with the certification of the house under the Building Control (Amendment) Regulations 2014.

7. The costs are based on building rates in September 2019.

Source: *Society of Chartered Surveyors Ireland*

Project Fitzwilliam, Dublin

Architect:
Grafton and O'Mahony Pike Architects

Linesight services:
Cost Management

The Eight Building, Dublin

Architect:
Reddy Architecture + Urbanism
Linesight services:
Cost Management

Review and Outlook

Global Insights

Global Market Review

In just a matter of months, the global landscape has changed dramatically, with COVID-19 having a profound impact on economies around the world.

In our early March Knowledge Centre update, we referred to COVID-19 as a new threat to the global economy, following eighteen months of uncertainty arising from the US-China trade war, which appeared to be coming to an end with the signing of the Phase 1 deal in early 2020. In a matter of mere weeks, the novel coronavirus moved from an impending threat to a confronting reality, and has had an unprecedented impact on both public health and the economy.

Recovery and resurgence in APAC

As the region in which the COVID-19 outbreak originated, many parts of Asia are a number of weeks ahead of the rest of the world in terms of recovery. Indeed, as other parts of the world seek to curb the spread of the novel virus, they can look to countries such as China, to review the efficacy of various policy responses in efforts to soften the economic shock.

The pandemic initially caused shutdowns in Asia earlier than elsewhere in the world, with industry grinding to a halt in February and having a significant impact on global supply chains. COVID-19 then brought much of the world's economic activity to an abrupt standstill, serving a secondary blow to the export-reliant Asian economy.

Asia's purchasing managers' indices (PMI) in August show up some mixed results – with Indonesia and Taiwan above the 50 mark, and the latter recording its highest figure in two years at 52.2, and Japan, South Korea, Malaysia, the Philippines and Vietnam all sub-50, indicating contraction. However, some of these sub-50 figures are still indicating gradual improvement and recovery, particularly in the big manufacturing nations. Bloomberg Economics also reported that a private gauge of China's factory activity grew at the fastest pace in August since January 2011, helped by improving exports and continued domestic recovery.

Having seen economic growth of 6.1% in 2019, despite the trade war, the Chinese economy was heavily impacted in Q1 with a 6.8% decline before a return to positive growth of 3.2% in Q2. Although the Phase 1 agreement seemed hopeful with regards to the US-China trade war, tensions have once again intensified, which is having an impact on the Chinese economy and remains a risk factor.

In India, pre-COVID, some important reforms, while expected to benefit the economy in the longer term, such as a unified tax system and demonetisation, have been disruptive in the short term, and India has since been faced with considerable economic challenges due to the pandemic. Q2 was India's worst quarter ever recorded, with a 23.9% contraction and the IMF is projecting a 'historic low' for 2020, with a 4.5% contraction, before a return to growth is expected in 2021.

Although Australia appeared to have a good handle on containing the virus by June, and was beginning to focus on awakening its economy, there has been a recent resurgence in the virus and a recession has hit the nation for the first time in 28

years. A contraction of 6% is expected for 2020 before a prolonged recovery period kicks in over the coming couple of years. The Government introduced a considerable stimulus package, including the AU$130 billion JobKeeper payment, which aimed to keep Australians in work and support businesses that had been significantly affected by the economic impact of the virus.

Singapore had an austere reaction to the pandemic, implementing an eight-week circuit breaker to suppress the virus. It entered a recession in Q2 with a 41.2% contraction quarter-on-quarter. To date, the government has announced four support packages worth close to S$100 billion (nearly 20% of GDP), and has not ruled out announcing another package.

Plummeting activity in Europe

Europe has been particularly hard-hit by the pandemic, between the public health impacts and the strict lockdowns seeing economic activity plummet, and the eurozone recorded an economic contraction of 11.9% in Q2.

Although the European Central Bank acted quickly upon the onset of the virus, with significant stimuli put in place to prop up the regional economy, it now appears that even more stimuli will be required from the ECB to tackle the disinflationary impact. Inflation in the eurozone was negative in August for the first time in over four years, with a figure of -0.2% recorded across the 19 countries, well below the ECB's target of 2%. While it is hoped that this is relatively temporary and that a rebound is in the near future, Brexit remains a significant risk, in addition to the pandemic.

Although many European countries looked to be making a recovery in July, as lockdown and restrictions were lifted, a marked slowdown was seen in August as COVID cases rose again in some countries, with the eurozone PMI dropping from 54.9 to 51.6. Unemployment hit 7.9% in July, up from 7.7% in June, although a Reuters survey of economists had projected a slightly higher figure of 8%.

As Europe's largest economy, Germany, which was already enduring a period of political instability and ongoing economic uncertainty, has reported Q2 as its worst quarterly performance on record, with total output falling by 10.1%. Despite Germany not being as reliant on tourism as other European countries and the public health effects not being as stark, consumer spending has nosedived, and this has been coupled with the steep decline of exports and global trade, which are significant contributors to its economy. While its economy is doing better than initially expected, the aforementioned sluggish demand may prolong the recovery period. Germany's political landscape is in a state of flux, as far-right and the green parties gain popularity, and the once-powerful democratic left has become alienated from the industrial, working-class base.

Meanwhile the French economy, Europe's second largest, saw GDP decline by 13.8% in Q2, although there was moderate improvement in May and June as lockdown measures eased. It was reported that economic activity was down 7% year-on-year in July, albeit an improvement on previous months, as construction activity ramped back up. Spain, however, has recorded its worst recession of modern times, with the economic shock leading to declines of 5.2% in Q1 worsening to 18.5% in Q2, coming out as the eurozone's worst performer.

The Irish economy is expected to shrink by 8.5% this year, and the Government's budget deficit increased to €9.5 billion in August, as VAT receipts reduced and spending on the likes of income supports related to the pandemic soared, compared to a deficit of €625 million this time last year, marking a year-on-year

The UK has entered a recession for the first time since 2009, with a decline of 2.2% in Q1 followed by 20.4% in Q2 – the steepest decline on record

deterioration of €8.8 billion. In addition to contending with COVID-19, Ireland stands to be one of the most impacted countries in the eurozone at the hands of Brexit, with the lack of direction adding to the uncertainty. Furthermore, as a country that is heavily reliant on FDI, the performance of the US economy is particularly impactful.

As the end of the Brexit transition period fast approaches, and the economic shock of COVID continues to be felt, the UK has entered a recession for the first time since 2009, with a decline of 2.2% in Q1 followed by a negative figure of 20.4% in Q2 – the steepest decline on record. The Government has put in place various packages and supports to mitigate the negative impacts and start on the road to recovery, but it is fair to say that economic recovery will be heavily dependent on any recurrence of the virus and whether post-Brexit trade deals are secured.

Israel has posted its worst performance in more than 40 years in Q2, coupled with the CBS (Central Bureau of Statistics) reporting a 28.7% decline. This follows a 10.1% contraction in Q1, after 3.4% growth in the second half of 2019. The country's high-tech landscape has been largely unscathed in comparison to other sectors of the economy. The ripple effect from the pandemic has not been felt so far in the sector, but a slowdown is expected as the pandemic continues.

Record contraction for the US

The US started the year with strong optimism, but reported its sharpest contraction on record (since 1947) in Q2, at a rate of 32.9%. While it was hoped that recovery would ensue quickly, the second wave of the virus in some locations and resulting measures to suppress it infer that it may take longer than initially anticipated.

As the main driver of the US economy, consumer spending is a particularly important indicator, and declined by 10.7% year-on-year in Q2. Unemployment stood at 10.2% in July, down from 11.1% in June. In addition to the pandemic, rising tensions again between the US and China also pose a significant risk to its recovery.

Looking forward, unsurprisingly, projections for 2020 have been curtailed significantly, with GDP now expected to contract by 6.5%. Key commodities and materials have already seen a drop in prices, with oil and steel products bearing the brunt of this decline. Production facilities are slowing down, and in some cases, closing completely, which raises concerns over the ability to increase supply once demand returns.

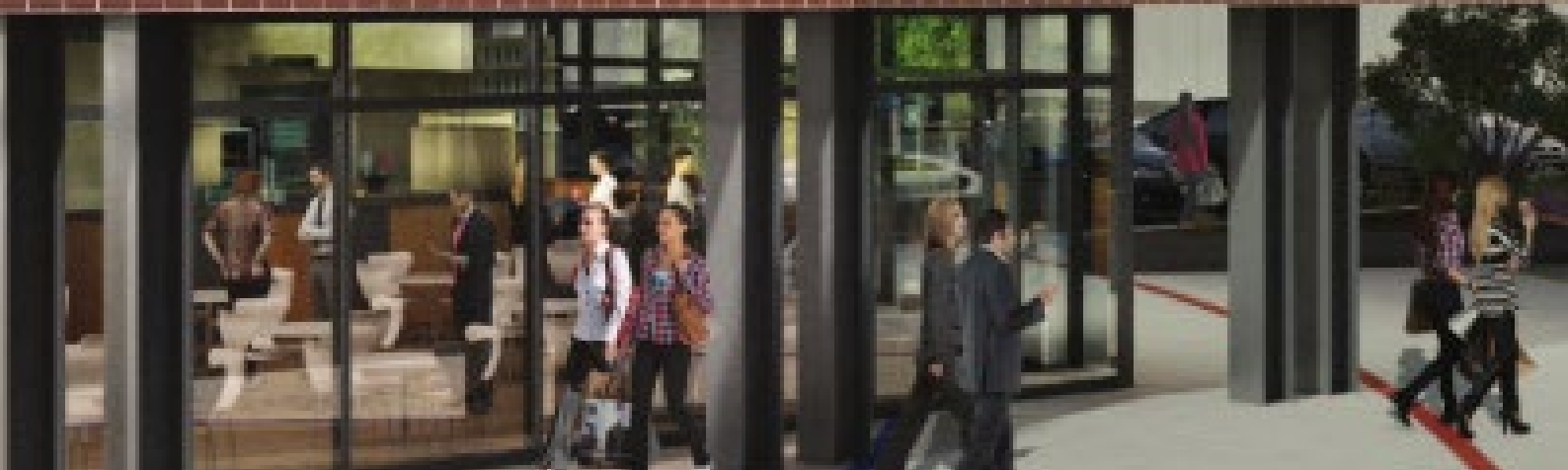
Continued volatility in the GCC

In addition to COVID, oil prices, geopolitical tensions, global trade wars and macroeconomic performance continue to have a significant impact on growth and make the GCC less predictable than most major global markets. A contraction of 7.3% is expected in the Middle East oil-exporting countries as of July 2020. In addition to the effects of COVID, the GCC remains highly dependent on the oil economy, and the market volatility will undoubtedly have a role to play in terms of the pace of recovery post-pandemic.

The UAE Central Bank has forecast economic contraction of 3.6% for 2020, having put together a comprehensive stimulus package to support the economy, with increased loan-to-value ratios for first-time home buyers, as well as the range of regulatory changes announced in 2019.

The pandemic is dealing a double blow to Saudi Arabia, with a high volume of COVID cases, as well as energy market turmoil, including cuts in production and an oil price decline to below US$20 per barrel, saddling the Government with a budget deficit that could rise to around 15% of GDP this year. Officials have been reported to have doubled their borrowing plans and implemented a series of austerity measures, including raising the VAT rate from 5% to 15%.

KIm Hegarty
Director



Lidl Ballymun - Student Accommodation, Dublin

Architect:
MCA

Linesight services:
Cost Management

GLOBAL INSIGHT

The evolution of data centres

By 2025, the International Data Corporation (IDC) projects that the global need for data will skyrocket to 163 zettabytes, and COVID-19 has further increased our reliance in the interim. But how is this dependency on data in our day-to-day lives affecting the data centre sector?

Gavin Flynn,
Program Director

Eoin Byrne,
Associate Director

Today's world is dependent on data, and that dependency has been exacerbated by the COVID-19 pandemic. By 2025, the International Data Corporation (IDC) projects that the global need for data will skyrocket to 163 zettabytes. From our banking infrastructure to our smart homes, technology and information play an increasingly crucial role in every aspect of our daily lives. This demand will continue to propel the data centre market, which has changed dramatically since the 1940s, when large computer rooms like the Electronic Numerical Integrator and Computer (ENIAC) became the predecessors of modern data centres. From 2019 to 2023, the global data centre market size is expected to grow by US$284 billion, at a compound annual growth rate (CAGR) of more than 17%. But with the accelerated pace of innovation calling for facilities that are built faster, on tighter budgets and to evolving specifications, the construction industry must first understand the new challenges impacting the market. By bringing improved construction management methods like cost management, procurement and supply chain management, the industry can address the new challenges related to cost and time to market.

The impact of cloud and edge computing

The adoption of cloud infrastructure has heavily influenced the requirements of modern data centres. With the advent of cloud-based software platforms, the organisation of resources has shifted to hybrid cloud systems, which pools off-premises and on-premises resources to optimise digital processes.

Another shift in workflows that affects the market is the rise of edge computing. More Internet of Things (IoT) devices, and the increased need for real-time data analytics and interactions, have pushed the demand for applications to have their computing processes closer to end users, which is usually at the edge of a network. By 2025, it is projected that 75% of enterprise-generated data will originate and be processed outside of traditional data centres or clouds.

This restructuring of digital resources has caused many enterprises to begin shifting from owning or operating their own data centres to incorporating colocation and managed hosting services. Businesses are now spending more on cloud infrastructure services than on data centre hardware and software: from 2009 to 2019, spending on cloud infrastructure services has grown by 56% annually to nearly US$100 billion, while annual enterprise spending on data centre hardware and software grew by only 4% on average.

Hyperscale and colocation

This substantial change in how digital resources and infrastructures are managed has boosted the hyperscale market, but also shortened project timelines. More than half of data centre hardware and software spending now comes from cloud providers' hyperscale facilities. This massive demand for more capacity means that previously acceptable project durations are no longer sustainable. Providers must explore other options to reduce their construction schedules, which can include changing designs, land banking, developing cold shells and applying pressure to the construction market to match the speed of data centre growth. The added demand has a domino effect. If hyperscale facilities and their supply chains cannot meet the need for more capacity, enterprises can lease more space from colocation providers to handle changing workload requirements.

