

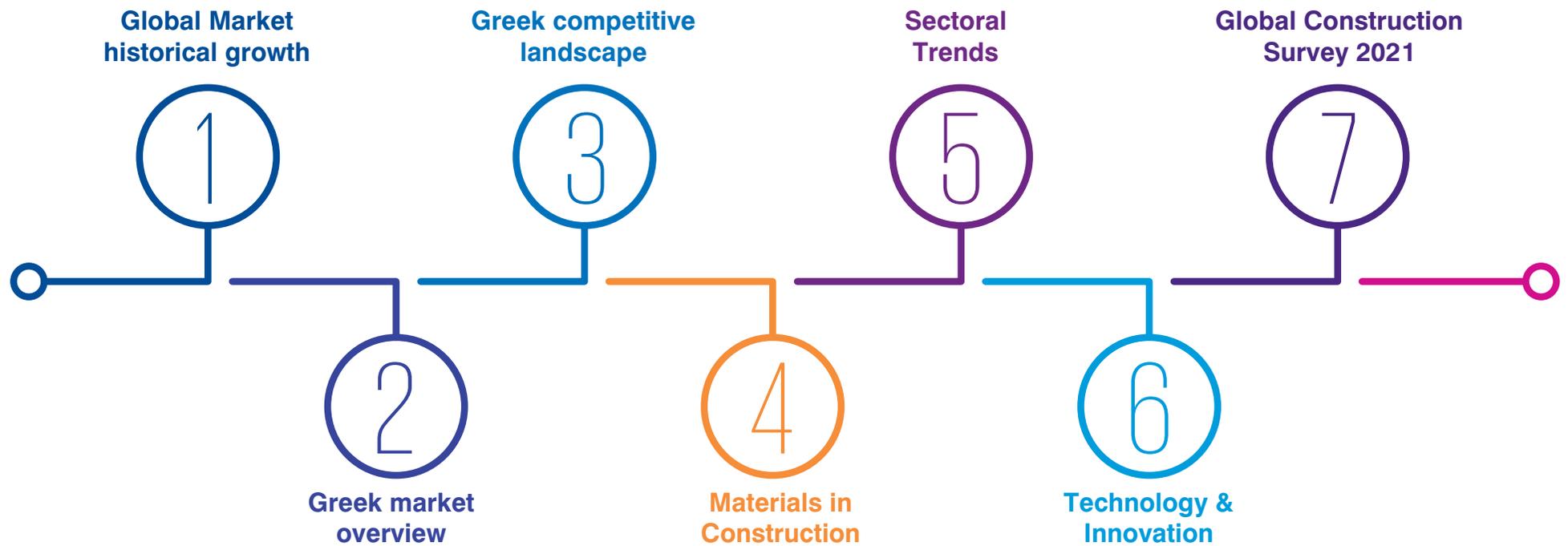


The Future of Real Estate & Construction

**Outlook, trends and new developments
in the Greek Market**

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Survey's structure





Global Market Overview

Global Market historical growth



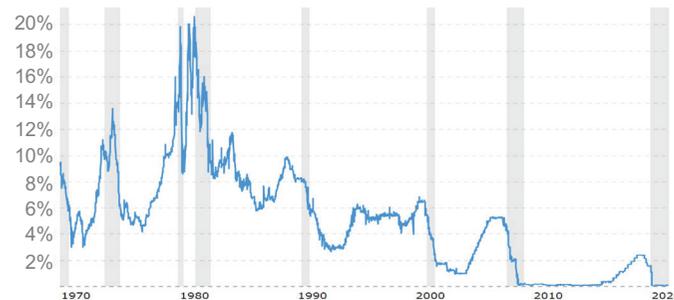
Before the COVID-19 pandemic

The global economic

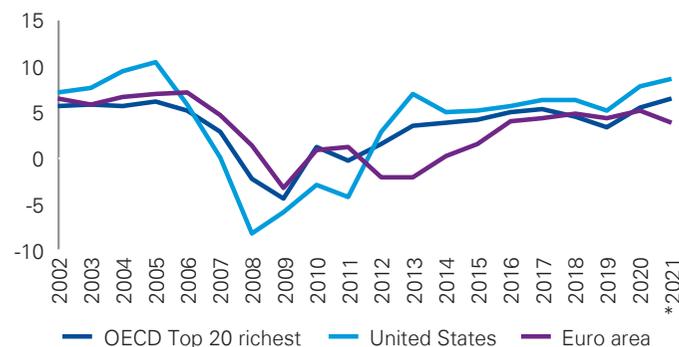
downturn that began in 2007 impacted significantly the dynamics of the housing market. The housing bubble in the US was the impetus of the credit crisis which triggered the Great Recession. By 2016 prices had almost recovered to their pre-crisis levels. The recession affected significantly the construction sector too. The foreclosures that followed the mortgage crisis, falling house prices and decreased consumer spending were the primary reasons that the sector struggled to bounce back to its 2006 levels. New single family residential construction experienced the biggest hit.

The US housing market prices had already entered a rapid upward trajectory since the mid-1990's. In 2000, FED started lowering the federal funds rate aiming to boost the US economy. From 7.3% in July 2000 the rate gradually reached 0.86% in August 2003, its lowest level in forty years. Along with it, mortgage rates declined to record low levels, which fueled demand for mortgages and consequently a run-up in house prices. However, housing prices increase was already moving out of line with fundamentals like household income or price-to-rent ratios. In addition, expectations for future increases inflated prices even further.

Federal Funds rate and Recessions



House prices across the top 20 OECD countries, by GDP per capita. Average annual Index % change (nominal prices)



The average price of a house increased by almost 50% between 2001 and 2006.

Contributing dramatically to this direction were also the inadequate risk management in credit issuance and the resulting origination of subprime mortgages and mortgage-backed securities. The collapse of the housing bubble came in 2006, two years after the FED had started to tighten monetary policy. House prices were declining, and interest rates had risen to levels that made homeowners unable to refinance their mortgage payments.



In 2007, the housing market plummeted, reaching a 20% drop between 2007 and 2011,

forcing a massive sell-off in mortgage-backed securities, while numerous delinquencies, defaults, and foreclosures that followed led to the Great recession.

House prices returned to pre-crisis levels for the first time in 2016 and had been increasing by an average of 6-7% per year since then, up to the outbreak of the COVID-19 pandemic.

In the US, value added by the construction industry as a share of GDP fell from 4.9% to 3.4% between 2007 and 2009 and unemployment in construction peaked at approximately 20% in 2009. In July 2014, the total monthly valuation for all construction projects was more than 20% below its 2006 peak, with the housing sector alone experiencing the highest drop, over 50%. Construction activity returned to pre-crisis levels for the first time in 2016 and had been increasing by an average of 6-7% per year since then, up to the outbreak of the COVID-19 pandemic.

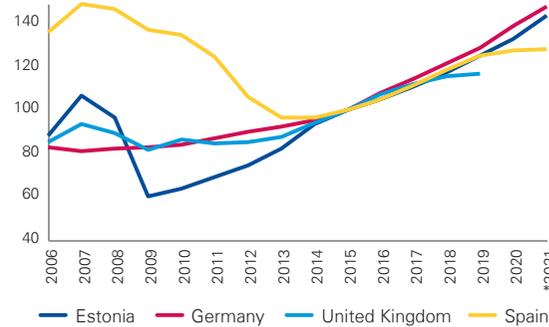
Global Market historical growth



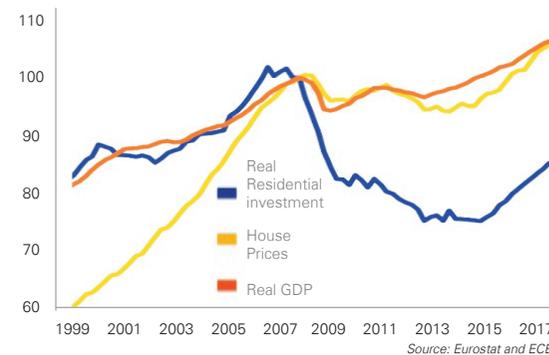
Before the COVID-19 pandemic

In Europe, the housing market was hit at different times and to a varying extent, owing to the structural heterogeneity and different stages of markets maturity across its constituent countries. Market adjustments and government responses also varied.

House prices Index OECD (nominal prices)



Residential investment, house prices and real GDP in the euro area, indices (Q1 2008=100)



EU-27, construction production per type, calendar & seasonally adjusted (2015=100)



Since the mid-2000s many house financing systems in Europe have been under great strain, to a certain degree because they grew fast in the early 2000s.

House prices in the euro area did not experience a more than 3% drop per annum during the crisis, but recovery was slower compared to the US or OECD countries on average. Overall, prices started to pick up at the end of 2013 and had been increasing by 4-5% on average per year, up to the pandemic.

Individually, some countries experienced a deep dive in prices during the period 2007 to 2016, in others a steady increase trajectory was maintained;

House prices decrease compared to pre-crisis levels exceeded 35%-40% in Spain, Greece, Ireland and the Baltic countries. Germany or Finland, on the other hand, had a steady pacing of 1-3% per annum. In the United Kingdom, prices reached a bottom in 2009 (-13%) and picked-up in 2014.

Meanwhile, residential investment declined sharply by 25%, bottoming out in 2014, and still has not returned to its pre-crisis scale; in early 2018 was still 15% below.

Europe's construction sector was heavily impacted. In 2006 construction accounted for 13% of GDP and reached a low of 9.4% in 2014. Construction declined over 25% from 2007 to 2013, with new housing contraction near 50%. The impact of the financial crisis varied among Europe's countries. In Germany production in the construction registered an overall growth rate of 10.4% between 2010 and 2016, while in Greece it dropped by more than 58%.

Overall, construction activity in EU has not returned to its pre-crisis levels, but since 2016 and before the outbreak of the pandemic, it has been steadily increasing.

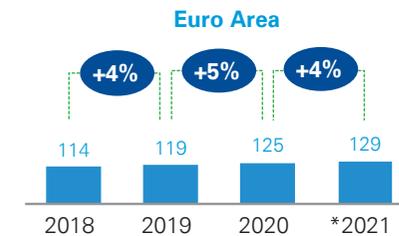
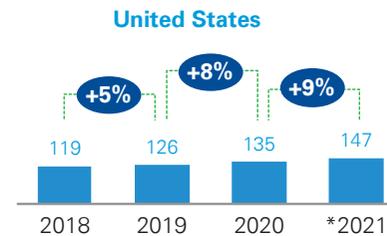
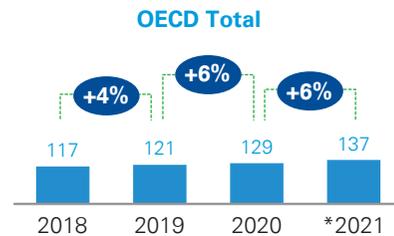
Global Market historical growth



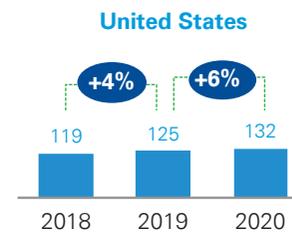
Impact of the COVID-19 pandemic

In the wake of the COVID-19 pandemic, house prices are rising in most major economies. Despite the weak economic activity, low borrowing capability and household saving during the pandemic, boosted demand for house purchases.