Modular construction

Another way in which data centre demands can be met is by adopting a modular construction approach. By applying modular techniques, speed to market can be addressed with an efficient supply chain. Modules can be manufactured offsite and tested for compliance, while the shell and core are built on location. Once the modules are ready, they can be shipped to the site and installed quickly. The simultaneous progress of all elements of the build shortens schedules significantly, with a 25-30% reduction in the time needed to build and commission a modular project.

There is also the added benefit of cost efficiency when adopting a modular approach. This is achieved by standardising certain building materials and designs. The modular method also employs economies of scale, where building materials that are mass-produced can be made at a lower cost.

Supply chain and procurement management

While modular construction methods may help in preventing delays and cost overruns, supply chain and procurement management processes are also extremely important tools that can be used to drive down costs and control project schedules. With market growth comes stress on the pool of available equipment manufacturers and suppliers, and if there are delays to equipment deliveries, then there will be interruptions in the overall project schedule. Equipment is a critical part of the project and can have a direct impact on a provider's ability to complete builds on time. By having an established supply chain with robust contracts, providers can take proactive steps to protect themselves.

Vendor Managed Inventory (VMI) is another key element. With the market moving towards more cost effective and consistent oversight of large equipment, VMI provides suppliers or the supply chain with more certainty around the construction project pipeline. This in turn helps them to be more economical and flexible to align with their customers' demands. VMI also enables owners and data centre providers to reduce their overall lead time. Collaboration and information sharing between clients and suppliers are essential to drive these results. By implementing supply chain and procurement management processes, and working closely with suppliers, project costs can be reduced and delays can be minimised.

The next step in data centre construction

The changing requirements of data centre builds and the growing demand for capacity highlights the need for a solution that can bring projects to market quickly and within a reasonable budget. Providers must now look beyond traditional construction techniques to meet market demands by employing a developed approach to procurement and supply chain management in navigating the new age of data centre construction.

GLOBAL INSIGHT

The impact of COVID on the supply chain

The supply chain has been one of the key casualties of the pandemic, with significant disruptions to delivery scehdules and material supply remaining a core challenge.

Neil L Doyle,
Director

From the very early stages of the COVID-19 pandemic, with its outbreak in China and its proliferation around the world, and the subsequent and ongoing lockdown periods, the impact on the supply chain has been one of the key considerations and vulnerabilities for the construction industry. Significant disruptions to delivery schedules and material supply remain a key challenge, with diversification and strength within the supply chain now a fundamental objective. With the risk of financial instability, the strain on resources, and reduced efficiencies, lower working capacities and increased sanitation checks leading to longer lead times to contend with, there are three core pillars to focus on with regards to securing the supply chain, as discussed below; investment, diversity and resilience.

Investment

Construction is an essential component in the recovery of the global economy, constituting a key contributor to GDP for most countries and a vital source of demand for raw materials. As the industry continues to recover and restart, investment in the supply chain is a fundamental requirement across all levels.

Private investment and financial support from clients and Tier 1 suppliers should be provided to the lower levels of the supply chain to protect and secure it, and avoid further casualties of COVID-19. These lower levels are key to a successful recovery of the construction industry, and with numerous suppliers affected by the pandemic, the focus should be to return to pre-COVID levels. Equity investments and acquisitions are crucial to the re-emergence of the supply chain. It is also imperative that government stimulus packages are used to restart the economy and provide a boost to the lower levels of the supply chain to return to operations. The current shortage of materials will continue in effect if government support is not provided.

Lastly, with the delays caused by COVID-19, the sharing of business forecasting and planning is imperative to securing a supply chain. Many businesses are now employing the use of advanced purchasing and increasing inventory levels to provide short-term security in the supply chain. While this will provide encouragement to the suppliers, the onus must be on the supplier to maintain pricing levels and not pass the costs of inventory storage to the consumer.

Diversity

With the considerable disruptions to the supply chain, which are well documented at this stage, there has been an increased focus on sourcing more local suppliers, who have manufacturing capacity and materials available to circumvent the overseas shipping delays. This includes Tier 1 suppliers looking into local suppliers, with an overall shift away from dependency on cheaper produce available from other regions. If COVID has highlighted anything to the wider industry, it has been the overreliance on China as the factory of the world, and there is now a marked effort to look at other low labour cost locations as alternatives.

The pandemic has undoubtedly spurred on key improvements across the industry and the supply chain, including innovation to maintain agility in the sources of supply and to mitigate the risk of issues in the supply chain. The ability to move quickly to activate secondary supplier relationships, and secure additional critical inventory and capacity is key. It may also be prudent to identify suppliers with shared resource pools for raw materials inventory, where it applies. Overall, the adaptability of suppliers is coming to the fore.

Furthermore, COVID-19 has impelled the digitalisation of supply chain management, innovation and the advancement of technology. This extends across resource planning, supporting increased communication without the need for complex travel arrangements and enhanced supplier relations.

The severe impact we have all witnessed within supply chains around the world has led to a rethink around different supplier resources, and mapping those out to reduce the impact in the supply chain when 2nd and 3rd tier suppliers can't meet demand. While it can be expensive as it requires time to build up a good

risk-mitigation strategy and an updated list of companies in the market, it is ultimately worth it to avoid disruption at times like this. Lastly, the importance of better due diligence checks and increased awareness across the supply chain cannot be underestimated. It is imperative to know all of the supplier base below level 1, and where the supply comes from to secure business continuity. There is also, of course, a need to now tighten up supplier selection protocols. updated list of companies in the market, it is ultimately worth it to avoid disruption at times like this.

Lastly, the importance of better due diligence checks and increased awareness across the supply chain cannot be underestimated. It is imperative to know all of the supplier base below level 1, and where the supply comes from (geographical location) to secure business continuity. There is also, of course, a need to now tighten up supplier selection protocols.

Resilience

Needless to say, resilience within the supply chain has become all the more important in light of the current pandemic. The impact of COVID is reverberating down the chain, through Tier 2, 3 and 4, given the unavailability of raw materials and components to feed up through. With the reduced efficiencies and loss of revenue as a result of less purchasing during the pandemic, financial instability within the supply chain is a risk, and the increased strain on resources may drive some suppliers out of business.

Conversely, some businesses and supply chains have demonstrated their adaptability and changed their approach, and may have excelled during the pandemic due to demand, e.g. PPE, delivery services. We have seen collaboration across the supply chain in some instances, with suppliers working together with a common end goal in sight. Some have even seized opportunities presented by the crisis for growth, with new businesses emerging, although the long-term stability and viability of these companies could be considered somewhat precarious.

Ultimately, companies are quite susceptible to experience disruption in the challenging times we find ourselves in, with potential factory closures at play, whereby manufacturing can grind to a halt very quickly. Supply lead times are being prolonged by the extra security and sanitation checks required, with packaging, loading and shipping taking longer than previously, and scheduling becoming more difficult.

Summary

Undoubtedly, the impact of COVID-19 on the supply chain has been a huge issue since the early stages of the outbreak and has been felt around the world. It has proved to be a significant challenge and vulnerability for the construction industry, and the need to protect and secure the supply chain has never been more apparent. There are three core pillars that we view to be fundamental in this regard, as discussed above – investment, diversity and resilience.

GLOBAL INSIGHT

Reimagining the post-pandemic workplace

COVID-19 is redefining how we live and work, as well as altering our perceptions of place, and challenging us to rethink the design and functionality of our spaces.

Adrian Farren,
Associate Director

Des O'Broin,
Director

COVID-19 is redefining how we live and work, as well as altering our perceptions of place, and challenging us to rethink the design and functionality of our spaces. The built environment will face new demands post-pandemic, and how we use spaces will change, from repositioning and adapting existing assets to building new ones.

Real estate has undergone quite a bit of change in recent years as is, with the proliferation of concepts such as coworking, flexible working and hot desking, providing new solutions that account for the evolving ways in which we work. However, COVID has certainly served as a catalyst for transformation with the commercial and corporate interiors space. In this piece, we put forward some of the key considerations in this sector for the near future, as we look towards a return to offices.

The role of remote working

Prior to the pandemic, the proportion of individuals working remotely was low, with figures from various labour force surveys indicating that just 5% of the workforce in the EU27 worked from home in 2019 – a proportion that had remained relatively constant since 2009. In the US, this figure was 7% according to the 2019 National Compensation Survey from the Bureau of Labor Statistics. Despite years of predictions about remote working being the upcoming trend and advocacy for its merits, a marked shift never really happened. And yet, suddenly in March 2020, working from home was thrust upon us as the new norm.

While productivity has been relatively unscathed – a recent Stanford report notes a 13% gain in employee performance related to remote working – it is clear that social and collaborative workplace engagement have been casualties of full-time working from home, and that employees may not feel as connected to the company culture as they do when immersed in it physically in an office. It is more challenging to maintain the more personable, human aspect of an organisation remotely.

Going forward, it is likely that there will be a happy medium in terms of remote working, and that corporate workspaces will serve as environments for collaborative working and connectivity, rather than a place where employees come to work on individual projects or tasks.

Density and space utilisation

Pre-COVID, soaring real estate costs were driving higher density and greater utilisation of space. Many large companies were forming global standards of office spaces, that were essentially a kit of parts to be adapted to different locations, such as tech hubs, easily configured offices, open-bench workstation neighbourhoods, and open network team areas. In terms of average square feet per employee, the norm in the 1980s was 200 to 300, according to Moody's Analytics, but by 2019, that average had fallen to 126.5.

However, with the social distancing measures in place for the foreseeable future, and the abovementioned role of remote working going forward, space capacity and functionality will change, meaning that traditional high-density configurations of rows of desks will have to be reconsidered. With offices expected to cater more towards collaborative and social functions, there will need to be a shift towards smarter spaces that are conducive to interaction and conversation.

HVAC

The role of adequate ventilation and indoor air quality in office spaces is obviously important, but it should be noted that not all heating, ventilation and air conditioning (HVAC) systems are up to the task for current requirements. Now more than ever, it is vital that systems are reviewed with fresh air intake in mind and relative humidity, and potential improvements, such as filter upgrades, pre-filtration options and purification solutions, considered. The opportunity for smart technology to optimise the systems should also be explored, in terms of monitoring CO2 levels as a fundamental air quality indicator (and of the performance of the ventilation system), and controlling the operation of the system.

A strong focus on well-being

In recent years, there has been increased focus on the role of health and well-being in the workplace. Given that the average American spends 93% of their life indoors, according to the Environmental Protection Agency (EPA), it makes sense that now more than ever, organisations want to explore how they can optimise their workplace from a health and wellness perspective.

While certifications such as the Well Building Standard and Fitwel have been more and more popular in recent years, both have developed new standards in response to COVID. WELL has introduced the Health-Safety rating, which builds upon the existing pillars within the Standard, focusing on five key themes: cleaning and sanitisation; emergency preparedness, which incorporates business continuity planning, building re-entry, and supporting resilience during emergencies; health-related services for occupiers; air and water quality management; and stakeholder engagement and communications. It is not confined to a particular type of facility and is customisable across 38 different criteria.

Meanwhile, Fitwel has launched a Viral Response Module as of the end of August, as an addition to its standard building certification. It provides annual, third-party certification of policies and practices, informed by the latest public health research on mitigating the spread of contagious diseases and incorporates turnkey policies that can be adapted to specific requirements. There are five chapters involved: leveraging buildings to migrate viral transmission; building trust in the workplace; addressing mental health within residential settings; optimising density for people; and addressing health disparities in the built environment.

While developers and tenants are reviewing their space requirements and looking to adapt their office space for flexible and remote working, the reality is that the need for connectivity and collaboration will ensure that the office market remains somewhat resilient during these uncertain times.

GLOBAL INSIGHT

The importance of institutional investment in real estate

Institutional capital has become a significant component of both global and local markets. Its growth here in Ireland has been driven by a range of factors, and going forward, it is imperative that Government policy facilitates the positive impact that institutional investors are having.

Stephen Ashe,
Director

Institutional capital has become a significant component of both global and local markets. Thankfully Ireland has moved from a speculative, debt-based funding model to the current model, enabled by long-term institutional capital. These investors are vital to the delivery of the much-needed critical infrastructure within Ireland, and play a major part in the delivery of the required housing supply. Irish Institutional Property (IIP), launched last year, is the voice of the sub-sector seeking to increase the understanding of the positive role and impact of institutional capital in enabling economic growth and development. Critical in sustaining institutional investment is the need for public policy predictability and stability, as planning and investment decisions are based on a long-term view for such investors.

The mission statement of IIP

The mission statement of IIP is "to promote the development of a sustainable world-class real estate sector in Ireland, which benefits members, the economy, communities and wider society". This will be achieved by focusing on the following key objectives:

- Foster proactive and open communication between members and with all key stakeholders on matters of common interest
- Leverage member insight to provide thought leadership which supports the development of a sustainable property sector
- Constructively engage with government, legislators, policymakers and other relevant stakeholders to maintain a stable and properly functioning property market
- Position Ireland as a preferred location for institutional capital investment, supporting economic growth and the development of sustainable communities and workplaces.
- Support the modernisation and professionalisation of the sector by continuously improving the quality of the built environment.

National Planning Framework

The Department of Housing, Planning and Local Government has prepared and published the finalised National Planning Framework under Project Ireland 2040. It will guide strategic planning and development for the country over the next 20+ years, so that as the population grows, the growth is sustainable (in economic, social and environmental terms).

The plan's objectives are to sustain growth, including the promotion of compact growth in Irish cities to avoid urban sprawl, as well as goals for sustainable mobility and regional accessibility. Key aspects include:

- Population growth of over one million through 2040
- 550,000 new houses to house the growing population
- 660,000 new jobs to employ the population
- 22 new road projects, in addition to 23 road projects currently in planning, design and construction

In order to pay for this, significant public capital expenditure is required with €116bn earmarked for investment through to 2040. We note that the IIP estimates that private sector investment will need to be multiples of this (projected to be circa. €322bn) to provide the housing, office space, retail space and other amenities required. As such, it is vital to the future of our economy.