House prices Index (nominal prices)



Construction production Index



Source: OECD

House price growth accelerated during the pandemic. In the first quarter of 2021, house prices across the top 20 OECD nations by GDP per capita reached an annual growth of 6.4% - the fastest pace over the last 20 years. Indicatively, house prices rose around 9% year on year in the United States and 4% in the Euro area.



Monetary policy stimulated housing demand as low interest rates facilitated finance housing with mortgage debt. (IMF suggests that a 100-basis point change in interest rates would have an impact of between 1.5 and 2 basis points on the rate of change in house prices*).



Accumulated savings in advanced economies, due to the forced shutdowns of the economic activity, along with **fiscal policies** (e.g., income support for families) drove an increase in real estate investments.



The supply side helped push up prices. Supply suffered from the slow-down in construction activity due to construction sites shutdowns. Meanwhile, materials rapid cost increase amplified the pressure.

In the EU, construction production development increased dynamically in May 2020, but has stagnated since then.

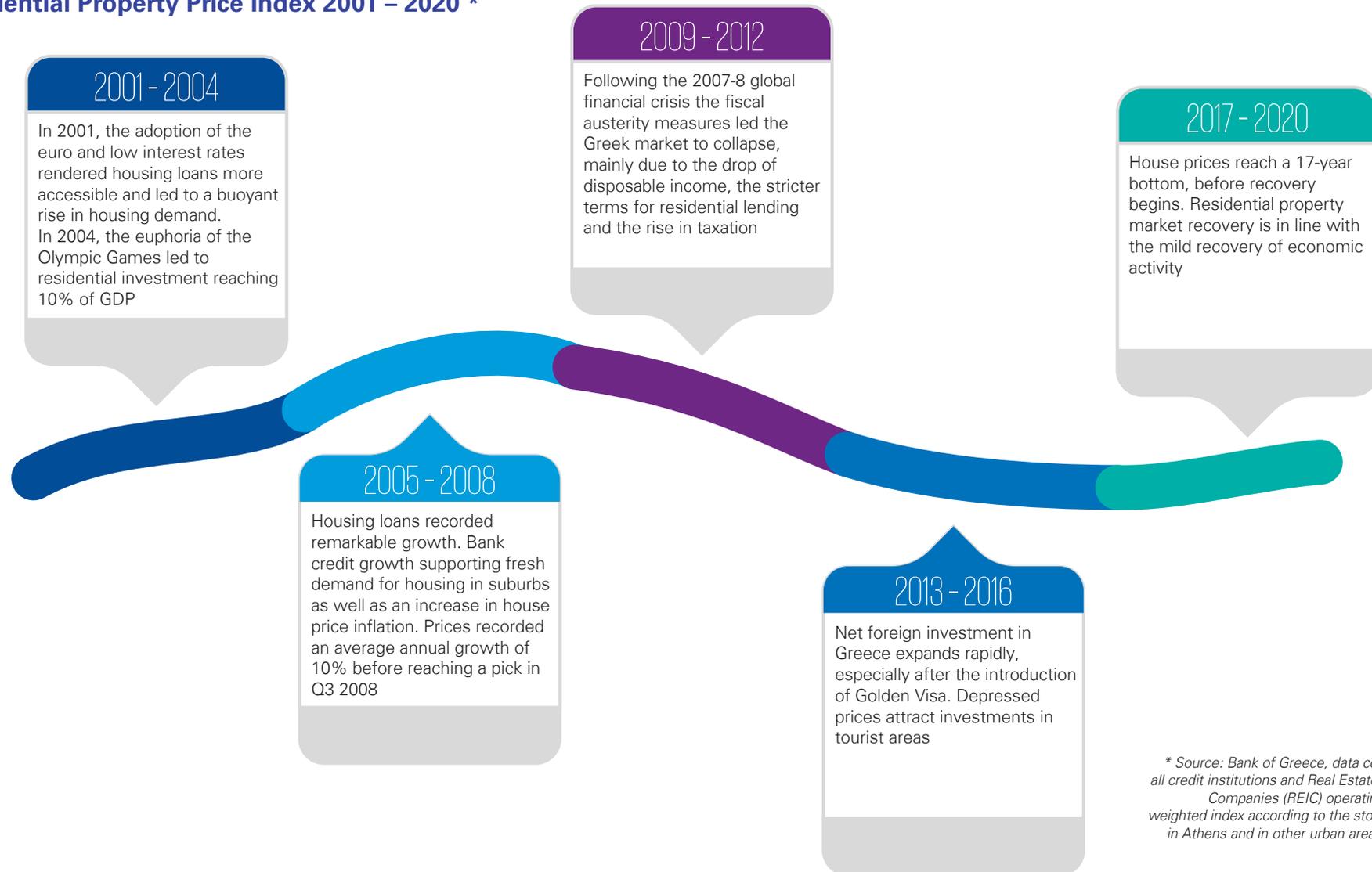
* *The Global Real Estate Boom: Is It Time to Worry Again?* available at <https://ieo.imf.org/-/media/IEO/Files/Seminars/ieo-webinar-igan-real-estate-markets-covid19-june-2021-v2.ashx>



Greek Market overview

Greek Residential Market overview

Residential Property Price Index 2001 – 2020 *



* Source: Bank of Greece, data collected from all credit institutions and Real Estate Investment Companies (REIC) operating in Greece, weighted index according to the stock of houses in Athens and in other urban areas, 1997=100

Greek Residential Market overview



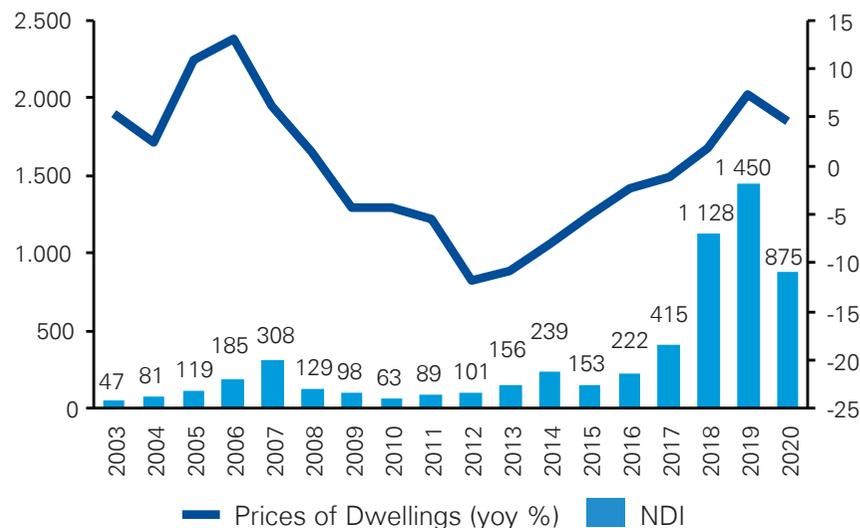
Historical growth

The economic prosperity of the '90s and early '00s, along with the credit liberalization which diminished households' borrowing constraints, led to a remarkable growth in housing loans. This was intensified by the low interest rates, which drove a significant rise in housing demand. With supply lagging rising demand needs, house prices rallied. Between 2001 and 2010 prices of dwellings increased by an average annual growth rate of 9.4%. The debt crisis and fiscal austerity measures that followed the 2008 financial crisis, resulted in the collapse of the real estate market. Residential property prices dropped 43% between 2008 and 2017, while the number of real estate transactions in Greece declined by 72.5% between 2008-2014. Signs of recovery started showing in 2018, after a prolonged period of depressed prices, along with the remarkable increase of net capital inflows from abroad for property purchases in Greece. During the COVID-19 pandemic the market showed resilience and the current mismatching between macroeconomic data and house prices is obvious. Foreign investors demand, particularly for tourism-related areas, "forced" household savings, along with the government measures which aimed at mitigating the impact of the economic fallout, prevented a fall in the housing market.



Even though growth slowed down compared to the previous couple of years, house prices in 2020 increased by 4.7% year-on-year in urban areas, increase coming mainly from Athens (7.6%) and in general tourist destinations which attract foreign investors. Building permits increased by 8% in 2020. In Q1 2021, residential property prices increased by 3.5% - despite stricter restrictions compared to Q1 2020- and in Q2 4.6%. Despite the economic shutdowns and the strict travel restrictions, the housing market was able to sustain its recent years upward trend, partially because investor interest was not sharply discouraged by the mid-term impact on the economy. Meanwhile, fiscal measures helped mitigate the impact to households.

Net Foreign Direct Investment in Greek Real Estate (Euro million)



Pricing determinants

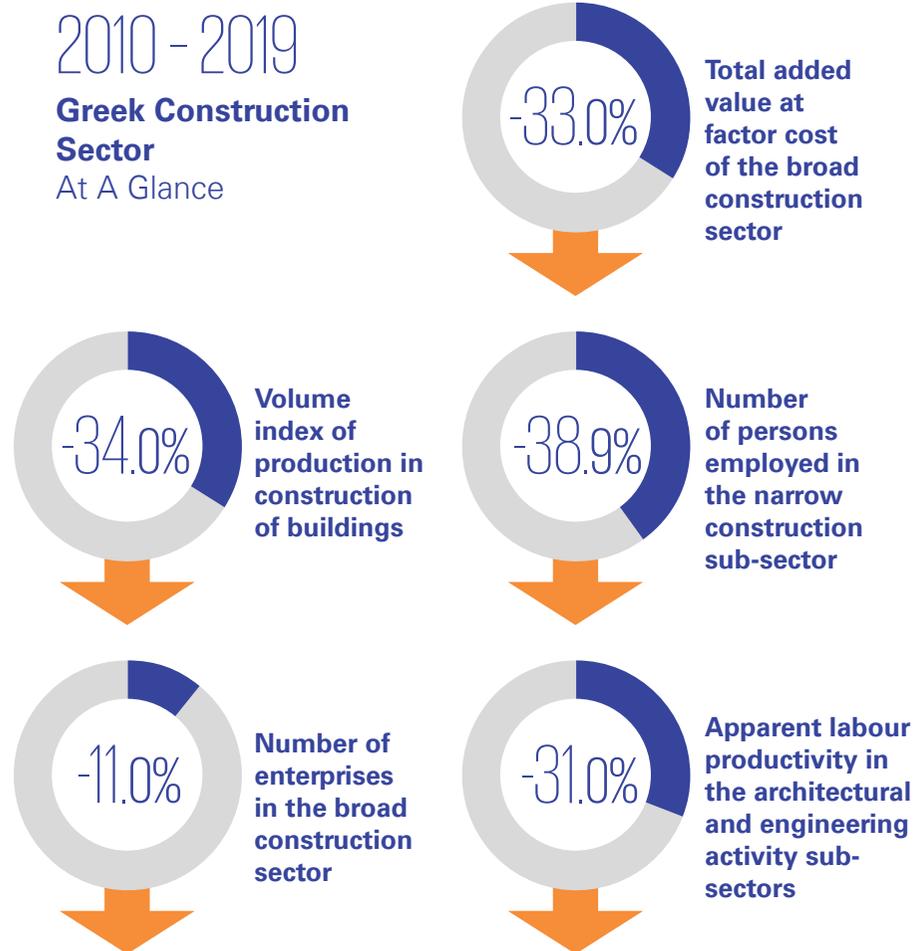
Real estate prices are determined by both demand and supply factors

Below are some of the key factors to be considered.



Greek Construction sector overview

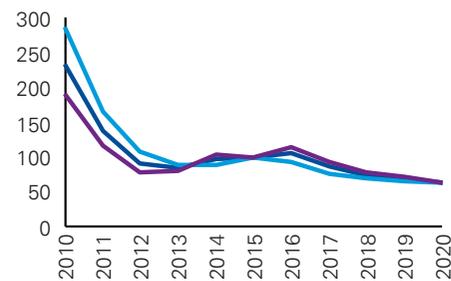
The Greek construction sector has still a long way to go to return to its pre-financial crisis levels. The total turnover in the broad construction sector declined by 11.6% during the period 2010-2019, reaching Euro 20.3 billion in 2019, while the total added value by 33.0% (Euro 9.0 billion in 2019). The global outbreak of the COVID-19 pandemic has additionally impacted the Greek construction sector, due to contract delays and costs of restarting and reorganising the construction sites. However, the construction sector is expected to recover from the short-term turbulence, as the economy gradually reopens and the government re-focuses on measures related to housing and infrastructure. In Q2 2021, production in construction increased by 29.6% QoQ and 16.1% YoY1.



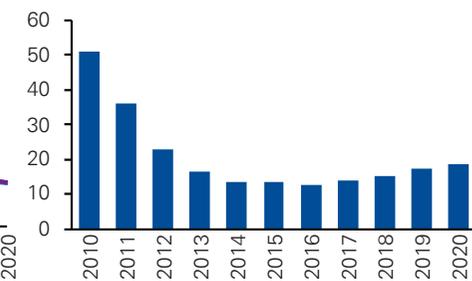
The share of gross value added of construction & real estate activities in the GDP reached 16.4% in 2019. Over the past few years, several government measures have been introduced to support the housing market and construction activity in Greece and attract domestic and foreign investments:

- Granting non-EU investors five-year residency rights with the purchase of real estate property worth at least 250K euros (“Golden Visa” program)
- Tax incentives to natural persons who transfer their tax residence to Greece, if they invest 500K euros within 3 years in real estate or companies based in Greece
- Reduction of the single property tax (ENFIA)
- Suspension of three-year VAT payments on new building permits
- 40% tax deduction for expenses related to receiving services for energy, functional and aesthetic upgrade of buildings

Volume index of production in Construction²



Private Building No. of Permits³ (thousands)



— Construction — Buildings — Civil engineering works

1 Source: Eurostat, Quarterly indices for production in construction, calendar adjusted, 2015=100

2 Source: Eurostat, Volume index of production calendar adjusted, 2015=100

3 Source: Published financial statements

Greek Construction sector overview

Meanwhile, the investment in non-residential construction and civil engineering, increased by 2.8% between 2015-2019. Next years' focus is shifted towards privatization of regional ports, backed by EU funding, along with major renovations and overhauls on the network of highways, railroads, and ports. Around Euro 7.4 billion are invested in rail projects and Euro 4.3 billion in highways.

Some of the next big development/ infrastructure projects in the pipeline for this decade:

The Ellinikon project

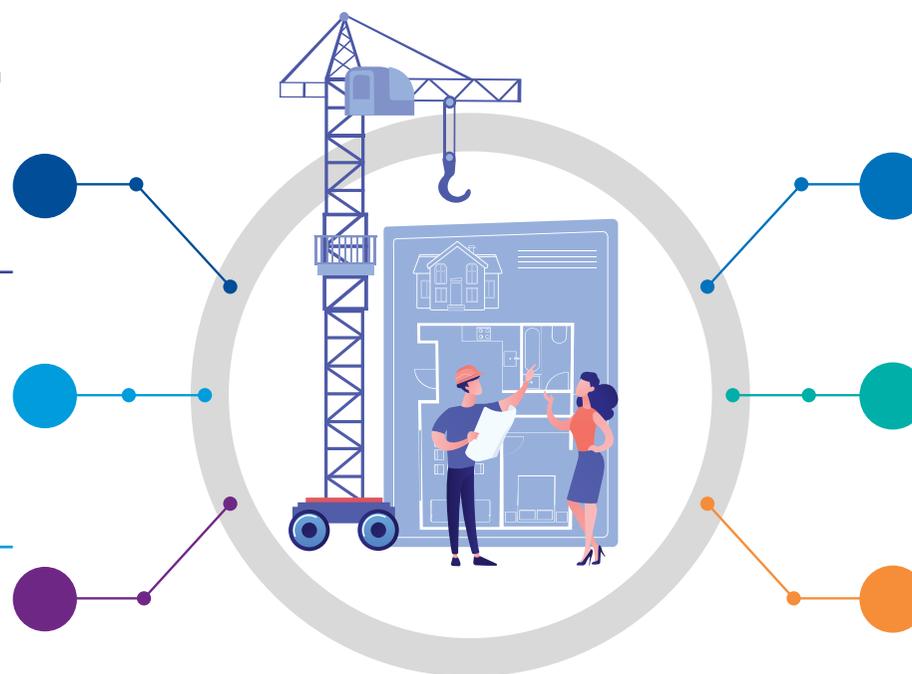
is presently Greece's biggest development project. It is an Euro 8 billion investment at the decommissioned Ellinikon airport, aiming to become Europe's biggest urban regeneration project. It is expected to add around 2.4% to Greece's GDP by completion date and according to the Foundation for Economic & Industrial Research 75K jobs once completed.

Motorway 90

("BOAK" in Greek, i.e., the Northern Road Axis of Crete), is a Euro 2 billion project to build the longest National Highway on the island of Crete (300km long), and largest to be built in Europe, by 2028.

Line 4 of Athens metro

(phase 1) is a Euro 1.5 billion project, funded by ESPA resources (NSRF), to build a metro line that will pass from fifteen densely populated areas of central Athens, servicing 530K passengers per day. It is scheduled to be completed in 2028.



Thessaloniki – Toxotes railway project:

The railway connection of Thessaloniki with the new port harbor of Kavala and Toxotes of Xanthi (206km long), is a project budgeted at Euro 1.3 billion. It is expected to enhance connectivity between the most northern part of the country, towards Bulgaria and Turkey.

New suburban railway lines:

construction of a new suburban railway line in the section from the Koropi junction to Lavrio and the port of Lavrio (Euro 391 million), and connection of Rafina and the port of Rafina with the existing railway network (Euro 309 million).

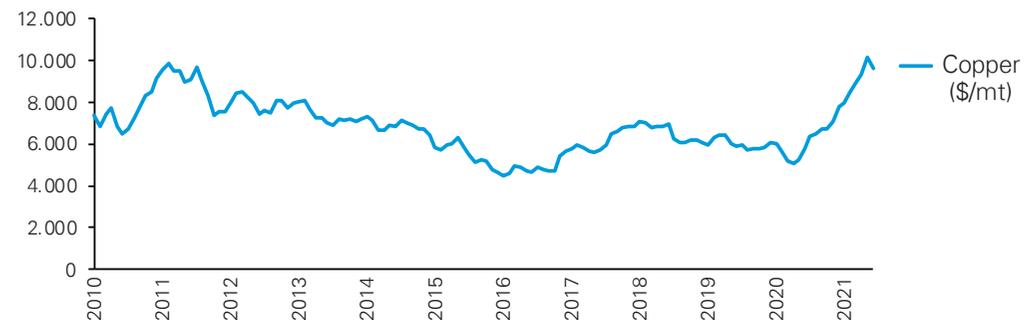
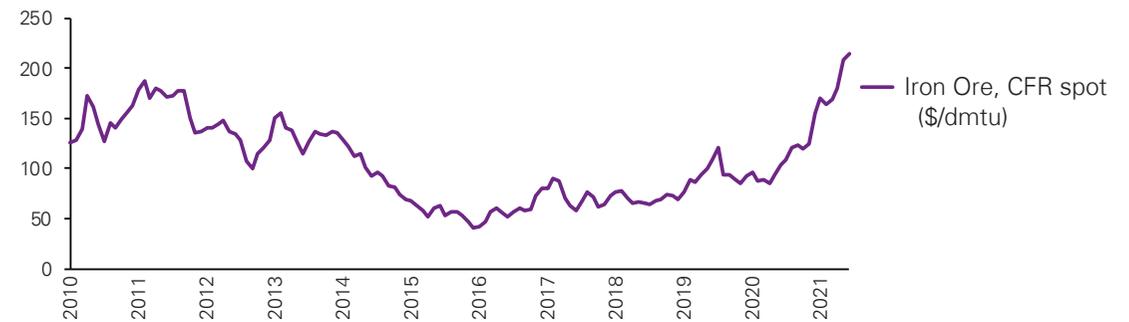
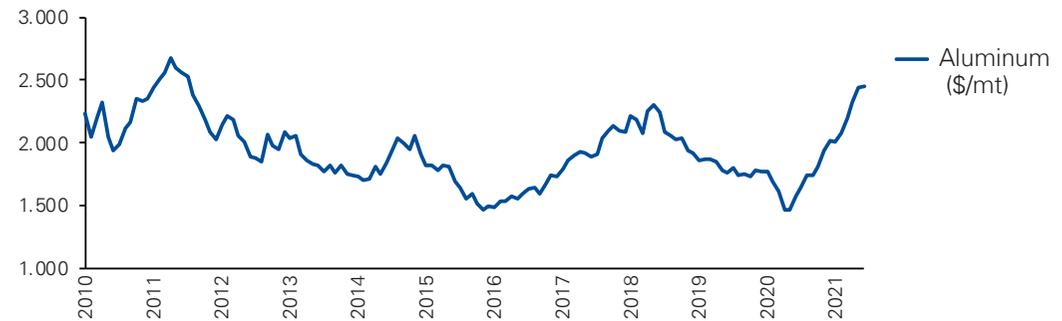
New Kastelli Airport

in Crete will replace Greece's currently 2nd largest airport and have a handling capacity of 15M passengers a year. It is budgeted at Euro 480 million, expected to create 7 to 7.5K new jobs and a need for another 35 to 37K jobs related to the tourism and trade sectors. The airport is scheduled to be operational in 2025.