Key issue – viability of residential development

As noted above, institutional investors are playing a significant role in the delivery of much-needed housing supply, in particular within the rental market. It is a driving force behind the increase in the number of apartment units in planning and granted permission in Dublin. The recent change in planning regulations relating to build-to-rent (BTR) in Ireland has improved the viability. However, the viability of build-to-sell (BTS) is still under pressure, in particular for apartment development. Key reasons for this include:

- Land supply and cost
- Cost of finance
- Delays to planning and infrastructure delivery
- Government taxes and levies on new construction
- Overall increases in construction costs

The above, together with Central Bank borrowing limits and deposit requirements, means that actual sales at viable prices are very slow. All stakeholders must come together and focus on solving this problem.

It should be noted that the existence of institutional investors who are acquiring large blocks is facilitating the supply of apartments that may otherwise have been unviable to build. This is due to the fact that institutional investors can source finance at low rates, and also take a long-term view. The BTR model is a yield model, and is not reliant on sales to make it work.

Building at height and increasing density in key urban areas

Ireland is redefining the profile of its cities upwards, building and planning a new generation of taller buildings. This is necessary, against a backdrop of growing urban populations, increased traffic congestion and a shortage of development land.

The Department of Housing, Planning and Local Authority published its Urban Development and Building Heights Guidelines in August 2018. These guidelines "consider the role of building height as part of a broad strategy to increase housing delivery and choice, through more compact and diverse urban form, to assist in counteracting sprawl and promoting enhanced sustainability in meeting strategic development needs".

In our 'Building Taller in Ireland' report, published in October 2019, Linesight outlined some of the planning policy problems encountered with tall buildings and the inflexibilities around same. Difficulties are also being encountered with local authorities providing appropriate zoning and planning along key transport hubs, such as the LUAS.

Increased height and density in key hubs has many advantages, including:

- Helps alleviate growing congestion problems
- Restricts inefficient outward sprawl
- Provides more space for people to live near where they work or on an efficient transport link
- Provides a greater return on investment in public transport
- Enhances work-life balance
- Attracts foreign direct investment and local investment
- Provides for more efficient use of land, which is a finite resource

Off-site manufacturing

Institutional investors generally have both the funding models in place and the development pipeline to address the requirements of off-site manufacturing (OSM). Pre-COVID, they were focused on this and will be even more so post-COVID. OSM is a more efficient form of construction than traditional build, benefiting from digitisation and leveraging available technologies to streamline the design and construction process.

Key benefits of OSM include:

- Build time on-site is fast (circa. 60% quicker than traditional construction)
- Speed to site of a finished product, as modules are complete internally when delivered
- Pushes the client and design team to design the full project in advance of commencement in the factory, thereby reducing overall design development risk
- Construction works are undertaken in a controlled factory environment, with improved working conditions and efficiency, health and safety, and quality standards
- The labour force on-site is significantly reduced, requiring a small, experienced crew to locate the modules, and a similarly small fit-out crew following on to connect services

At Linesight, we feel it is imperative that large developers embrace OSM.

Summary

In summary, and as outlined by the Department of Finance paper 'Institutional Investment in the Housing Market' in February 2019, "The growth of institutional investment is the result of a structural change in the market. The change has come from a combination of post-crisis capacity constraints in the financial and construction sectors; long-term societal

changes such as increasing urbanisation and changing tenure profile; and the desire to avoid previous mistakes by improving spatial and urban planning".

Looking forward, it is imperative that Government policy facilitates the positive impact institutional investors have in Ireland.

GLOBAL INSIGHT

Managing bioreactor lead times for success in biologics

Because of their long lead times, bioreactors can greatly influence a biotech project's critical path and affect the overall project timeline. Linesight has conducted in-depth market research to better understand the current conditions, drivers and future trends of the bioreactor industry.

Jeff Peragallo,
Director and Vice President of Operations

Nigel Barnes,
Director of Life Sciences

Ronak Shah,
Scheduling and Project Controls Graduate

With the global healthcare spend continuing to increase dramatically and projected to reach in excess of US$10 trillion by 2022, pharmaceutical companies are making significant investments in the research, development, and manufacturing of biologics, which are drugs that are derived in living organisms. Biologics projects consist of many elements, including the overall design, construction, and start-up of the entire facility, but one of the most important pieces of equipment involved in the manufacturing process is the bioreactor. Because of their long lead times, these reactors can greatly influence a biotech project's critical path and affect the overall project timeline. By focusing early on a bioreactor's design and development, clients can control one key aspect in ensuring the successful and timely delivery of biologics projects.

Key considerations

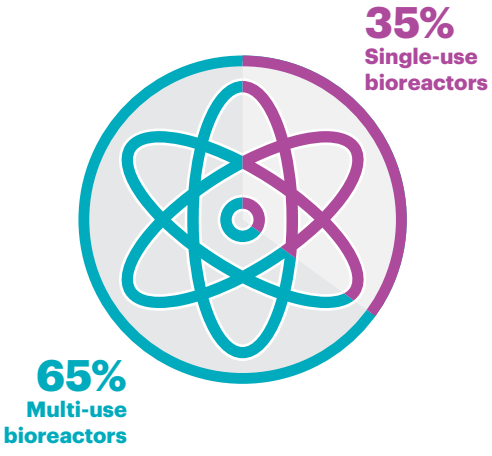
- Preparing for a project's success begins with understanding critical equipment lead times
- Bioreactors are major components in biologics facilities
- Developed by rigorously distilling project and market data, Linesight's diagnostic reveals vital insight into the impact of bioreactor lead times on the overall project timeline.

Investments in biologics are 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. Spending on new cancer drugs alone is expected to grow by more than 50% over the next few years, with particular focus on the production of biologics. These biologics have revolutionised the treatment of many cancers and chronic conditions, such as multiple sclerosis, arthritis and rheumatoid arthritis, Crohn's disease and other autoimmune diseases.

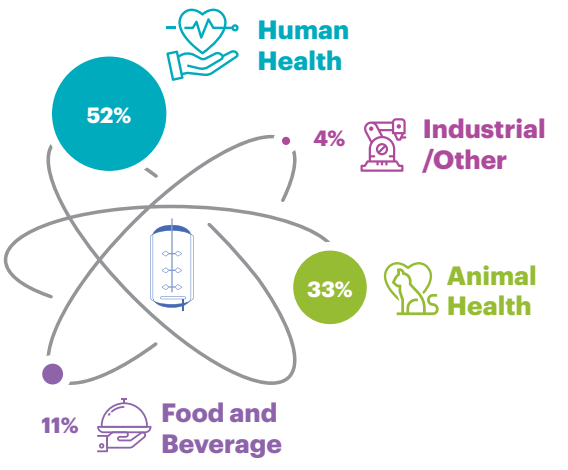
Additionally, established life science companies are upgrading their existing facilities to keep track with the latest regulations and technology. Start-ups are also joining the fray, as funding has become available based on the anticipated high return-on-investments. Thus, biologics manufacturing is expected to skyrocket over the coming years.

The manufacturing of biologics relies heavily on the use of bioreactors. A bioreactor is simply a vessel in which a chemical process, usually involving organisms or biochemically active substances derived from such organisms, is carried out. There are two types of reactors: multi-use and single-use.

TYPES OF BIOREACTORS BEING BOUGHT



WHO IS BUYING?



A single-use bioreactor, or disposable bioreactor, is a bioreactor that is lined with a disposable bag. A multi-use reactor is a vessel made typically of stainless steel or glass. With the full-on press of the pharma industry into biotech, the bioreactor market is red hot.

As such, with any significant investment, understanding the critical equipment and the lead times help our clients to better plan and prepare their projects for success. Our clients depend on us, as the market intelligence leader, to bring this insight to their projects.

To this end, Linesight created a diagnostic that was based on real-time data that was gathered through a survey administered to a cross-section of bioreactor manufacturers located across the globe. The respondents were business owners, operations managers, and sales managers with current project experience. The objective of the survey was to understand the current conditions, drivers, and future trends of the bioreactor industry.

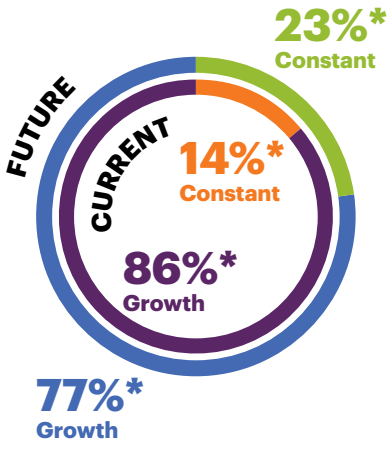
Insights and market forecast

Historically, the US and Europe have been the major consumers of bioreactors and continue to be in a strong position with robust demand. The US biologics market could, however, face possible threats to its vitality, depending on the US Presidential election and any incoming changes to policies regarding healthcare and drug pricing. The market in Asia, on the other hand, is having a major effect on the purchasing of bioreactors and is expected to see growth, with many of the bioreactor suppliers moving to the region to meet the demand. 80% of the reactor suppliers see the market increasing in activity, thus adding more pressure to lead times. The factors that are driving biologics are not expected to change if a global recession were to occur.

Conclusion

With their long lead times, bioreactors are driving the critical path of biotech projects. Though lead times are primarily influenced by reactor size and the manufacturers' supply chain, there are specific actions that clients can take to help minimise

MARKET CONDITIONS



* % of respondents

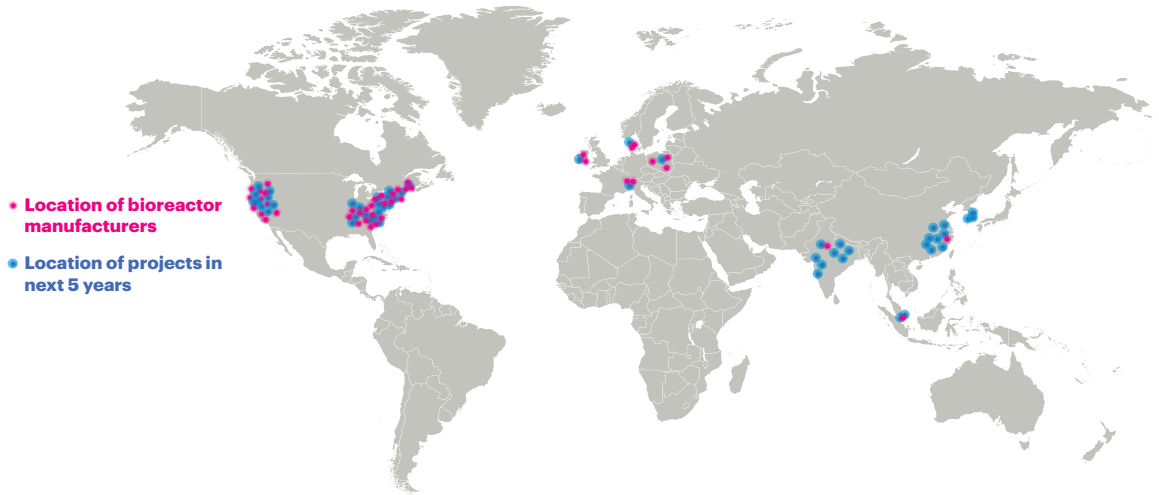
IMPACT TO MARKETPLACE IF GLOBAL RECESSION OCCURS

* % of respondents

delays by **locking in their process design early**, providing **focused show drawing reviews** and **streamlining approvals**. Linesight has seen success with clients that have a strategic focus on sourcing. These sophisticated clients have engaged Linesight to bring industry and marketplace expertise to help implement and execute sourcing strategies that are aimed to deliver value across their programme of work. These clients have successfully leveraged their buying power and have strategically aligned with some of these reactor manufacturers to improve costs and lead times. The work does not stop at the sourcing stage; order management is equally important, where focus must be on maintaining regular contact with the manufacturer and visiting the fabrication facilities to ensure processes are on track. Understanding bioreactor lead times and working with construction consultancies that have experience in reducing delays on this critical equipment are proactive steps to ensuring overall success on biotech projects.

Please note that this study was conducted pre-COVID, so bear in mind that supply chains are disrupted and as a result, lead times may vary at this juncture.

WHERE THEY ARE VS WHERE THEY ARE NEEDED



GLOBAL INSIGHT

The true adoption of BIM - adding tangible project value?

Despite improved quality of information, as well as more accurate and speedier cashflow analyses being obvious advantages in the built environment, these benefits of BIM are often not realised to their full potential, due to implementation or adoption issues.

Diarmaid Connolly,
Associate Director

It is fair to say that BIM has been a topic of great interest within the construction industry over the last number of years, hailed as one of the core ways that we as an industry are embracing technological evolution, tackling inefficiencies, improving information quality and increasing design team collaboration. It is true that it offers a number of distinct advantages, and yet, as noted by John Hainsworth of Aurecon in his article, 'The promise of 'digital' won't be achieved by doing things the way we've always done things', with an array of definitions and a lack of clarity surrounding BIM, its full benefits are yet to be realised. John points to the fact that its implementation is often carried out in a file-based, transactional manner, with a truly collaborative approach absent and ways of working essentially the same as they have been traditionally – just using the technology to do the same things and missing out on the potential benefits.

At Linesight, the lack of willingness to fully adopt is something that we see on a global basis, although the extent does vary somewhat from region to region. We have adopted BIM on a global basis and invested heavily in its implementation, both in hardware and software, and in continuous staff training, to ensure that we are up to date with the latest developments and at the forefront in terms of its effective utilisation. Below is a summary of the key benefits that we see in the effectual use of BIM.

Speed and agility

The pace at which estimations can be produced increases considerably with the use of BIM, and this is one of the key advantages of its effective implementation. It enables the creation of option costs with greater speed, as well as the potential for live cost planning and modelling – introducing a level of agility with cost planning and estimating that has not traditionally been possible. Ultimately, this leads to faster decision-making and thus, a faster speed to market.