Materials in Construction

Materials used for construction constitute the greatest expense of the sector. Amongst them, the main metals used (iron, copper and aluminum) have skyrocketed in 2021.

Iron ore prices reached their lowest point of the decade at the end of 2015 and have been increasing gradually, up until the pandemic. Between 2015-2020 prices increased by around 95% and then rallied in 2021, showing an increase of almost 70% in a year. Copper and Aluminum prices have been decreasing between 2018-2019 and increased by 50% and 25% respectively during the pandemic period.



Materials in Construction

Disruptions caused by the pandemic have led to a cost increase of construction materials required from 15% to 75%¹. This increase derives from an increase in the cost of primary materials such as iron and cement.

Metals

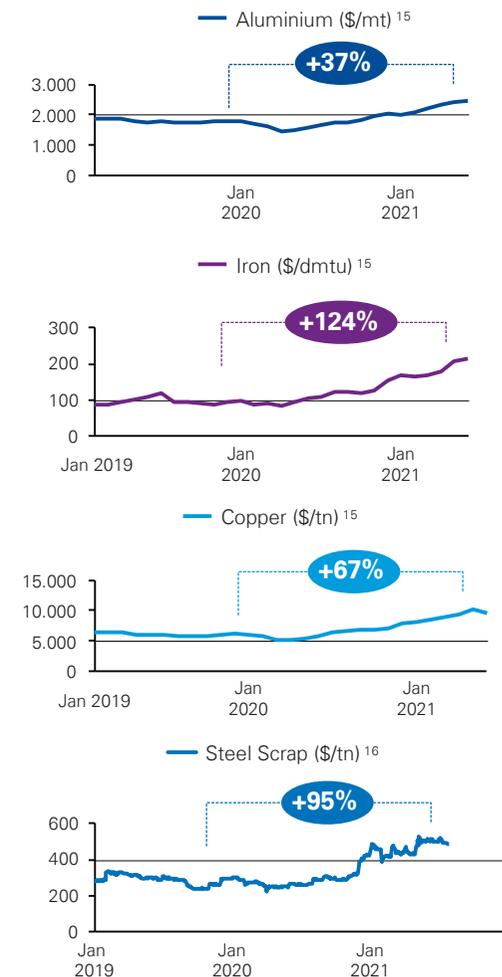
- The price of metals has increased sharply amidst the pandemic as presented in the Graphs, due to:
- Production and transportation of metals were initially disrupted thus hindering supply²
 - Consumers shifted their spending from services to goods that could require metals for production³, such as home appliances and outdoor equipment^{4,5}
 - Freight rates for the transportation of bulk material increased due to (a) congestion in key ports, (b) quarantine restrictions, (c) problems with staffing shipping crews and (d) a rebound in fuel prices²
 - Policy changes from major players such as China and Russia, regulating metals production and trade^{5,6,7}
 - Worldwide shift towards a greener economy through large investments in mobility and construction^{8,9}
 - Rising energy prices are expected to further increase the cost of metals

Other material

Cement: Cement price is reportedly increased worldwide because of (a) Increase in the energy cost for the production of cement, as it is being passed on to buyers^{10,11} (b) increased cost of sea transportation and (c) spikes in metals price as cement contains iron oxide and alumina at a small percentage¹²

Lumber: The price of lumber peaked in May 2021 recording a 325% rise from December 2019¹³ as labor shortages and supply chain disruptions caused by the pandemic have led to timber supply unable to catch up with a rising demand¹⁴. However, from May 2021 to October 2021 lumber price fell, 93.5% higher than in December 2019¹³, due to oversupply¹⁴

Metals prices during the pandemic



Sources: Business Daily ¹, International Monetary Fund², World Trade Organization ³, Yahoo Finance ⁴, Reuters ⁵, Argus Media ⁶, Metal Bulletin ⁷, IMF ⁸, CNN ⁹, GlobaCement.com ¹⁰, Euronews ¹¹, CivilToday.com ¹², Nasdaq ¹³, NY Real Estate News ¹⁴, World Bank ¹⁵, London Metals Exchange ¹⁶

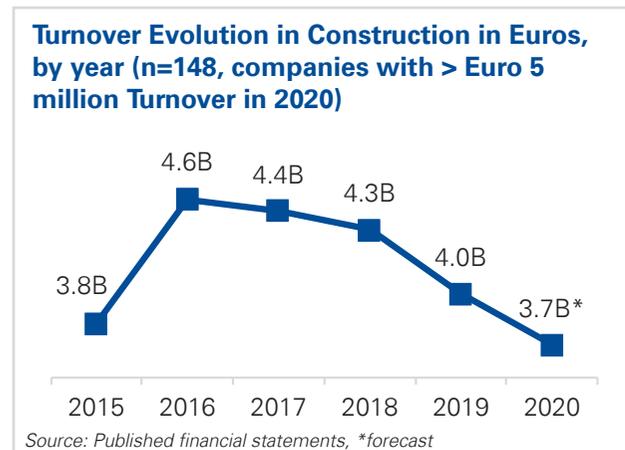
Competitive Landscape

Construction Landscape

The Construction sector usually mirrors the prosperity of a nation's economy since it affects multiple professions and drives financial activity. The thrive of the sector has been associated with an economic blossom, whereas its shrinkage is a strong signal of an upcoming recession. By reviewing the construction landscape, we will be able to understand where the sector is heading and how the sector has changed – in term of financial measures – over the last years. In order to depict the viability and financial stability of the companies in the Construction sector, we have employed key financial measures to describe at high level the course of the sector during the last 6 years.

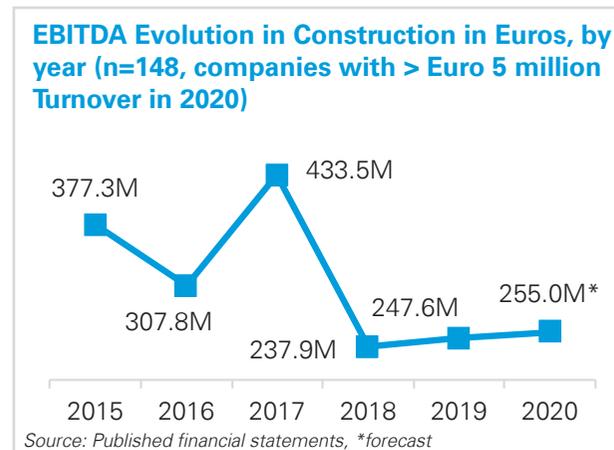
Turnover

The Turnover is the total amount of money a business receives as a result of the sales from its goods and/ or services, over a certain period. In 2020, the Turnover of the sector is expected to suffer additional losses, following the declining trend of the recent years. After the peak of Euro 4.5 billion in 2016, the Construction sector steadily loses Turnover value, with a sharp decline in 2019 which continued in 2020.



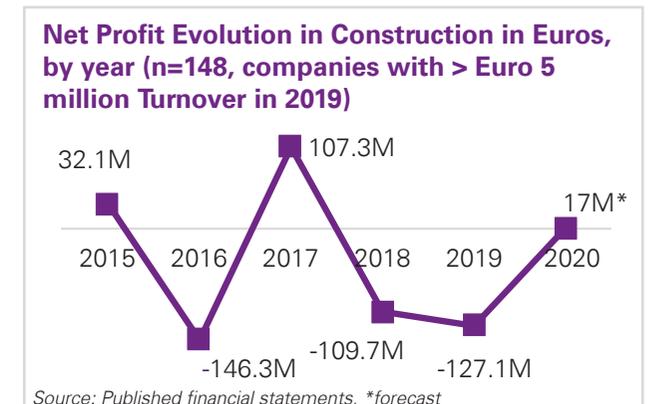
EBITDA

EBITDA is a metric used to evaluate a company's operating performance. We can see that EBITDA moves around two different levels in the last 6 years. From 2018 to 2020, it follows a slight linear increase, after the great decline in 2018 when the sector collectively reached Euro 238 million. In 2017 –the year before the great decline– the EBITDA of the sector had reached Euro 434 million, a performance which is the best in the last 6 years.

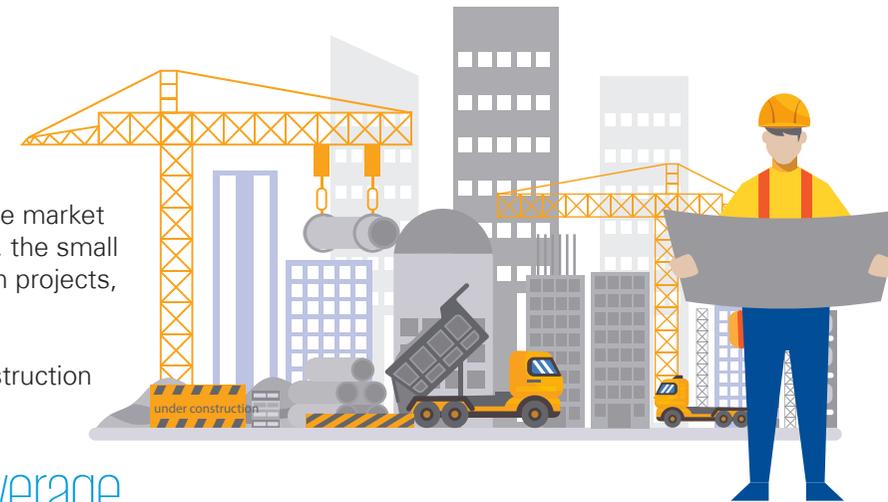


Net Profit

The Net Profit of firms within the Construction sector has reached both positive and negative values over the last 6 years. More specifically, in 2015 we can see that the sector achieved a Net Profit of Euro 32 million, while in 2016 the sector experienced huge losses, reaching the –Euro 146 million– the lower point of the last 6 years. It is worth mentioning that in 2017 the sector had positive Net Profits of Euro 107 million, with a very sharp decline to –Euro 110 million in the next year. In 2019, the sector continued to struggling, falling further below, reaching –Euro 127 million. In 2020, a notable improvement was observed compared to 2019, with the total Net Profit of the sector reaching –Euro 51.5 million.



Key players in Construction



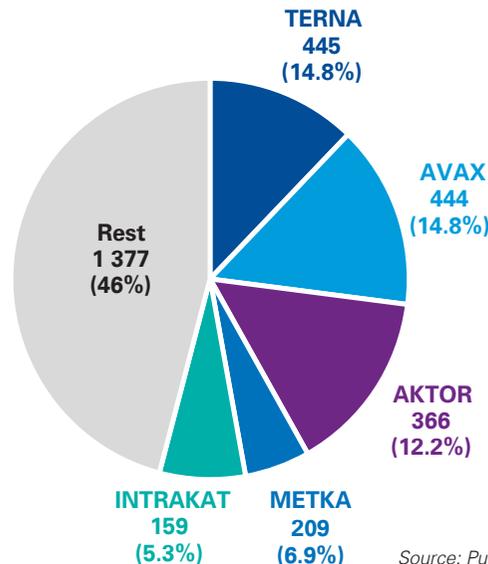
In the Construction sector, there are a handful of big players that possess a very high percentage of the market share. It is a capital intense sector and the barriers to entry for new companies are very high. Similarly, the small companies already in the sector might not have easy access to the required capital for big construction projects, and as a result leaders are hard to be challenged by incumbent players.

In the following paragraphs we will try to depict the differences between the leading firms in the Construction sector in terms of some basic financial measures for 2020.

Market Share

As we can understand from the chart, the Construction sector is a very concentrated sector, with the top five Construction companies to accumulate 54% of the sector's Market Share. Terna and Avax are both leading the market with 14.8% market share. Aktor follows with a market share of 12.2%, while Metka and Intrakat close the top with 6.9% and 5.3%, respectively.

Market Share in Construction in 2020 in million Euros (n=98, companies with > Euro 1 million Turnover in 2020)

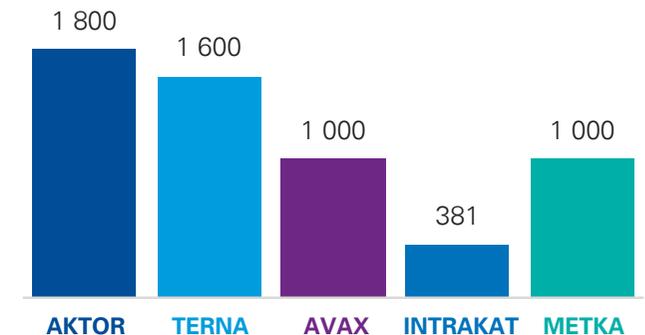


Source: Published financial statements

Level of Leverage

The level of leverage of the top five key players in the Construction sector reached almost Euro 9 billion in 2020, showing a decrease compared to previous years. Aktor had the most leverage with Euro 1,8 billion. Terna follows with Euro 1,6 billion, while both Avax and METKA had Euro 1 billion. Finally, INTRAKAT's leverage in 2020 reached Euro 381 million.

Level of Leverage of the key players in Construction in 2020 in million Euros



Source: Published financial statements

Key players in Construction

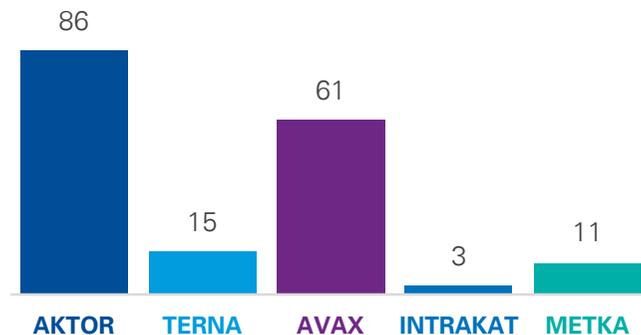
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In the following paragraphs we will try to depict the differences between the leading firms in the Construction sector in terms of some basic financial measures for 2020.

EBITDA

The EBITDA of the key players is positive for 2020. Intrakat, Metka and Terna had a marginal positive EBITDA of Euro 3 million, Euro 11 million and Euro 15 million, respectively. Avax and Aktor both achieved significantly higher positive EBITDA of Euro 61 million and Euro 86 million, respectively. It is worth mentioning that the vast majority of the companies of the Construction sector had a positive EBITDA.

EBITDA of the key players in Construction in 2020 in million Euros (n=98, companies with > Euro 1 million Turnover in 2020)

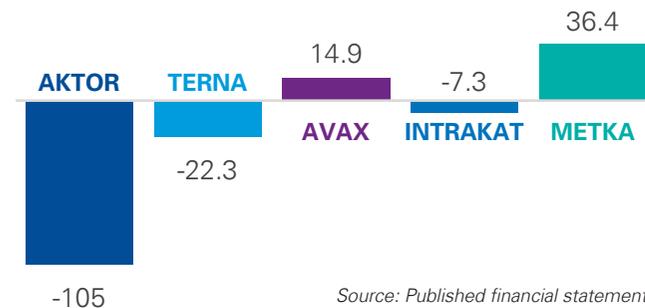


Source: Published financial statements

Net Profit

The Net Profit of the top five firms in the Construction sector is mainly characterized by negative figures in 2020. More specifically, Aktor's Net Profit dropped to -Euro 105 million, which however is a 25% increase from 2019. Aktor's Net Profit was the lowest among the firms of the sector. Terna, had a Net Profit of -Euro 22 million, the second lowest among the firms of the sector. Intrakat had a negative Net Profit of -Euro 7.3 million, a decrease compared to 2019. Avax and Metka achieved a Net Profit of Euro 14.9 million and Euro 36.4 million, respectively – becoming the only two companies amongst the top five of the sector with a positive Net Profit.

Net Profit of the key players in Construction in 2020 in million Euros (n=98, companies with > Euro 1 million Turnover in 2020)



Source: Published financial statements

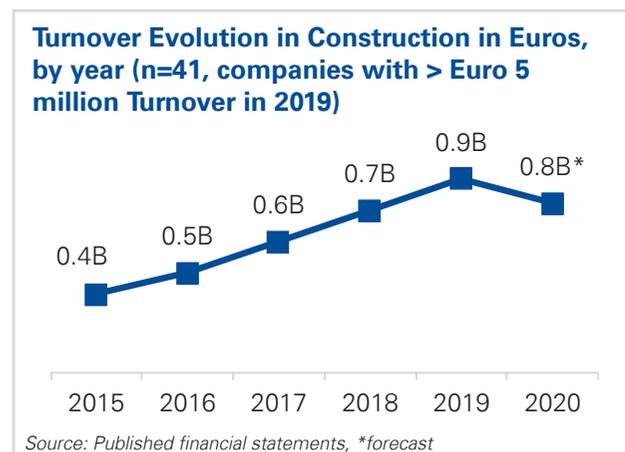
Real Estate & Development Landscape

The Real Estate market has an important bearing on macroeconomic developments and financial stability. The main segments of the Real Estate sector are land real estate, residential real estate, commercial real estate, and industrial real estate. Systematic monitoring of Real Estate market developments and prospects are very important for a comprehensive analysis of the macroeconomic conditions and prospects of the Greek economy.

In order to depict the viability and financial stability of the companies in the Real Estate sector, we have employed key financial measures to describe at high level the course of the sector during the last 6 years.

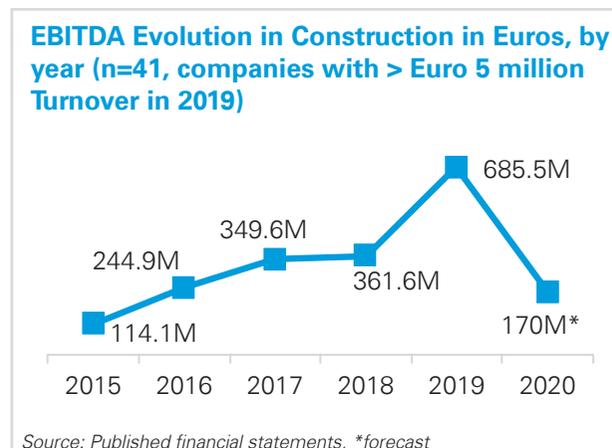
Turnover

The Turnover of the sector had a steady – almost linear – upward trend from 2015 until 2019, reaching its highest point in 2019 with Euro 881 million, and with a Compounded Annual Growth Rate (CAGR) of 25.7%. In 2020, the sector experienced a decline, amounting to Euro 367 million.



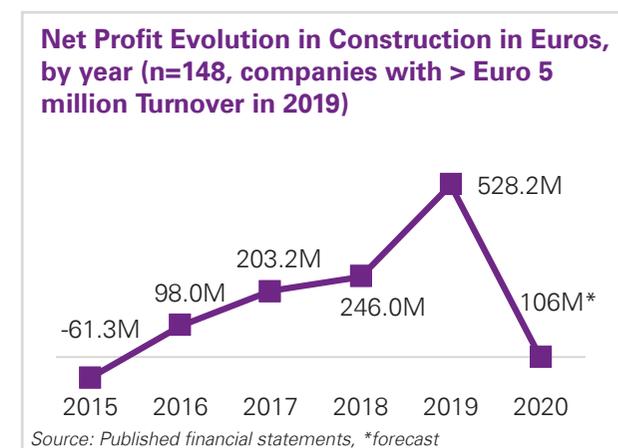
EBITDA

The EBITDA of the sector has a notable variance in the last 6 years. In 2015, the EBITDA reached its lowest point at Euro 114 million and from that point and onwards it started to rise. After a reduced increase rate between 2017 and 2018 – compared to the previous YoY percentage increase – where EBITDA reached the Euro 350 million, Real Estate's EBITDA skyrocketed in 2019, reaching the Euro 689 million. In 2020 though, the EBITDA of the sector experienced a great decline, reaching the Euro 170 million.



Net Profit

The Net Profit of firms within the Real Estate sector has reached both positive and negative values over the last 6 years. More specifically, in 2015 we can see that the sector achieved a negative Net Profit of -Euro 61 million – the lower point of the last 6 years. Over the next years the sector's Net Profit was positive, and until 2019, was also increasing. The Net profit reached its peak in 2019, reaching Euro 528 million, a 115% increase YoY compared to 2018. In 2020, the Real Estate sector sharply decreased, reaching the Euro 106 million.



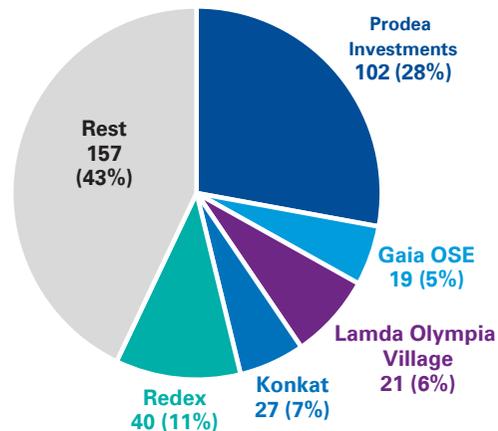
Key players in Real Estate & Development

In the Real Estate sector, a couple of big players maintain a high percentage of the market share. Similarly, to the Construction sector, the high capital requirements for claiming a leading position in the Real Estate sector pose high barriers to entry for new companies. The Real Estate sector is expected to be increased in the following years, largely due to the construction of the Ellinikon Project, where multiple residential and commercial real estate will be available for sale. In the following paragraphs we will try to depict the differences between the leading firms in the Real Estate sector in terms of some basic financial measures for 2020.