Accuracy and quality

Information accuracy and quality has been a particular challenge for the industry in recent years, with the UK's 'Get It Right' initiative finding that information errors cost the industry an estimated 5% of project value globally. In addition to the abovementioned speed and agility benefits, effective BIM implementation increases the accuracy with which cost estimating, planning and modelling can be carried out, by minimising the risk of human error, as well as supporting a higher quality of information. This in turn leads to a more cooperative project, as tenderers are much less likely to recover costs incurred due to poor or inconsistent information.

Increased productivity

While increased collaboration is often touted as a key benefit associated with BIM, this is not something that comes to fruition as often as one may think. The technology facilitates clarity, transparency and real-time sharing of information across the project team, coordinating information from various disciplines and eliminating version control issues, as well as keeping the lines of communication open. However, a proactive approach is needed across the team to actually realise these benefits, which is quite often lacking.

Cashflow

Managing and forecasting cashflow throughout a project is fundamental to its success, and traditionally, cashflow analysis is a lengthy and tedious process. From Linesight's perspective, this is one of the biggest advantages associated with BIM – its effective adoption facilitates more accurate speed forecasting by linking cost-loaded models and programmes, with more detailed models producing more accurate cashflow analyses. Ultimately, our early involvement in a project means that cashflow investment can often be deferred, which is particularly beneficial for projects with a large capital spend.

Cost intelligence

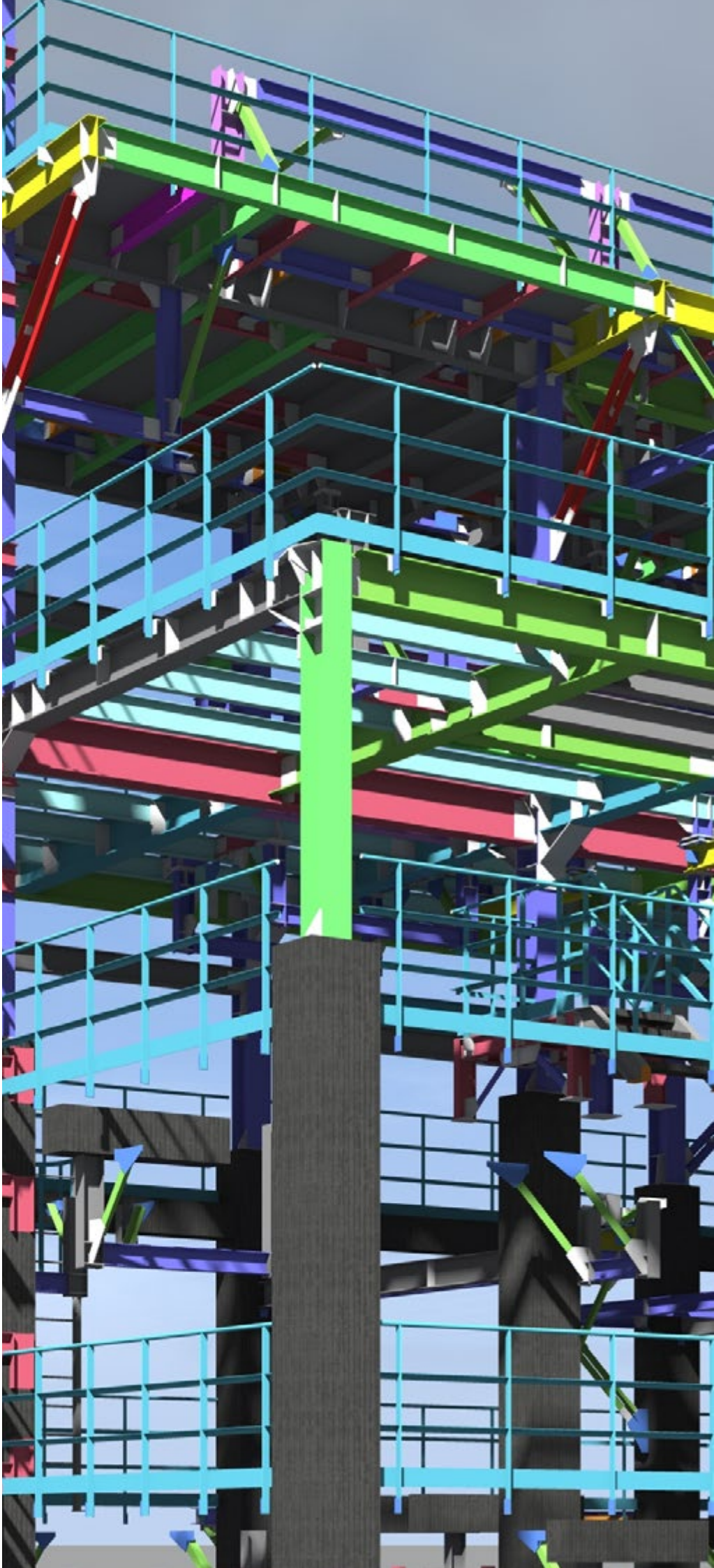
While benchmarking is not a new methodology, BIM facilitates it at a more accurate level as costs are broken down in more detail in the models, so by splitting the model, it allows us to benchmark

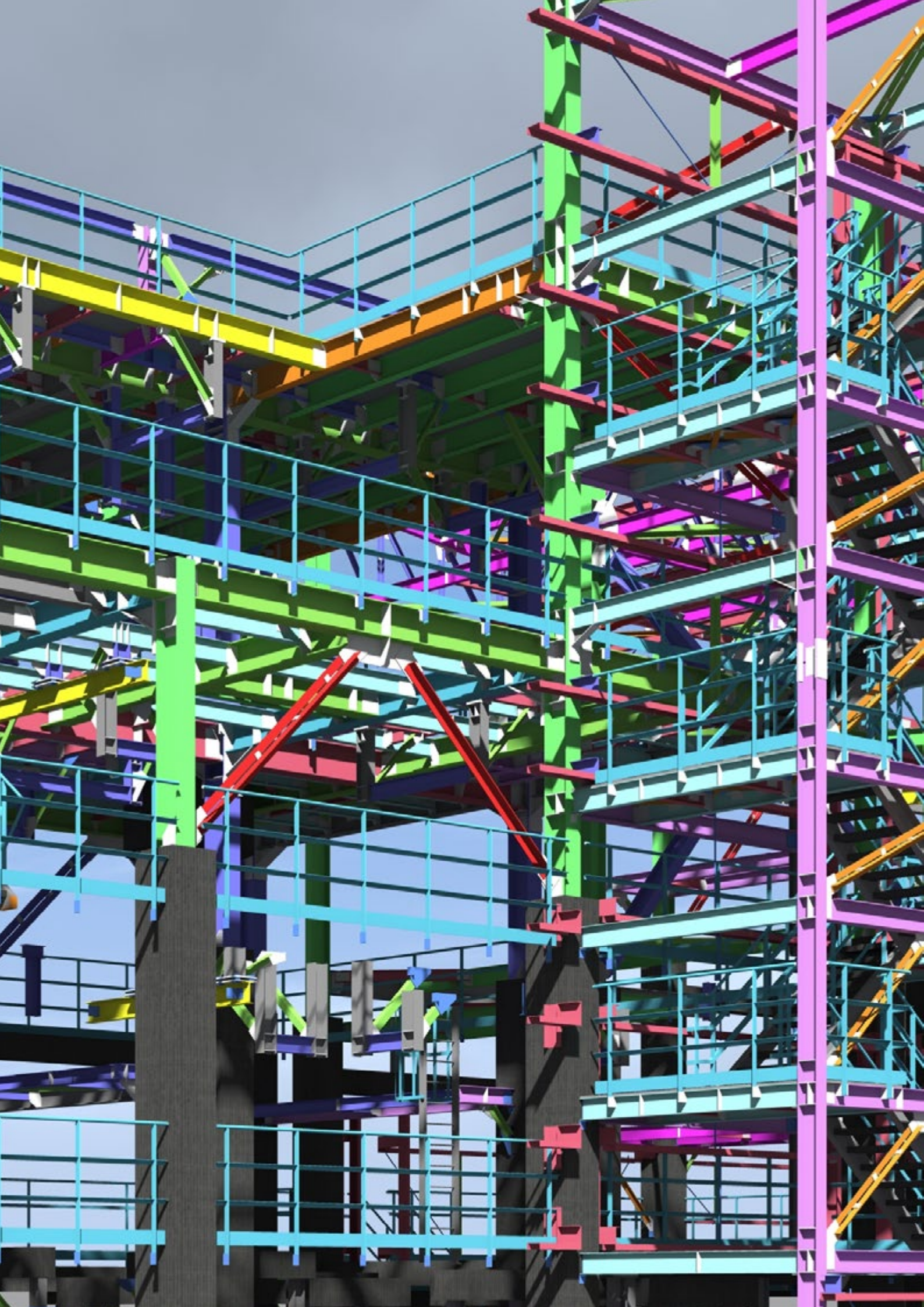
specifics. However, by using BIM to its full potential, it pushes this further, to what we refer to as cost intelligence. With a deluge of complex data associated with projects nowadays, utilising the latest data visualisation tools brings this data to life in a meaningful way – illustrating trends and concepts in a quick and easy-to-digest format, allowing project teams and clients to draw conclusions from large volumes of data and inform effective decision-making.

In summary

While the benefits of BIM are often well-covered, these are not often realised to their full potential due to implementation or adoption issues. Ultimately, the technology is there, but not the willingness to take the leap of faith to truly adopt and trust the use of BIM. At Linesight, we believe that clients and design teams should consider this sooner rather than later, as the rewards are rich. We've made the jump and seen significant benefits in the built environment for our clients – are you ready for the leap?

Information errors
cost the industry an estimated
5% of project value globally.





GLOBAL INSIGHT

PBSA - an updated cost analysis

Since the 2018 Linesight report on purpose-built student accommodation, the sub-sector has continued to evolve, as the pipeline remains strong in response to significant demand.

Eoghan Tangney,
Associate Director

In our 2018 Linesight report on purpose-built student accommodation, we carried out an in-depth analysis into the sub-sector across a range of different areas, from macroeconomics to planning. Since then, PBSA has continued to evolve in Ireland, as the pipeline remains strong in response to significant demand. In this article, we provide an updated cost analysis for the six distinct headings under which PBSA direct construction costs can be broadly categorised. The cost range highlighted in brackets in each section is expressed over the total building area (basement as applicable, superstructure including circulation areas).

Preliminaries

The cost of preliminaries is closely linked to the complexity, challenges and risks presented by particular projects. These can range from a low of 11% (of the construction costs) to a high (albeit less common) of 20%. As the industry has recovered, and as the volume of work has increased, contractors are looking in much more detail at the costs and risks associated with undertaking more complex and challenging projects. The effect of this has been a significant increase in the tender price included for project preliminaries, and even more so when looking at tight brownfield city centre sites. The impact of this increase is by no means insignificant, and can amount to anywhere between 11-16% for PBSA projects, dependent on the scale and complexity of the project and site selection (range €280 to €390+/sq.m.).

Site clearance

The cost of site clearance will vary greatly depending on site location – greenfield or urban renewal. There may be existing buildings to be demolished, or asbestos and ground contamination to be addressed etc. (range €45 to €65+/sq.m.).

Basement costs (where relevant)

Basement costs typically pertain to urban PBSA sites, where due to limited site area and building height restrictions, there is a requirement to maximise site utilisation with the construction of basement space for plantrooms and storage areas (e.g. bicycle storage) (range €300 to €500/sq.m.).

Basic building costs

Basic building costs excluding fixed and loose furniture vary enormously depending on the choices of façade treatment, core density, quality of finishes selected, choice of mechanical and electrical systems, and module size.

Abnormal costs, such as transfer structures relating to ground floor retail or upper floor area set-backs, contribute to this cost range (range €2,180 to €2,475/sq.m.).

Furniture, fixtures and equipment

Loose and fitted furniture fixtures and equipment costs can vary significantly, depending on the extent of common area fit-out, including gymnasiums, cinema rooms, group study areas, etc. (range €130 to €175/sq.m.).

Site works and landscaping

The range of site works and landscaping costs vary significantly depending on the extent of the site area that forms part of the development, for example, landscaping, surface car parking, boundary treatment, surface water attenuation etc. (range €65 to €95/sq.m.).

Summary of costs

PBSA is often expressed on a cost-per-bed-space basis; however, the primary driver of cost in any building is its size (gross floor area). Expressing PBSA costs by bed space can be misleading, as the bed space area varies significantly from one scheme to another, depending on density, bedroom arrangement (cluster size, hall of residences, studios), bedroom size (single-study bed space is 12 to 13sq.m. typically, including en suite) circulation efficiencies, social/reception area, retail and basement.

The table on the following page gives an indicative construction cost range for the development of PBSA, and is based on recently completed and live projects in the Dublin, Cork and Galway areas.

Aungier Street Student Accommodation, Dublin

Architect:
Stephen Marshall Architects
Linesight services:
Cost Management

Table 1 - Cost range for the development of PBSA

Ref	Project elements	Low range /sq.m.	High range /sq.m.
1	Preliminaries	€280	€390
2	Site clearance and preparation	€45	€65
3	Basic building cost	€2,180	€2,475
4	Furniture, fixtures and equipment	€130	€175
5	Site works	€65	€95
	Estimated total cost (excl. basement)	**€2,700**	**€3,200**

Notes: *The costs above exclude for works associated with basement construction and are based on a gross bed space area of 30sq.m. Should a basement be required this could mean an uplift of between €300 and €500 per sq.m.*

Table 2 – Spread of costs for PBSA projects

Cost range per room	Number of live Linesight projects	Number of rooms
€80,000 - €85,000	3	1,660
€85,000-€95,000	6	2,009
€95,000-€105,000	3	1,601
In excess of €105,000	3	567

Notes: *The above projects represent 5,837 PBSA rooms on which Linesight is working. With due regard to the wide-ranging variables, the above range would be from circa €81,000 to €96,000+.*

GLOBAL INSIGHT

Building taller in Ireland - a benchmarking exercise

Following on from the Linesight 'Building Taller' report, released in October 2019, we include an extract of the report, covering the benchmarking exercise that we conducted in order to provide a meaningful cost analysis.