Market Share

As we mentioned in the Construction sector, the Real Estate sector is also highly concentrated around the top five companies holding the 57% of the sector's Market Share. Prodea Investments and Redex held 28% and 11% of the market share, respectively. Konkat, Lamda Olympia Village and Gaia OSE follow with 7%, 6% and 5%, respectively.

Market Share in Real Estate in 2020 in million Euros (n=21, companies with > Euro 2 million Turnover in 2020)

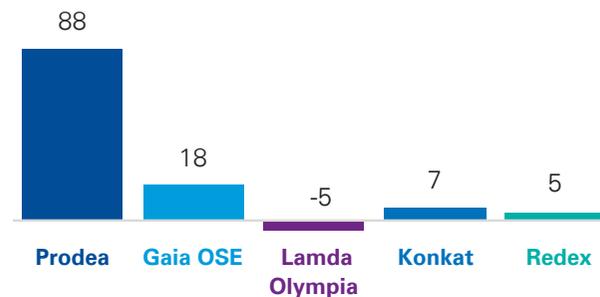


Source: Published financial statements

EBITDA

The EBITDA of the top five companies is mainly positive. This is also the case for the majority of the companies that belong to this sector. Specifically, Prodea Investments had the highest EBITDA with Euro 88 million. Gaia OSE, Konkat and Redex achieved EBITDAs of Euro 18 million, Euro 7 million and Euro 5 million, respectively. On the other hand, Lamda Olympia Village had a negative EBITDA of -Euro 5 million in 2020, a 107% decrease compared to 2019.

EBITDA of the key players in Real Estate in 2020 in million Euros (n=21, companies with > Euro 2 million Turnover in 2020)

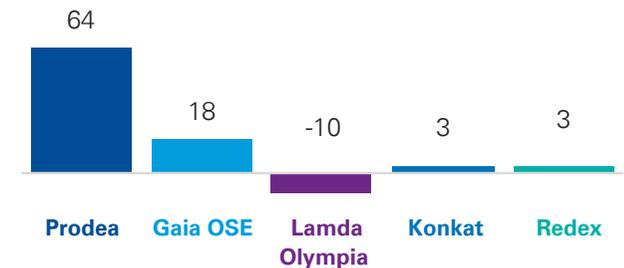


Source: Published financial statements

Net Profit

The Net Profit of the five top companies in 2020 is mainly positive. Prodea Investments had a high Net Profit of Euro 64 million, dropping by 72% compared to 2019. Gaia OSE had Net Profit of Euro 18 million, while Konkat and Redex achieved relatively small Net Profits of Euro 3 million both. Finally, Lamda Olympia Village had a negative Net Profit of -Euro 10 million (-128% vs 2019).

Net Profit of the key players in Real Estate in 2020 in million Euros (n=21, companies with > Euro 2 million Turnover in 2020)



Source: Published financial statements

Sectoral Trends



Forces of Transformation

Forces of change are factors or mega trends that can affect the whole economy including the real estate and construction sectors or target those specific sectors. Forces can be tightly connected, having uni- or bilateral effect, depending on each case.

Population & Demographics

One of the greatest forces of change for the sector is the population dynamics. The increasing level of urbanization and world population is driving a construction frenzy especially in developing countries, with real estate gains tagging along. The level of urbanisation in Greece rose from 76.3% in 2010 to 79.4% in 2019, leading to a surge in demand and subsequent increase in urban area house prices by 9.3%. However, the Greek population is projected to decrease by 3.9% by 2030 and by 11.4% by 2050¹. Declining population will put downward pressure on housing prices in the long-term in OECD countries.

Environment & COVID

Buildings are responsible for about 40% of global energy consumption, 25% of global water, 40% of global resources and 33% of total gas house emissions². To combat climate change and environmental degradation buildings need to meet new sustainability standards. The push towards greener practices can be encouraged or imposed by regulatory authorities. The pandemic has created numerous problems and spill over effects that reach the construction and real estate sector. Disruption of global trade, shutdowns and the transition towards greener practices have led to energy and metals price increase. This price increases affect the cost of construction and the price of the final deliverable.

Investments

The flow of investment on the real estate and construction markets is everchanging with investors hunting the next best opportunity. In real estate countries such as Sri Lanka, Brazil, Nigeria & Greece have stepped into limelight. In Greece, the value of real estate properties could increase up to 5% within 2021³. In construction, countries like USA and Greece are eager to improve and expand their ageing infrastructure. USA alone plans to spend over \$1 trillion over the next 8 years. In Greece, the construction sector will benefit from Euro 6 billion planned infrastructure projects in Attica and Euro 13 billion in Northern Greece.

Technology & Innovation

Improvements in existing technologies and the introduction of innovation can substantially reduce cost and completion time of construction projects, improve access to and reduce cost of managing real estate properties. Proper introduction of technologies such as sensors used in predictive maintenance can reduce project cost in construction up to 20%, while 3D laser scanning can lead to a 5-7% reduction in project costs and 10-12% improvement in project timing, with up to 80% reduction in site time¹. However, rewarding as innovation might seem, the implementation of digital technologies in the EU construction sector is still limited. In a global KPMG survey of 188 real estate companies, only 29% of real estate companies have a digital transformation strategy in place⁴.

Policy

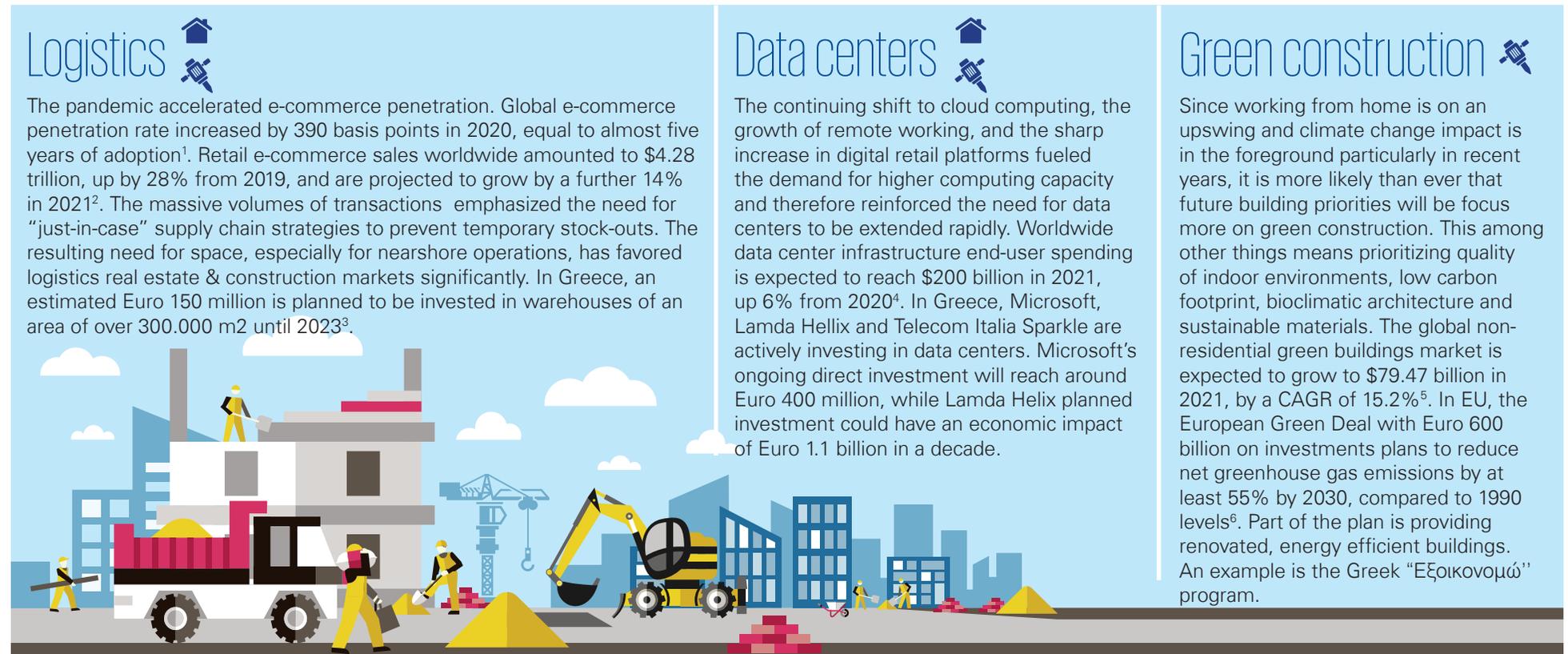
Governmental policies are a catalyst or deterrent for market trends with their effect on the real estate & construction sectors being direct or indirect through spillover effect. Example of these policies are the restriction of power usage and production capacities in the Chinese metals sector that is contributing to a global rise in metals price and cost of construction and the European Green Deal for the energy efficiency upgrade of buildings.

Sources: European Commission¹, World Economic Forum², Royal Institution of Chartered Surveyors³, KPMG Research⁴

Emerging themes

The pandemic has affected the construction and real estate markets at varying rates and in different directions, depending primarily on the potential spreading risk (spaces with a wide vs limited public use). Some of the existing trends were accelerated (e.g., logistics facilities), others lost momentum (e.g., big, densely populated, cities with extended shopping and entertainment facilities and potential for large passenger traffic volumes).

Economic & construction sites shutdowns and work from home resulted in severe delays or termination of entire construction projects of offices and retail properties. Within the residential property sector, the prevailing theme was migration from big cities to suburban areas; many rented or purchased houses in quieter communities to avoid public commute or moved to live with relatives. Some trends that were already underway were accelerated, such as the need for logistics and data center facilities, and bioclimatic buildings, and new trends came to rise such as work from home.



Logistics

The pandemic accelerated e-commerce penetration. Global e-commerce penetration rate increased by 390 basis points in 2020, equal to almost five years of adoption¹. Retail e-commerce sales worldwide amounted to \$4.28 trillion, up by 28% from 2019, and are projected to grow by a further 14% in 2021². The massive volumes of transactions emphasized the need for “just-in-case” supply chain strategies to prevent temporary stock-outs. The resulting need for space, especially for nearshore operations, has favored logistics real estate & construction markets significantly. In Greece, an estimated Euro 150 million is planned to be invested in warehouses of an area of over 300.000 m² until 2023³.