John Finnegan,
Associate

As part of the Linesight 'Building Taller' report, released in October 2019, we conducted a benchmarking exercise in order to provide a meaningful cost analysis.

The benchmarking exercise was based on relevant data taken from a sample of 500,000sq.m. of commercial project experience, and 15,000 residential units on which Linesight is currently providing cost consultancy services.

This benchmarking information is used to present cost comparisons across a number of buildings, where Linesight has provided cost consultancy under their separate distinct use, between commercial and residential. We would note that the results of the benchmarking exercise demonstrate that differences unique to each project exist, and there is variety in terms of shape, size and design.

However, where similarities in terms of design are identified, the results of the benchmarking pinpoint the changes in the elemental costs that are commonplace to the project. This is demonstrated in the following charts.

Figure 3 compares the elemental shell and core, and CAT A costs over a number of commercial buildings that were benchmarked. The graphs track the buildings in their varying heights, from low-rise to taller buildings, and validate the introduction of new elemental costs (sprinkler) and the increase in the predominant elements (structure, façade, etc.) as the building height increases. The percentage increment in costs is also displayed at the top of each bar to provide clarity as to the overall cost increase.

Figure 1: Linesight commercial experience used for benchmark

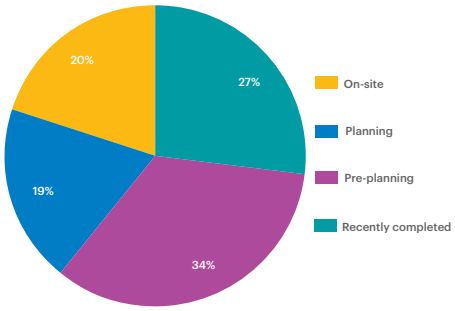


Figure 2: Linesight residential experience used for benchmark

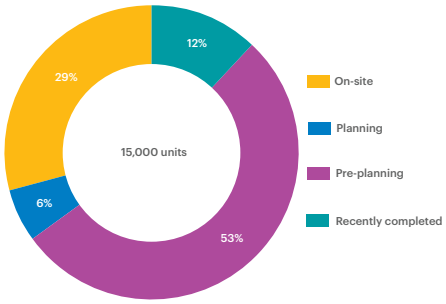
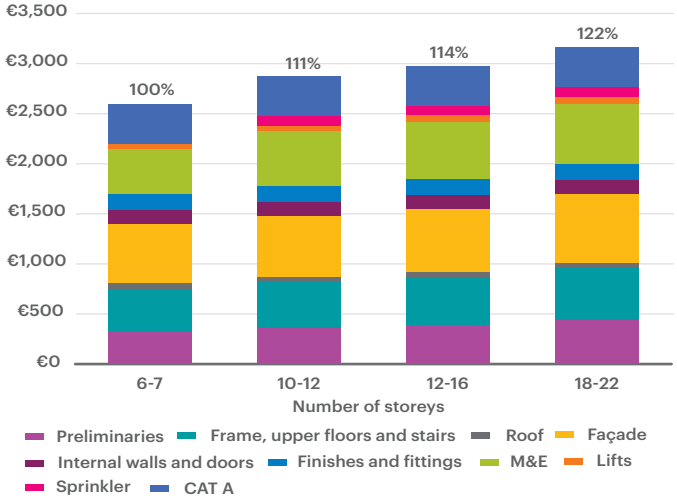


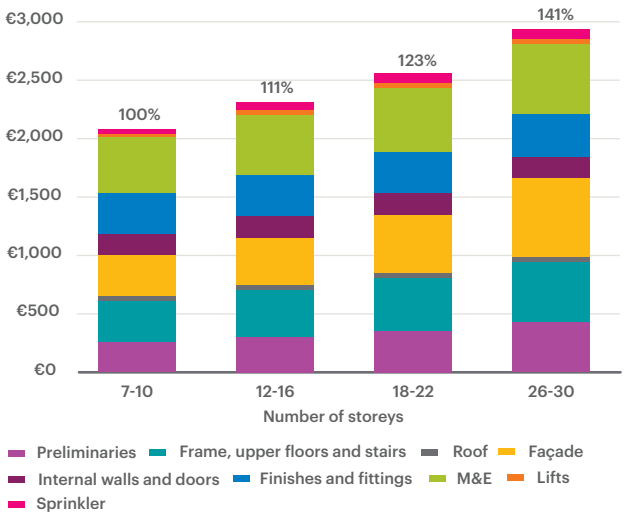
Figure 3: Commercial shell and core, and elemental CAT A benchmarking



Notes: *Substructure and basement construction costs are excluded from the above. External and site works are excluded for comparison purposes. Excludes shell and core enhancements such as twin-skin façades, interconnecting stairs, feature atria, etc.*

Exclusions*: Inflation, contingency, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, any costs associated with ground conditions below ground, archaeology, marketing, works outside boundary of site. The above assumes a wall-to-floor ratio of 0.64 and net-to-gross varying from 83-75% (low to high-rise).*

Figure 4: Residential elemental shell and core benchmarking



Notes: *Substructure and basement construction costs are excluded from the above. External and site works are excluded for comparison purposes. Loose fixtures, fittings and equipment are excluded from the above costs. Excludes shell and core enhancements such as twin skin façades, interconnecting stairs, feature atria, etc.*

Exclusions*: Inflation, contingency, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, any costs associated with ground conditions below ground, archaeology, marketing, works outside boundary of site. The above assumes a wall-to-floor ratio of 0.50 - 0.70.*

As per the commercial graph in Figure 3, Figure 4 tracks the buildings in their varying heights from low-rise to taller residential buildings, with the percentage increment in costs to provide clarity as to the overall cost increase.

Understanding cost drivers

To further determine the rise in costs due to the increase in the height of buildings, the following considerations, in addition to the waterfall charts on the following page, outline the point at which costs and design change as we start developing from a low-rise building into a taller structure. The increase in costs can be demarcated by the following:

1. Preliminaries – increase in heavier plant and equipment, working restrictions, welfare facilities distributed further up the building as work progresses, and health and safety measures
2. Structural increases – enhanced cores, to deal with structural and service requirements and occupation requirements, as well as increasing the number of fire escapes for evacuation strategies. Additional structural enhancements will be required to deal with loadings (lateral and vertical)
3. Façade – higher costs are due to increased aesthetics, less efficient wall-to-floor ratios due to slenderness, additional performance requirements, wind loadings, control of solar gain and façade maintenance measures
4. Sprinklers – the requirement for various sprinkler systems
5. Services – further cost to boost water supplies, pressurise heating and introduce interstitial plant floors
6. Balconies (residential) – expensive solutions, such as recessed balconies and winter gardens are introduced
7. Lifts – additional number of lifts, and the speed of the lifts begin to increase also

The waterfall charts on the following page for both commercial and residential developments display the demarcation in terms of the costs under the headings outlined above.

Figure 5: Indicative costs relating to commercial developments, increasing from low-rise to high-rise

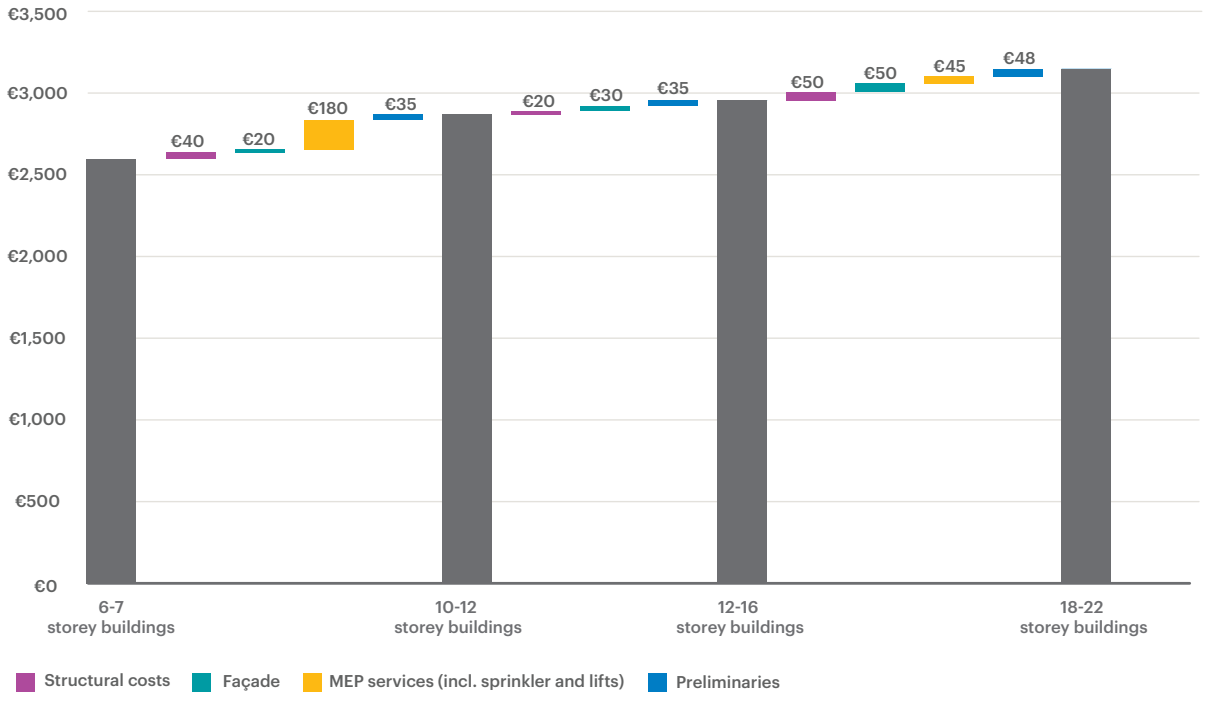
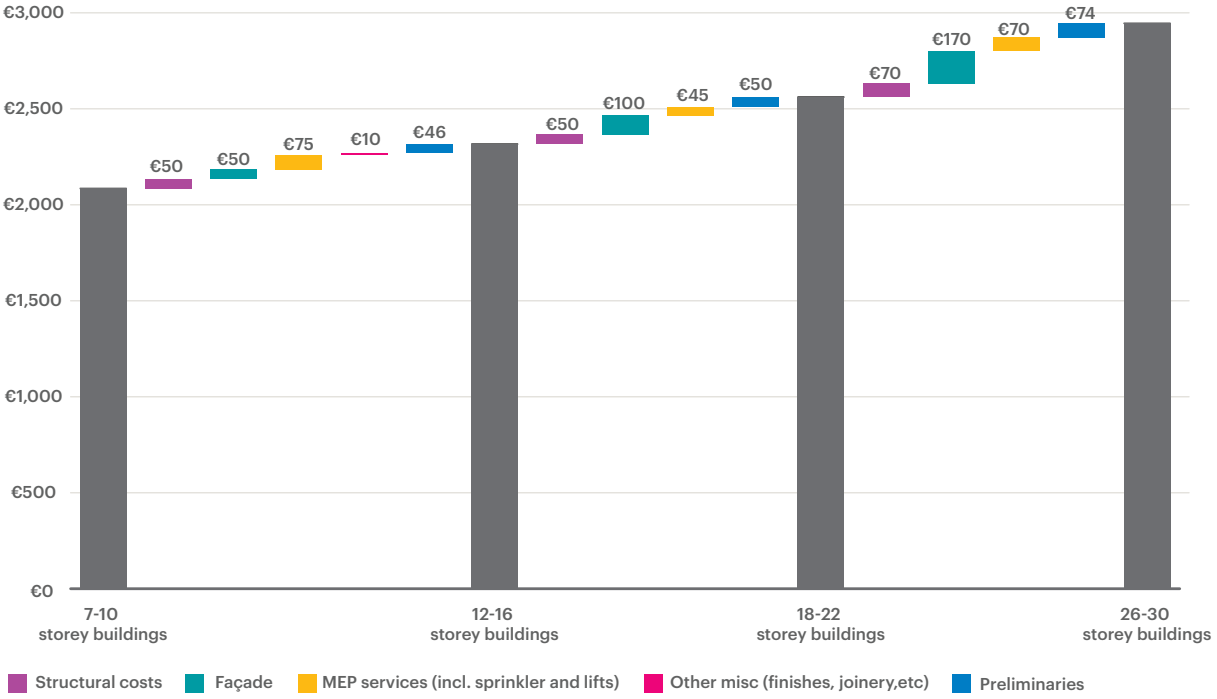


Figure 6: Indicative costs relating to residential developments, increasing from low-rise to high-rise



Notes: *Substructure and basement construction costs are excluded for comparison purposes, as are local external works and site works. Commercial costs exclude CAT B and tenant fit-out, including furniture, IT, AV equipment etc. Residential costs exclude floor finishes, as well as FF&E. General exclusions include inflation, contingency, site acquisition, finance, VAT, local authority and utilities contributions, consultant and professional fees, surveys, demolition, contaminated material disposal, abnormal ground conditions, archaeology, marketing, and work outside boundary of site. Figure 5 assumes a wall-to-floor ratio of 0.64 and net-to-gross varying from 83-75% (low to high-rise), while Figure 6 assumes a wall-to-floor ratio of 0.50-0.70.*

GLOBAL INSIGHT

Keeping it Lean and bringing contractors along for the journey

Lean concepts have been applied with much success in many industries and service provider organisations around the world. But how can it positively impact the built environment and why has its adoption amongst contractors been relatively slow to date?