Data centers

The continuing shift to cloud computing, the growth of remote working, and the sharp increase in digital retail platforms fueled the demand for higher computing capacity and therefore reinforced the need for data centers to be extended rapidly. Worldwide data center infrastructure end-user spending is expected to reach \$200 billion in 2021, up 6% from 2020⁴. In Greece, Microsoft, Lamda Hellix and Telecom Italia Sparkle are actively investing in data centers. Microsoft’s ongoing direct investment will reach around Euro 400 million, while Lamda Helix planned investment could have an economic impact of Euro 1.1 billion in a decade.

Green construction

Since working from home is on an upswing and climate change impact is in the foreground particularly in recent years, it is more likely than ever that future building priorities will be focus more on green construction. This among other things means prioritizing quality of indoor environments, low carbon footprint, bioclimatic architecture and sustainable materials. The global non-residential green buildings market is expected to grow to \$79.47 billion in 2021, by a CAGR of 15.2%⁵. In EU, the European Green Deal with Euro 600 billion on investments plans to reduce net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels⁶. Part of the plan is providing renovated, energy efficient buildings. An example is the Greek “Εξοικονομώ” program.

Sources: Prologis¹, eMarketer², Alpha Bank³, Gartner⁴, Global Newswire⁵, European Union⁶, KPMG Research⁷, U.S.- China Economic and Security Review⁸, OECD⁹, European Commission¹⁰



Emerging themes

Space Optimization & Flexibility

Pre-pandemic, on a typical working day, companies did not use an average of 20-40% of their space⁷. The pandemic gave rise to the work-from-home model further reducing utilisation of company offices. Companies are now moving towards a hybrid approach that let employees work both from offices and their house. Although still unclear, the aftermath for real estate companies could be a reduction in the total demand for office space and a downward pressure in office rent prices.

Digitalisation, Smart Cities and Connectivity

As cities continue their transformation towards a “smart” state, global smart city market is expected to reach \$820.7 billion globally by 2025. China has nearly 800 smart city programs underway or in planning, while the local smart city government investment had reached \$139.9 billion till the end of 2019⁸. In EU, digitalisation of services has reduced the cost of services up to 85%⁹ with northern and central European countries at the forefront of implementation. On the other end, according to the Digital Economy and Society Index, Greece was one of the poorest performers in terms of connectivity, digital public services and integration of digital technologies in the EU in 2020¹⁰ with obsolete infrastructure being one of the largest obstacles in the transition towards smart cities.

Golden Visas

The Greek Golden Visa is one of the most popular investment visa programs in the EU. It is a residence-by-investment visa, issued to non-EU citizens who make a significant contribution to the Greek economy. There are several investment options, but the most common route is through purchasing real estate worth at least a quarter of a million. The Greece Golden Visa offers immediate five-year residency to the investor as well as their immediate family members, as well as free travel in the Schengen Zone. From 2014 until the end of 2020, 8 011 residence permits have been issued, which translates into revenue of at least 2 billion euros for the real estate market.

Innovative technologies

The pandemic forced the construction sector to operate in different and smarter ways, speeding up the adoption of innovative technologies like video communications, cloud-shared files and site monitoring through drones. This has been a game changer for efficiency, enabling project managers to communicate remotely, change plans in real time and track people on site, enabling projects to proceed at pace⁷.

Risk Management

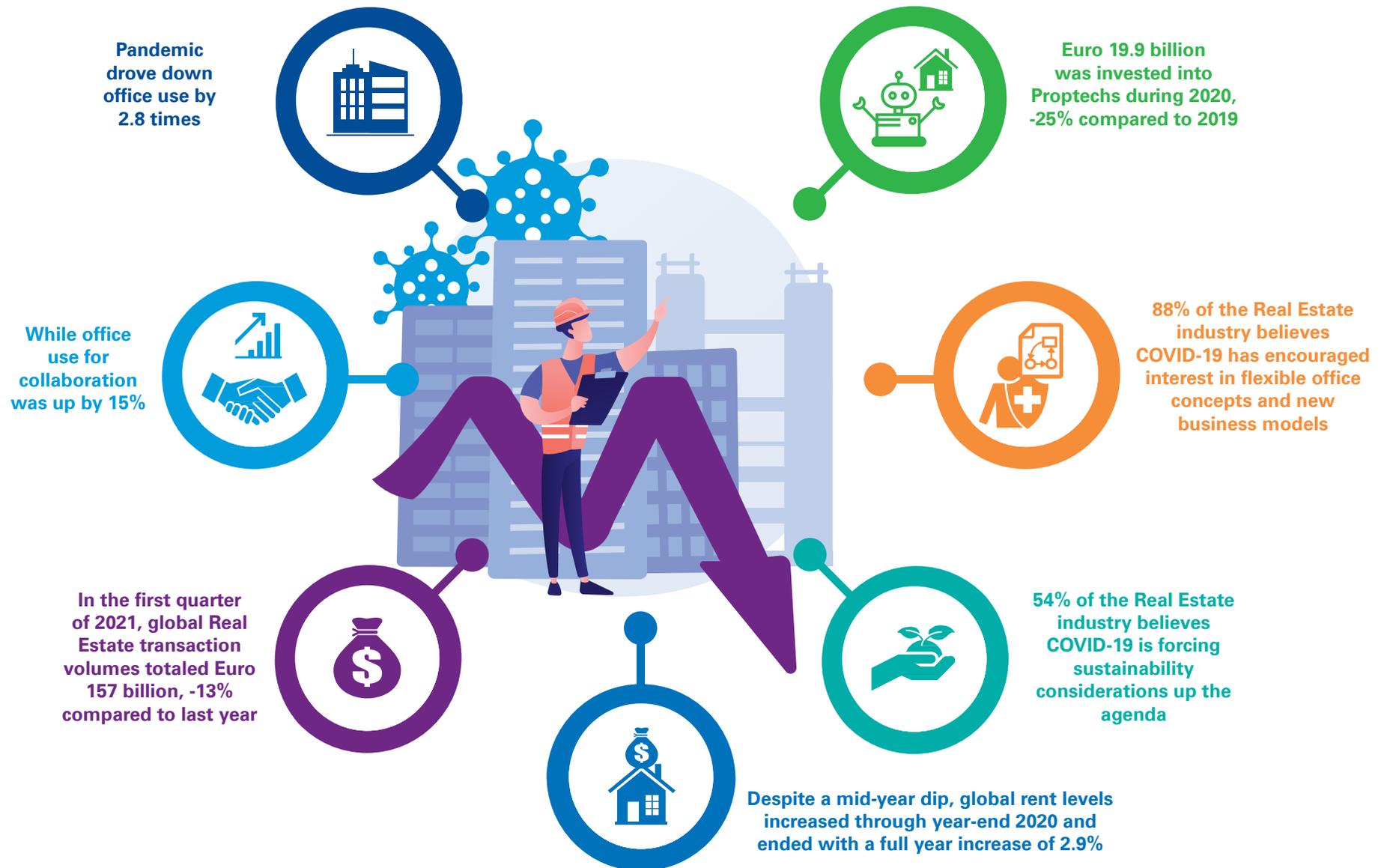
As presented in the KPMG Global Construction Survey 2020, in recent years, construction companies have pushed resources into risk management, a trend that is set to continue as two-thirds of participants are planning a moderate or high level of investment in future. Their focus is in (a) developing clearly defined & standardised project risk management processes and controls, (b) promoting a risk culture and (c) integrating between enterprise, portfolio and project risks functions.



Sources: Prologis¹, eMarketer², Alpha Bank³, Gartner⁴, Global Newswire⁵, European Union⁶, KPMG Research⁷, U.S.- China Economic and Security Review⁸, OECD⁹, European Commission¹⁰



A glimpse at the Post-COVID Global Real Estate market



Technology & Innovation

Technology & Innovation



Information Technologies utilised-specialised in the real estate sector are called **Proptech**, property technology. Proptech is intended to help facilitate the purchase, management, maintenance and investment into both residential and commercial real estate.



Construction technology refers to the collection of innovative tools, machinery, modifications and software used during the construction that enables advancement in field construction methods.

We have classified Proptech and Construction Technology innovation into 9 categories:

1



Digitizing processes consists of innovations that digitize traditional processes. This enables the processes to analyze more data, be accessible online and real-time while making them more efficient and user friendly.



Business Challenge

Although many people are used to having most tasks done digitally and having an unlimited world of data at their fingertips, many (Real Estate & Construction) companies often face situations and own procedures which are still performed manually. Companies struggle with implementing data solutions, trying to reap benefits of the digital world. This is due to a variety of reasons, such as having a legacy of systems which make integration of new solutions harder. Another reason is lacking resources to correctly gather and analyze data. Moreover, most firms use data to drive insights on financial analysis, while strategic decision making is less often a goal. Let alone tenant experience, which is rarely an aim at all. Not utilizing company data to its fullest comes at the cost of efficiency, lacking insights for decision making and ultimately, lagging behind the competition.



Solution

AI or machine learning can facilitate digitizing processes by automatically collecting and combining data from multiple sources and composing insights and predictions. Over time, this process will improve as more data is analyzed and the AI learns through all of the input. Everything can be adjusted and tailored to specific business needs, e.g. risk appetite and/or best-/worst-case scenario's. Herewith, better decision-making is facilitated. In the market KPMG observes that only analyzing data is not enough, a solid foundation is crucial and requires a combination of a managed data content combined with good data quality and enabling cross-organizational collaboration, but also entails the necessity for a sustainable data management program.

Technology & Innovation

2



Flexible workspaces entails innovations that create the opportunity for Real Estate to be flexible in time, location and environment; can be allocated 'anywhere' and 'anytime'.



Business Challenge

As organizations begin to plan their return to (shared) workspaces, a challenge is to enable a hybrid-workplace model that combines the aspects of remote and in-office working. Challenges related to modifying or adjusting seats, and workstations to ensure flexible arrangements could also mean deciding on situations such as:

- Impact on working culture and satisfaction
- Staff satisfaction and needs
- Optimal collaboration models



Solution

Flexible workspace providers offer solution which respond to the need for office space on demand; working from various locations at any time becomes reality. Companies are no longer obliged to facilitate in large communal offices to meet as they can empower employees by giving them the choice of where to work. This could be the traditional office, working from home, or through an external flexible workspace platform. Flexible workspace platforms connect supply of excess workspace to demand for additional needed space, thereby optimizing the use of existing assets. KPMG observes that a hybrid and tailor-made model combining flexible workspaces and traditional corporate workspace is considered by many employers, in order to adapt to the changing needs of the modern day employee.

3



Innovations in **healthy workplace and living** focus on the physical working environment, ranging from air purity to office treadmills for walking meetings, optimizing employee satisfaction, health or productivity.