Jeff Peragallo,
Director and Vice President
of Operations

Pat Unger,
Associate Director

The landscape for the construction industry has changed immeasurably in the face of the current global pandemic, similar to almost all other industries. It would seem now more than ever, that Lean principles would be beneficial to help the industry navigate into the post-COVID world. Furthermore, with the ever-growing demands and complexities associated with the built environment, and the well-publicised productivity challenge within construction (more than 70% of all construction projects are completed late and over budget), it is evident that the industry requires some level of disruption to enable it to keep apace of the progress other industries are making in terms of efficiency. So, why is Lean Construction still not fully embraced by contractors, and what do you as an end-user need to be aware of that can lead to this reticence to adopt?

What is value, and how is it driven by Lean?

Value is defined as what the customer perceives as important and is willing to pay for. It comprises anything that moves the project closer to completion and that cannot be reworked. True value is the 'why' behind a project being undertaken and the desired outcome or objectives, and this typically extends beyond budgets and schedules. Lean focuses on the prioritisation of the operational needs and values of the users, while delivering on budget and schedule, promoting innovation that optimises value and eliminates waste.

Eliminating waste and inefficiency

Construction industry studies have shown that in excess of 50% of the effort required to deliver a project is typically non-value-added effort, or waste from the perspective of the client. By focusing on non-value-added activities, processes are constantly reviewed for any waste or inefficiency, and what the client-led value objectives are, to achieve true alignment. Ultimately, it leads to productivity gains, optimal ways of working and the optimisation of project outcomes.

Nurturing a collaborative culture

Traditionally, construction is a combative industry – teams work in silos, the built environment is increasingly challenging, and as referenced above, productivity is stagnant. A combative culture will derail Lean, and will often have tangible impacts on a project, both in terms of cost and schedule. The Lean concept turns this on its head, championing collaboration, trust and open communication between all members of the project team, streamlining the efficiency of the project team and giving the highest chance of collective project success.

Streamlining the workflow and project delivery

Not only does Lean remove waste and inefficiency, while facilitating early engagement, consistent collaboration and constant communication, but these factors intuitively streamline the workflow. Furthermore, the use of methodologies, such as modular and prefabrication, support fast-tracked delivery, as well as optimising the capital spend.

Why are contractors slow to adopt Lean?

Contractors play a key role in the adoption of Lean, as they are responsible for the key facets of a project, including cost, schedule, safety and quality. And yet for the most part, general contractors have been somewhat slow to embrace it. Why is this the case?

A fundamental, organisational change

Lean is a significant change for any business, and can be perceived as a somewhat abstract methodology for those from a traditional construction background. It essentially changes the contractor's organisational approach at its core, and so it must be fully bought into and believed to be achievable to facilitate such a fundamental change.

Tight profit margins versus perceived cost

Construction contractors typically operate on a relatively tight net profit margin before tax, sitting around the 3% of revenue mark. Inevitably, the perceived costs associated with the necessary training and implementation of Lean will be a particularly important factor in this case, and may play a hand in its slow adoption as a result. Any potential adopter will need a good understanding of what level

of productivity loss they should expect during the learning and implementation phase.

An elemental approach

Lean's main allure for the construction industry comes in the use of elemental and relatively inexpensive tools, which again taps into its inherent value. Breaking activities and tools down will be cost-efficient but effective. A platform like Last Planner is an example of one of these tools.

What is the value to the contractor?

Similar to the client, Lean offers a distinct value proposition to the contractor, and again, the value relates to productivity. In an industry in which productivity is poor and wages account for a substantial proportion of total revenue, a marginal increase in productivity arising from a methodology such as Lean will have a significant impact on profit. For example, a 10% uplift in productivity in a business, with 3% average profit where wages amount to 35% of total revenue, will double the profit.

Furthermore, achieving improved productivity helps to mitigate against risk in a business that is inherently risky and competitive, and so it is hard to understand why the adoption rate is still remarkably low. However, the general consensus is that these distinct benefits have been lost in translation along the way, and that hard facts and statistics are needed to address this in terms of which contractors will be receptive.

What Lean techniques and practices are particularly relevant in a post-COVID world?

While the benefits that off-site methodologies can offer is relatively well-known, the potential for OSM to counteract some of the productivity challenges arising from COVID

measures (for example, reduced capacity on-site due to social distancing) is significant. Another system worth referencing in this regard is Last Planner, with its capabilities to produce a predictable and efficient work flow all the more pertinent with the current challenges being faced in the industry.

Conclusion

While we see Lean being readily adopted in some sectors, it is typically more widely accepted in manufacturing and industrial-type verticals. This is because the Lean concept is ingrained in their background, and as a result, it is second nature. For contractors, Lean can represent a daunting and costly investment, but it is evident that the derived benefits of adoption are worthwhile. There are many examples of contractors embracing the methodology to its full effect, and perhaps part of the solution lies in learning from peers and allies, exploring case studies of what has worked well in the adoption approach.

While overall, challenges to its widespread adoption remain, the benefits of Lean to projects and the construction industry as a whole are clear. It promotes the elimination of waste and inefficiency, nurtures a collaborative culture and streamlines the workflow and project delivery. In bringing the concept to the forefront, Lean becomes a client-led objective, with a clear statement of the intention to embrace the Lean approach to all members of the project team at an early stage. It must be implemented through a systematic, process-driven and program-based approach. Ultimately, there's a great deal to gain by innovating project delivery. The Lean methodology has a lot to offer, which begs the all-important question: where are you and your organisation on the Lean journey?

GLOBAL INSIGHT

Build-to-rent - an analysis of latest costs in the Dublin region

Since the publication of the Linesight report on the build-to-rent (BTR) sector in 2018, the sector has continued to evolve. We have updated our cost analysis to reflect current market conditions and more recent data.

Paul Brady,
Director

BTR has played a fundamental role in the residential market in Ireland in recent years, and continues to progress and demonstrate its viability as a more established sector, with investment in Dublin's BTR market expected to have reached €2bn in 2019. In our 2018 report, 'The Build-to-Rent Sector in Ireland', we explored the socioeconomic indicators that drive the sector, the town planning perspective, provided some detail on cost and the factors that affect cost, and detailed the results of our primary research exercise with key sector stakeholders.

Since then, the sector has continued to grow and establish itself as an attractive asset class. In this article, we provide an update on the cost aspect.

The data

We are currently providing cost consultancy services on over 12,000 units across 35 BTR projects in the Greater Dublin Area, on which this cost data is based. Figure 1 summarises this.

Residential average construction costs

In order to give context to the BTR sector, we have compiled data on the average construction costs for residential living projects in a range of locations and unit sizes in the Dublin Metropolitan area. The uses include build-to-sell (BTS), BTR and shared living, excluding basement parking and site works. The purpose of excluding parking and site works from the cost/sq.m. metric is that BTR projects may not require parking, and therefore should be analysed without it. Figure 2 below summarises these costs.

Figure 1: Linesight BTR data used for this exercise

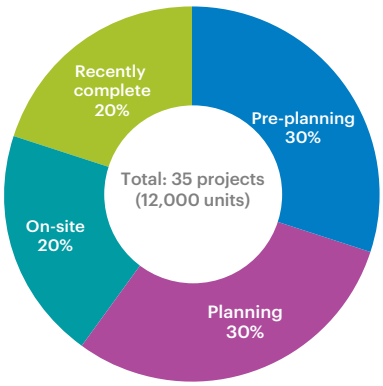
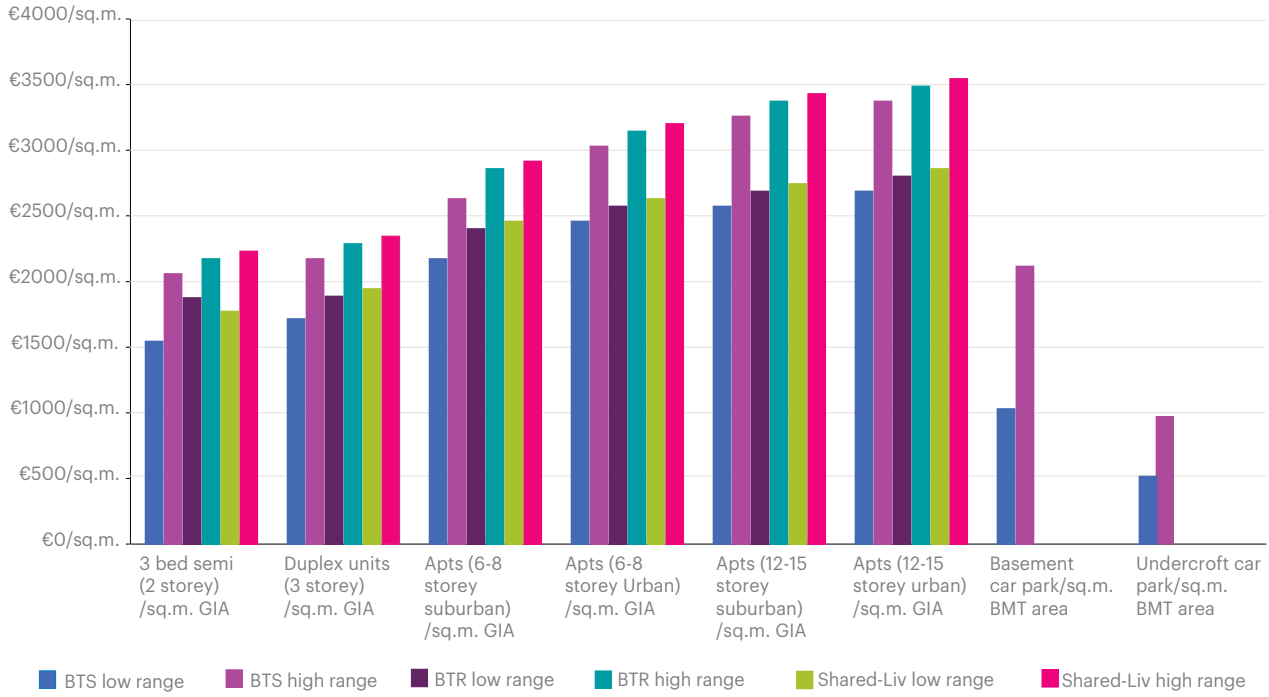


Figure 2: Residential BTS, BTR and shared living average construction costs/sq.m. GIA



Notes: *Substructure costs are included in unit costs and exclude basement construction.Local external works are included but site works (roads, paths, landscaping services, utilities) are excluded for comparison purposes. BTR costs include floor finishes and furniture, fittings and equipment. Services and amenity spaces and support facilities are included. Co-living costsinclude BTR costs plus reconfiguration to cluster format in accordance with shared accommodation design guidelines.*

Exclusions: *Inflation, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, contaminated material disposal, abnormal ground conditions, archaeology, marketing, work outside boundary of site.*

BTR average construction costs

Figure 3 and 4 reflect just the BTR sector, again accounting for a range of locations and unit sizes, excluding basement parking and site works.

Figure 3: BTR residential average construction costs

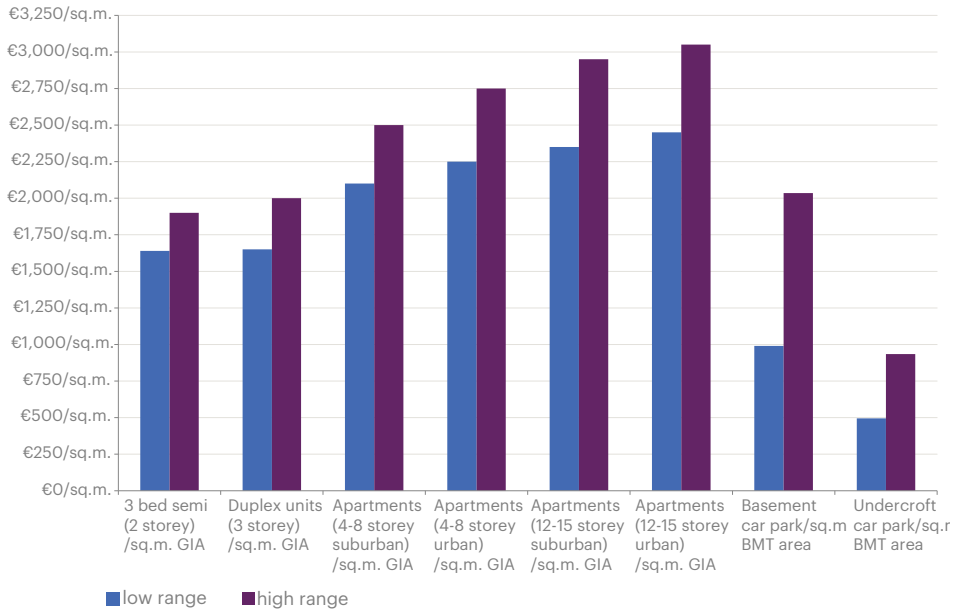


Figure 4: Average construction cost per unit

Average construction cost per unit	Studio	1B	2B	3B	Avg.
Gross internal area - sq.m. (incl. circulation and amenity)	48	60	94	117	84
Apts (4-8 storey suburban) - low range	€101,000	€127,000	€198,000	€246,000	€176,000
Apts (4-8 storey suburban) - high range	€120,000	€151,000	€236,000	€293,000	€210,000
Apts (4-8 storey urban) - low range	€108,000	€136,000	€213,000	€263,000	€189,000
Apts (4-8 storey urban) - high range	€132,000	€166,000	€260,000	€322,000	€231,000
Apts (12-15 storey suburban) - low range	€113,000	€142,000	€222,000	€275,000	€197,000
Apts (12-15 storey suburban) -high range	€142,000	€178,000	€279,000	€345,000	€248,000
Apts (12-15 storey urban) - low range	€118,000	€148,000	€231,000	€287,000	€206,000
Apts (12-15 storey urban) - high range	€147,000	€184,000	€288,000	€357,000	€256,000

Notes: *Substructure costs are included in unit costs and exclude basement construction. Local external works are included but site works (roads, paths, landscaping services, utilities) are excluded for comparison purposes. BTR costs include floor finishes and furniture, fittings and equipment. Services and amenity spaces and support facilities are included. Co-living costsinclude BTR costs plus reconfiguration to cluster format in accordance with shared accommodation design guidelines.*

Exclusions: *Inflation, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, contaminated material disposal, abnormal ground conditions, archaeology, marketing, work outside boundary of site.*

Figure 5 includes an indicative cost summary of two BTR projects and a shared-living project in both urban and suburban locations. This identifies façade and internal completions as the main drivers of cost difference between the locations.

Figure 5: BTR benchmark project costs

Project reference	BTR project A 30K sq.m. urban 6-8 storey	BTR project B 44K sq.m. suburban 6-8 storey	Shared-Living Project C 35K sq.m. urban 6-8 storey
Description	Cost/sq.m.GIA	Cost/sq.m.GIA	Cost/sq.m.GIA
Substructure	€120	€80	€130
Frame	€355	€340	€310
External façade	€550	€460	€360
Roof finishes and completions	€45	€45	€50
Internal completions	€110	€85	€230
Internal finishes	€160	€160	€170
MEP services	€500	€420	€620
Sprinkler	€80	€35	€80
Lift installations	€25	€25	€30
Built in fittings	€100	€95	€140
External works	€55	€60	€60
Preliminaries	€290	€255	€305
Total construction	**€2,390**	**€2,060**	**€2,485**
FF&E	**€95**	**€95**	**€105**
Total incl. FF&E	**€2,485**	**€2,155**	**€2,590**

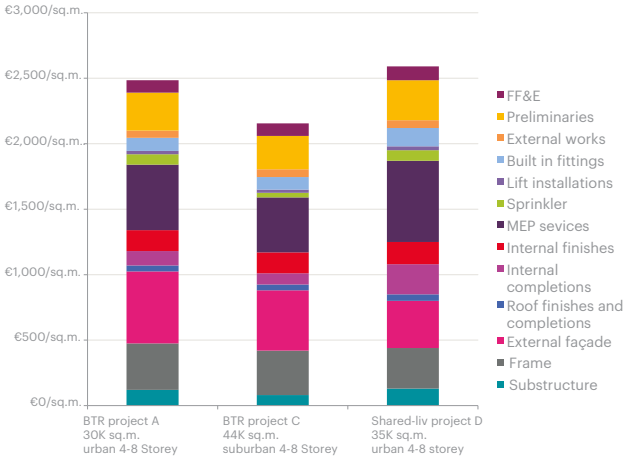


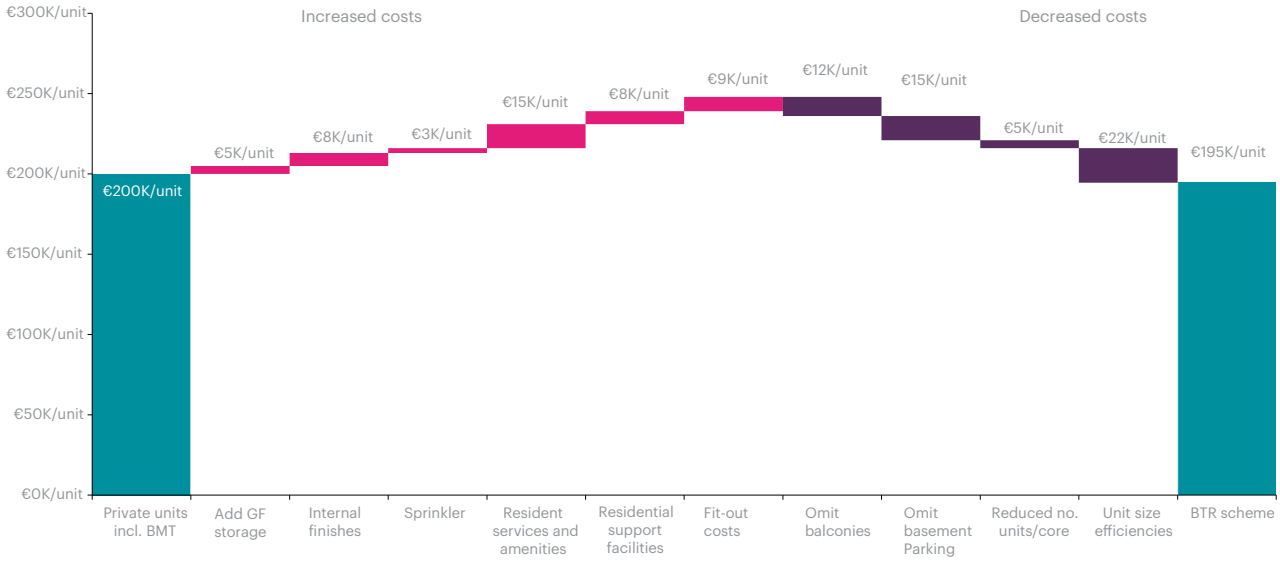
Figure 6 is an indicative analysis of BTR project costs, compared to private residential projects on a cost per square metre basis.
The analysis incorporates potential increased costs associated with specific BTR projects, whilst also including opportunities to decrease costs for elements that are required only for private residential.

The graph demonstrates that reduced requirements offer opportunities to mitigate the additional costs associated with the BTR Design Guidelines.

From a cost perspective, Linesight's experience identifies that BTR units can be constructed at a comparable cost to BTS units.

However, the cost of adding flexibility for future conversion of BTR apartments to BTS will result in a premium cost.

Figure 6: Waterfall graph of private residential costs to BTR



Key BTR considerations

- Successful BTR schemes are designed and built with the tenant in mind, as well as focusing on scale development and institutional owners
- Alternative design and construction methods require consideration, to alleviate the impact of the shortage of skilled trades and improve fast-tracked delivery
- Quality must be maintained within the constraints of a tight budget and strict programme deadlines
- The recent apartment design guideline amendments have improved the viability of BTR
- In particular, the removal of restrictions on unit mix and the relaxation of parking requirements (subject to conditions) is significant
- Exit strategy should be carefully considered
- BTR developments designed under the Design Guidelines must be held under the ownership and operation of the entity for not less than 15 years, with no individual units being sold or rented separately by legal agreement
- Compliance with planning guidelines to avoid delays in planning permissions is crucial
- A number of key design considerations should be accounted for, with emphasis on design layouts, efficiency, unit mix, amenity space and resident support services, and parking, amongst other factors that are outlined above
- Commercial tender prices rose by approximately 6.5% on average during 2019, with Linesight predicting that they will rise by 5-6% in 2020
- Residential tender price rises are at a lower level than commercial (circa. 4% to 5%) – attributable to residential projects being less reliant on the specialist packages associated with commercial projects (i.e. M&E, facades etc.) and the potential to utilise a different pool of contractors.

Operator-led key design considerations

- Engineered timber floor finishes to living rooms and carpet to bedrooms
- Robust kitchen unit design and materials with integrated class A+ appliances
- Robust white bathroom suites with shower tray or bath with clear glass screens
- Tiling to selected walls and selected heights
- Keyless door entry access control systems
- Video access control
- Integrated WiFi systems,
- Smart metering of power and heating use linked to BMS
- Roof activation
- Potential for 14 units per core
- Juliet balconies to north facing units in lieu of inset or projecting balconies
- Stacking of risers with access doors from corridors
- Amenity hubs - economic design amenity space with basic finishes and mechanical assisted ventilation to allow for increased occupancy, including resident lounges, entertainment suites and dry gyms
- Dedicated concierge facilities, including parcel collection areas, kitchenette, w/c, laundry facilities with tiled floor and wall finishes to 1100mm high
- Effective waste management systems at convenient locations

GLOBAL INSIGHT

The true cost of NZEB in practice

With NZEB now in practice, we are seeing the true cost and impact of it manifesting itself on Grade A commercial space and large-scale residential apartments. But in addition to the increased construction costs, we are also seeing the positive implications it is having for the developer.

Stephen O'Grady,
Senior M&E Surveyor

The background to NZEB

The EU Energy Performance of Buildings Directive which affirmed that all new building constructed in member states will be near zero energy buildings (NZEB) by December 31, 2020, and all new buildings owned and occupied by public authorities must be NZEB-compliant after December 31, 2018 has now been incorporated into Part L Building Regulations.

The key parameters for measuring NZEB compliance are the maximum permitted energy performance coefficient (MPEPC), renewable energy ratio (RER) and maximum carbon performance coefficient (MPCPC). Each method within the NEAP framework will calculate the EPC and CPC of the building being assessed, and clearly indicate whether compliance with regulations has been achieved:

- Where the MPEPC of 1.0 and MPCPC of 1.15 is achieved, an RER of 0.2 or 20% represents a very significant level of energy provision from renewable energy technologies
- Where the MPEPC of 0.9 and MPCPC of 1.04 is achieved, an RER of 0.1 or 10% represents a very significant level of energy provision from renewable energy technologies

Meeting NZEB

Commercial schemes

Since the revised Part L regulations have been introduced, Linesight has been involved in numerous commercial and residential projects, and the uplift to M&E installations is circa. 7-10% when benchmarked against historical projects. Ultimately, these new regulations are adding capital costs to developers.

In commercial office buildings in Ireland, there are numerous items to be undertaken to ensure compliance is achieved:

- Use of renewable sources – photovoltaics (PVs), air source heat pumps (ASHP) etc.
- Fabric insulation and reducing thermal bridging
- Enhanced building controls
- Limiting air infiltration
- Enhanced commissioning
- Specific fan power reduced for various systems

At Linesight, we are seeing the above having impacts across the mechanical installation in a standard four-pipe FCU CAT A development, and these include the following:

- Upsizing of FCUs to enable lower temperatures from ASHP
- Upsizing of pipework to enable lower temperatures
- Costs associated with specific fan power across all plant items
- Ductwork leakage testing mandatory on high-pressure ductwork
- Increase in costs of BMS to cater for additional building controls
- Increase in commissioning requirements to meet minimum standards

In most commercial office projects in city centre locations, it may be difficult to meet the RER 0.2 by changes to the above systems due to site constraints, so it is also advised to make the façade as efficient as possible, as this reduces the energy loss of the building. There is no one way to gain compliance with regulations, however. Whichever approach is taken, the M&E systems are affected and generally, when our benchmarks are looked at, the M&E element is increasing in cost by circa. 7-10%, as referenced earlier.

Residential projects:

Linesight is also involved in numerous large-scale apartment schemes, whereby various technologies are being used in order to meet the new NZEB requirements.

Where a building contains more than one dwelling, like a block of apartments, it has to be shown that every individual dwelling has an EPC and CPC no greater than the MEEPC and MPCPC respectively. Alternatively, it must be shown that the average EPC and CPC for all dwellings in the building is no greater than the MPEPC and MPCPC respectively.

The Part L regulation standards must be achieved for both apartment and landlord areas. The key client decision to make is the mechanical system to be installed, which can be summarised as follows:

1. EAHP (exhaust air heat pump) in each apartment for water heating, MVHR unit for

ventilation requirements, electric heaters for space heating, PV required on roof
2. EAHP for space, water heating and ventilation requirements, minimal PV panels required
3. District heating (ASHP) to HIU in each apartment for space and water heating, MVHR unit in each apartment, PV required on roof

Currently in the Irish market, the most common solution is the EAHP as a one-stop solution in each apartment for space, water heating and ventilation requirements. However, the most cost-effective solution to meet NZEB requirements is option 1 above, utilising electrical heaters, around which there remains a stigma, meaning that developers and agents are slow to commit to them.

Conclusion

In summary, the new NZEB regulations have a distinct impact on the clients developing Grade A commercial space and large-scale residential apartments, as it increases the cost of construction projects, so the developer may feel that they are not seeing a sufficient yield to warrant this additional cost. However, the flip side of the coin is that the developer is getting a higher quality building with a reduction in running costs, and also a higher specification of building services. This is down to the increased commissioning requirements, as well as the quality increase in monitoring and building management systems.

GLOBAL INSIGHT

The rise of the smart hotel

Intelligent buildings are not a new concept, but the level of advancement is gathering pace and the increasing adoption of smart technology is spreading across multiple sectors.

Andrew Callaghan,
Director

Des O'Broin,
Director

Hugh McElvaney,
Senior Quantity Surveyor

Intelligent buildings are not a new concept, but the level of advancement is gathering pace and the increasing adoption of smart technology is spreading across multiple sectors. While these core drivers impact every sector, the influence of technology and shifting demands is particularly significant within the hospitality sector, as it shows a marked shift towards integrating these technologies into the latest developments. This boils down to a few key factors, as discussed below.
It is important to bear in mind that while the sector is currently struggling with the impact of COVID, it will recover in the coming years as the world adjusts to the 'new normal', and smart technology will play an even more important role in its recovery and success.

The hyperconnected guest

One of the most fundamental drivers behind the trend for smarter hotels comes in the form of the rise of experience consumption, which is a key catalyst in a sector wherein consumer needs are front and centre. As noted by Alex Witkoff, Executive Vice President of Witkoff Development, at Bisnow's Hospitality Investment, Development and Management Summit in New York earlier this year, "Spending on the experience economy is expected to reach $8 trillion by 2028". The experience is becoming even more important to the guest and optimising this can make all the difference against an increasingly competitive landscape. Recent reports actually suggest that 2020 will be the year that customer experience overtakes price and product as the key brand differentiator.

There is a plethora of ways in which intelligent technologies can be leveraged in order to optimise the guest experience, but the crucial aspect is its ability to tailor and personalise their stay. Indeed, 86% of consumers say personalisation plays a role in their purchase decisions, according to recent Kahuna survey, and brands that incorporate personalisation by integrating data and advanced technologies report revenue increases of 6-10% (Qubit). Ultimately, Millennials or Generation Y form a very significant proportion of the target market, influencing the design of new hotels, from incorporating new technologies to the inclusion of co-working areas.

Customer expectations are evolving in line with their adoption of technology in their day-to-day lives. Guests are using technologies, from streaming services and smart assistants to remote climate control in their homes, so the expectation that hotels will have the infrastructure to support and match these technologies is taking hold. They expect the ability to tailor their experience to some extent, and to have the autonomy to control their space and hotel experience, including:

- Climate and temperature control
- Temperature for showers
- Curtain/drapes/blinds
- Entertainment systems
- Hands-free, voice-control
- smart assistants
- SmartBed™ technology
- Smart self-check-in/check-out kiosks

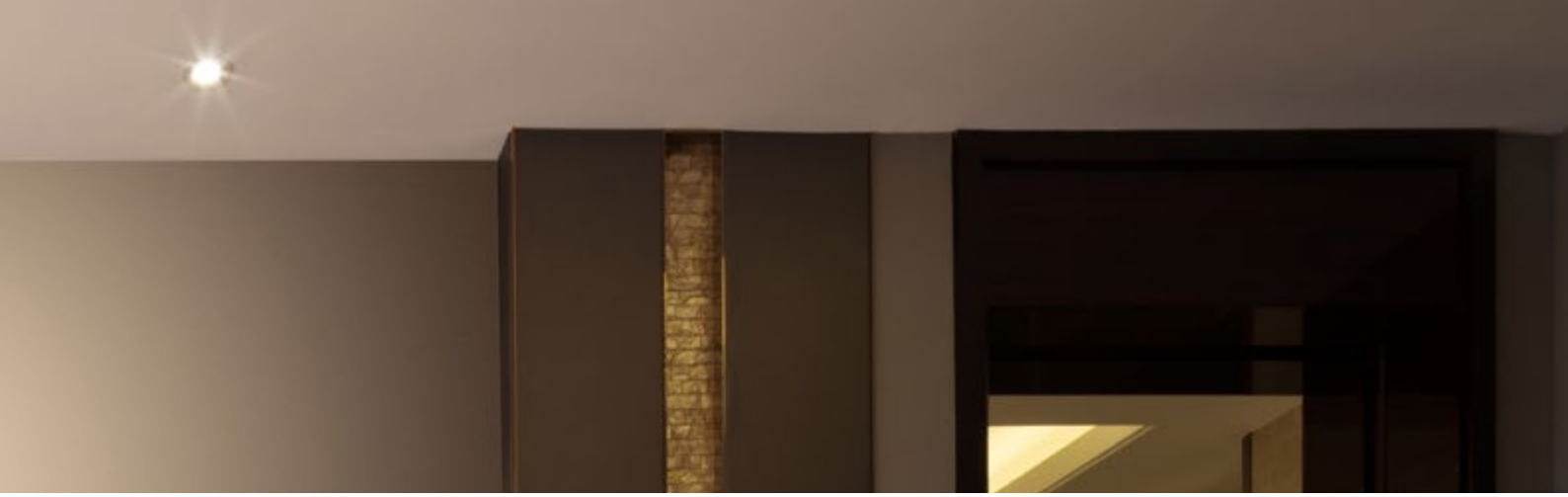
Needless to say, it is now the norm to interact with multiple devices at any given time.

Furthermore, hotels are now in a position to collect and analyse insightful data, and to anticipate, manage and understand guest preferences, in order to enhance the guest experience.
Data-driven insights will help to personalise the experience and guide service provision.

Guiding operational efficiency

The second key driver lies in operational efficiency. Integrating smart technologies, from the simple occupancy detection systems to the more complex smart phones operating the lights and electricity within a room, keyless access and mobile check-in — these measures are proving to offer tangible benefits to the running costs of a hotel.
We are moving towards the concept of a truly connected hotel, by leveraging Internet of Things (IoT) technology to ensure systems work together and communicate to deliver efficiencies in all areas. This extends from robot butlers delivering your room service to digital door signage functionality, to allow housekeeping staff to


32°
Sunny
1 Feb
25.3°



remotely see the rooms to be cleaned and devise an efficient workplan around that live data.

Smarter hotels in practice

Yotel, Citizen M, Best Western and Wynn Resorts are just some of the names adopting and promoting these new technologies. Marriott International is often perceived to be leading the charge in this regard across its 30 brands in 126 countries, from integrating keyless access on a widespread basis, to continuing to work on its connectivity and adoption of smart technologies via its IoT Guestroom Lab within its Innovation Lab. An example of how it is implementing this technology in practical terms lies in the Aloft Hotel chain, which sits under the Marriott umbrella. Linesight was a part of the team that delivered its Dublin City branch last year, with some interesting and forward-thinking technologies delivered as part of the project:

- Mobile check-in
- Keyless access via an app
- Wireless printing facility in reception
- Large video walls to reception and bar area
- USB charging sockets
- Integrated international adaptors in guestrooms
- A fully-integrated VRF AC system, controlling the room temperature and power supply to the room
- An integrated door sensor for room access. Once the room is activated by the guest's smartphone, the power is automatically supplied to the guestroom and the VRF system comes online and goes offline automatically when the room is unoccupied for any length of time
- An automated minibar system - once an item is removed, if it is not returned within a certain time period (can be set by the operator), a charge will be applied to the room for that item
- 43" smart TVs in all bedrooms with a casting system for the whole hotel, to allow guests to watch content from their own devices
- A room service robot named 'Lofty' or 'Botlr'. Once an order is made and placed, the robot travels to the lift, which it calls wirelessly on its way to the room. Once it arrives, the room phone will ring and inform the guest that the order has arrived

Costs

There are reasonably significant costs associated with upfront investment in these technologies and systems, including high-speed WiFi everywhere and boosters for the latest 5G mobile coverage, but the pace of demand for smart hotels and the latest technology is on the increase.

In summary, the hyperconnected guest, and their needs, evolving habits and expectations are driving the shift towards smart hotels. In their 'home away from home', they expect an integrated experience that aligns with the technology that they have become accustomed to in their day-to-day lives. Hotels should leverage the data that they can now readily collect to glean meaningful guest insights, and to anticipate and better manage guest preferences. Room presets based on loyalty scheme guest accounts can have the room set-up for guest preferences, including temperature, lighting and even minibar contents.

From an operational perspective, there are a multitude of benefits that arise from integrating smart technologies, from streamlining running costs and optimising operational efficiency, to reducing power consumption, and playing its part in making the hotel a more sustainable facility.

"I was initially attracted to Linesight by the project portfolio, in particular its diversity in both sector and region. It's a dynamic team of great people, with a positive work environment, a proactive approach to achieving optimum outcomes for clients, and plenty of opportunities to work on world-class projects."

John O'Sullivan
Associate Director

What we do

Our services are tailored for your project, delivering maximum efficiency from inception to completion. We specialise 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
Driving 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 deliver 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
Securing 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
Providing an initial project overview, developing a detailed structure and identifying schedule controls.

Monitoring and Due Diligence
Examining project information independently, identifying issues, and ongoing project monitoring.

Our values

Over the years, we have developed a way of working that delivers 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 proactive 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.

76 Sir John Rogerson's Quay, Dublin

Architect:
RKD

Linesight services:
Cost Management, Project Management and PSDP

Working with you, wherever you are

With staff located across Europe, MENA, Asia Pacific and the USA, our reach is truly global. We are delivering 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 we have developed a broad portfolio of innovative projects in every region.

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- Transportation and Infrastructure

Our offices

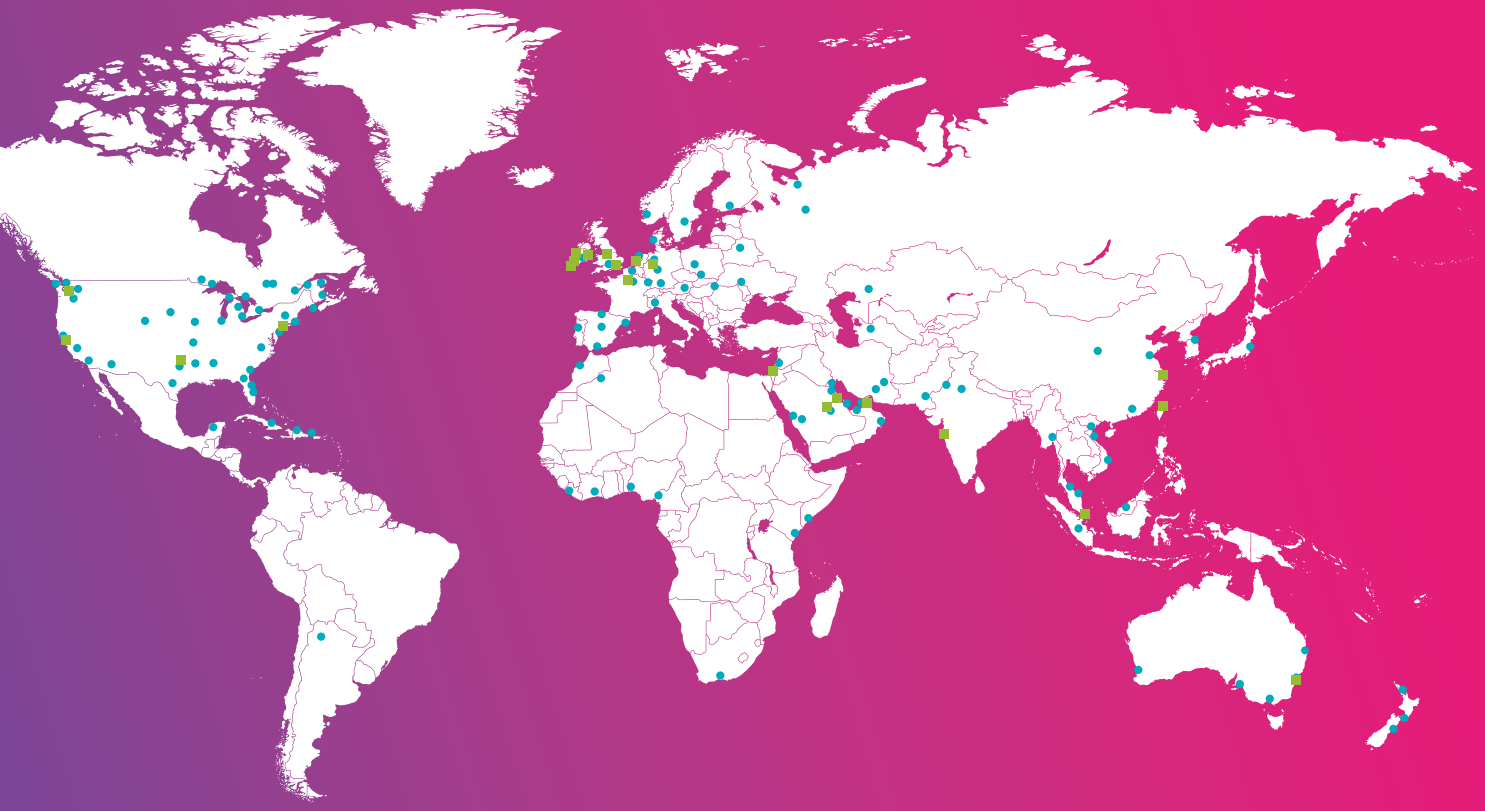
Ireland

Dublin
Hoban House
Haddington Road
Dublin 4
T: +353 1 661 4711

Cork
VHI House
70 South Mall
Cork
T: +353 21 4274 474

Limerick
Linesight House
6 Hartstonge Street
Limerick
T: +353 61 493 515

Galway
TaraRock 7,
Galway Technology Park,
Parkmore,
Galway
T: +353 91 734 005



Europe

London
2nd Floor
27-29 Cursitor Street
London EC4A 1LT
T: +44 20 7784 7330

Manchester
Peter House
Oxford Street
Manchester M1 5AN
T: +44 161 618 1811

Paris
Linesight SAS,
23 Rue d'Anjou,
75008 Paris,
France.
T: +33 1 70 92 37 91

Dusseldorf
4th Floor
Konigsallee 92A
40212 Dusseldorf
T: +49 211 5403 9615

The Hague
11th Floor
Koningin Julianaplein 10
2595 AA The Hague
T: +317 08 918 467

Tel Aviv
Ramat Gan Atrium
18 Jabotinsky 2nd Floor
5250501
T: +972 3 754 1289

Asia Pacific

Singapore
150 Cecil Street
#05-01
Singapore 069543
T: +65 6801 4540

Shanghai
Unit 819 8F Building 2
No 1196 Century Avenue
Shanghai 200120 PRC
T: +86 21 6043 3695

Taipei
10F-2 No 162 Sec 4
Zhongxiao E Rd Da'an Dist
Taipei City
106 Taiwan (ROC)
T: +886 906 179382

Sydney
Level 5
131 Macquarie Street
Sydney NSW 2000
T: +61 2 8278 9500

Mumbai
Unit No 902
Maithili Signet
Sector 30A Vashi
Navi Mumbai 400705
T: +91 22 49766744

The Americas

New York
286 Madison Avenue
Suite 602
NY 10017
T: +1 646 802 9900

San Francisco
582 Market Street
Hobart Building
San Francisco CA 94104
T: +1 415 343 2434

Seattle
2018, 156th Ave NE
Suite 310, Bellevue
WA 98007
T: +1 425 748 5147

Dallas
350 North Ervay Street
Suite 3105
Dallas
Texas 75201
T: +1 469 513 4113

MENA

Bahrain
Building No 655
Road 3614
Al Seef Area
T: +973 17 746 892

Dubai
24th Floor - Office 2403
1 Lake Plaza Tower
PO Box 11497 Dubai
T: +971 4 432 3831

Riyadh
Office 503, 5th Floor,
Al Akariyah 1
Olaya Street,
Riyadh 14023
T: +971 55 615 6846

22
offices

Edwards Lifesciences, Castletroy, Limerick

Architect:
Jacobs

Linesight services:
Cost Management, Project Management and Health and Safety review

Acknowledgements

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Editorial team:

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Contributors:

- Adrian Farren
- Andrew Callaghan
- Des O'Broin
- Diarmaid Connolly
- Eoghan Tangney
- Eoin Byrne
- Eoin Dunphy
- Gavin Flynn
- Hugh McElvaney
- Jeff Peragallo
- John Finnegan
- Neil L Doyle
- Nigel Barnes
- Pat Unger
- Paul Brady
- Stephen Ashe
- Stephen O'Grady