Business Challenge

The COVID-19 pandemic has demonstrated the importance of healthy and safe workplaces. While starting to return to the office work space and construction sites, employers have to deal with new insights in health requirements to create comfortable and safe environments for their employees and ensure their peace of mind. Specifically, dealing with challenges such as distancing, clean air, and proper ventilation to maintain a healthy work environment. In the Real Estate, this involves connecting multiple stakeholders like tenants and landlords, the tenants' employees and external service providers like cleaning companies or suppliers.



Solution

Sensors to monitor for air pollutants, ventilation speed or humidity, autonomous disinfection robots for cleaning activities, installation of touchless entry systems at common areas using biometrics or facial recognition (AI-technology) and occupancy management using sensors to track movements for the post-pandemic hybrid workplace can facilitate a healthy work environment. KPMG observes that robots and touchless entry systems may help facilitate the shift to the new normal, especially for places that witness high footfalls. Coupled with sensor-based monitoring of occupancy and movement, used to adjust the work environment to the needs of employees, employers can ensure working conditions are up to standard.

Technology & Innovation

4

Innovative constructions contribute to new ways of constructing Real Estate. This may include architectural benefits or enhancements in construction materials and processes (e.g. 3Dprinting, modular building and wooden skyscrapers).



Business Challenge

In an ever-changing world the construction sector has proven to be fairly conservative. Several challenges within the construction sector are becoming increasingly urgent. The productivity increase in the sector has been lagging in comparison to the larger economy, the sector is facing high failure costs, raw material costs have increased, labor shortages are worsening and craftsmen are becoming scarce. All the while the demand for affordable housing is structurally growing. Additional pressure from stakeholders, due to environmental concerns, is driving a call for change. Specifically for the construction sector this focuses on the negative impact on the environment through emissions, the production of large waste streams, and the part played in the depletion of natural resources.



Solution

Standardized components of a building are produced in an off-site location under controlled plant conditions, before transporting the components to a final location where they are assembled. Components are standardized, therefore construction is faster and can be scaled more easily, while still allowing to build personalized and unique buildings. KPMG observes that transitioning to modular construction is often accompanied by the need for a digital transformation. We find that modular construction is most effective and efficient, when data, robotics, and technology drive process improvement. Focusing on standardization regarding design, production, and realization, while allowing for personalization through modules usable in different configurations.

5



Internet of Things (IoT) applies to innovations that connect multiple devices, systems and/or buildings with the aim of making Real Estate and Construction more efficient, sustainable and user-friendly.



Business Challenge

The pandemic has made enterprises realize that the possibility of acquiring insight by being on site is not always a given. Without remote access and control, assets might become inaccessible or inoperable resulting in increased costs or an inability to provide the right service. Moreover, an inability to access the right data may result in erroneous decision making. Internet of Things (IoT) technologies, whether it's sensors or data systems, is believed to be the crucial technology to overcome challenges related to service delivery. Additionally, providing the ability to seamlessly carry out business operations, and increase efficiency due to fast and accurate measurements.



Solution

Organizations have the ability to embed camera, sensors, actuators, software or other applications to existing infrastructure to create a connected and automated world; one that can be monitored and analyzed on a real-time basis. Moreover, this creates the opportunity to take preventive and detective measures. Note that the Internet of Things is already an advanced innovation and that many applications –e.g. pipes, lights and plants –can complement your online domain. KPMG observes that post-COVID-19, IoT solutions will become indispensable for companies to manage organization and workforce. As in a world in which physical presence is becoming less of a norm, remote access and insight will be a prerequisite for doing so.

Technology & Innovation

6



New ways of funding are innovations that aim for making funding less complicated, more accessible and/or increase liquidity for both the demand and supply side.



Business Challenge

In the traditional way, financing any Real Estate transaction has been limited to a limited number of channels, making access to finance rather challenging. Consequently, this has impeded smaller investments such as those originating from non-professional investors. Besides access, the process of acquiring Real Estate often comes with plenty of challenges, right from selecting a property, to finalizing a broker (for selling and purchasing) and a mortgage lender to finance the purchase. The process is complex due to the many parties involved and possible issues related to the expensive and time-consuming process of underwriting loans due to changing lender guidelines and rates.



Solution

Digital RE platforms leverage big-data and AI technology to provide services related to title operations, closing deals, escrow services and other facilities like mortgages and shopping for insurance. These platforms have integrated all services into a single digital solution thereby eliminating commissions and excess cost for consumers. Moreover, platforms using blockchain can provide access to the Real Estate sector for all levels of society by tokenizing the asset or portfolio and removing the minimum investment hurdle. KPMG observes that the Real Estate sector benefits from technological upgrades such as loan automation, digital leasing, and online investment platforms. Each of these innovative solutions in various parts of the value chain contributes significant value to the efficiency of Real Estate industry by decreasing cost and simplifying deals, enhance communication and customer experience.

7



Platforms to connect allow users to connect and interact with stakeholders (e.g. buyers/sellers, owners/tenants, or construction parties and maintenance). These could essentially result in optimized communication, collaboration and knowledge-sharing.



Business Challenge

Technology is playing an increasingly important role in our daily lives. Connecting efficiently with other stakeholders in the Real Estate value chain becomes more and more critical. This requires professionals to have the ability to communicate instantly and provide accurate and up-to-date information. Communication through traditional modes such as phone or email are no longer sufficient to provide the required speed and hence there is a need for additional and widely accessible platforms.



Solution

Platforms which connect several stakeholders into one digital environment enable smooth collaboration and communication. Moreover, these can provide a market place for supply and demand where the need for middle man disappears and a service provider can communicate directly with the requestor (e.g. tenant), thereby paving the way for introduction of new and innovative business models. In a world in which digital communication is becoming the norm, and efficiency, safety and hygiene are of paramount importance, KPMG observes that digital collaboration tools will continue to play a pivotal role in ensuring seamless workflow.

Technology & Innovation

8



Sustainable innovations focus on aspects such as ESG, energy savings, water-efficiency and circular economy in order to sustain our natural resources. Drivers may be regulatory changes, sustainability agendas or cost reductions.



Business Challenge

Long-term benefits of integrating ESG-efforts into business are more evident than ever. Organizations get evaluated by clients and challenged by society on their carbon footprint. The industry is still struggling with prioritization of ESG on the executive agenda. At the same time, public opinion keeps shifting and regulation becomes more strict (i.e. for asset managers), in particular at the end of the current COVID period where Real Estate owners and Construction Developers and Contractors are pushed to deliver on their promises regarding ESG, making it a top priority.



Solution

There are several solutions available within the Real Estate value chain. Real estate owners and occupiers are able to reduce carbon footprint by increasing utilization efficiency of Real Estate through sensor-based technology. Investors are able to implement these technologies on a large scale, driving the change towards sustainable Real Estate. Moreover, sustainable or re-usable materials and circular Real Estate help improving carbon footprint, i.e. with help of a materials passport. Embedding circular models and implementing ESG solutions in different aspects of a Real Estate or Construction company is essential to reduce our industry's carbon footprint in the long-run while at the same time providing favorable opportunities to stand out towards clients and investors.

9



Virtual reality and 3D mapping replicates an environment using computer and/or drone technology or allows users to create an alternative reality (e.g. BIM).



Business Challenge

Digitalization has further accelerated through working from home. On-premises tours are no longer a must have and architectural viewings take place in the online domain, 24/7 globally. Marketing properties, showing photos and videos are more commonly replaced by immersive experiences and 3D visualizations and tours. Property managers need to invest in their capabilities and technology to ensure their properties stand out – everywhere and continuously.



Solution

Adoption of virtual reality or 3D mapping technology for providing digital walkthrough allows prospective tenants, buyers or manager to carry out a full property viewing/inspection online. The technology merges the images and videos of a property to create a digital space that is practically indistinguishable from the real property. This potentially provides new exclusive experiences for investors, and hence the chance to differentiate from competitors. Moreover, pre-construction architectures can be viewed with minimal clicks. Herewith, constructions can be viewed ahead of laying the first brick.



Global Construction Survey 2021

2021 Global Construction Survey

No turning back: An industry ready to transcend

The past 18 months have seen some welcome changes in approach to major projects. There's been an imperative step change in the use of remote and collaborative technology, in order to keep projects running despite fewer people on site.

We've also witnessed a renewed spirit of collaboration, as owners acknowledged the truly unique nature of the pandemic and lockdowns and accepted their share of the associated risks and costs.

Having come through this difficult period relatively unscathed, there's a sense that contractors may finally be turning their backs on projects with unmanageable risks that could jeopardize their entire business.

Are these accommodations a signal of more permanent shifts or merely temporary adjustments?

This 13th edition of the Global Construction Survey aims to answer big questions such as this.

Download the report to find out what 186 people from engineering & construction companies and project owners are saying about the future of resilience, integrated risk management, portfolio project management, diversity, equity and inclusion and technology and innovation in the sector.

No turning back

An industry ready to transcend



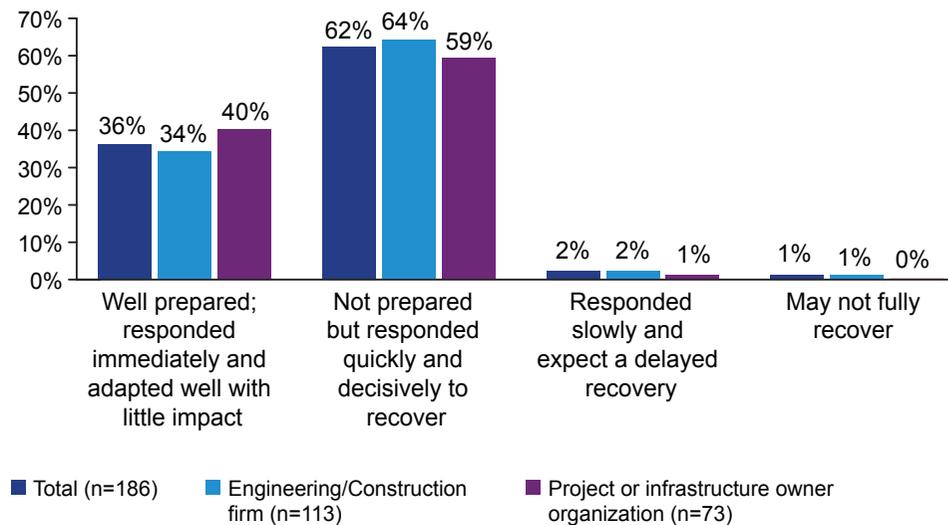
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2021 Global Construction Survey

Sneak peek

The engineering and construction industry is accustomed to coping with disruption. Whether it's macroeconomic and financial cycles, natural and man-made disasters, or increasingly varying and impactful weather conditions, the sector routinely overcomes design, schedule and budget changes, supply delays, equipment failure, labor disputes and accidents.

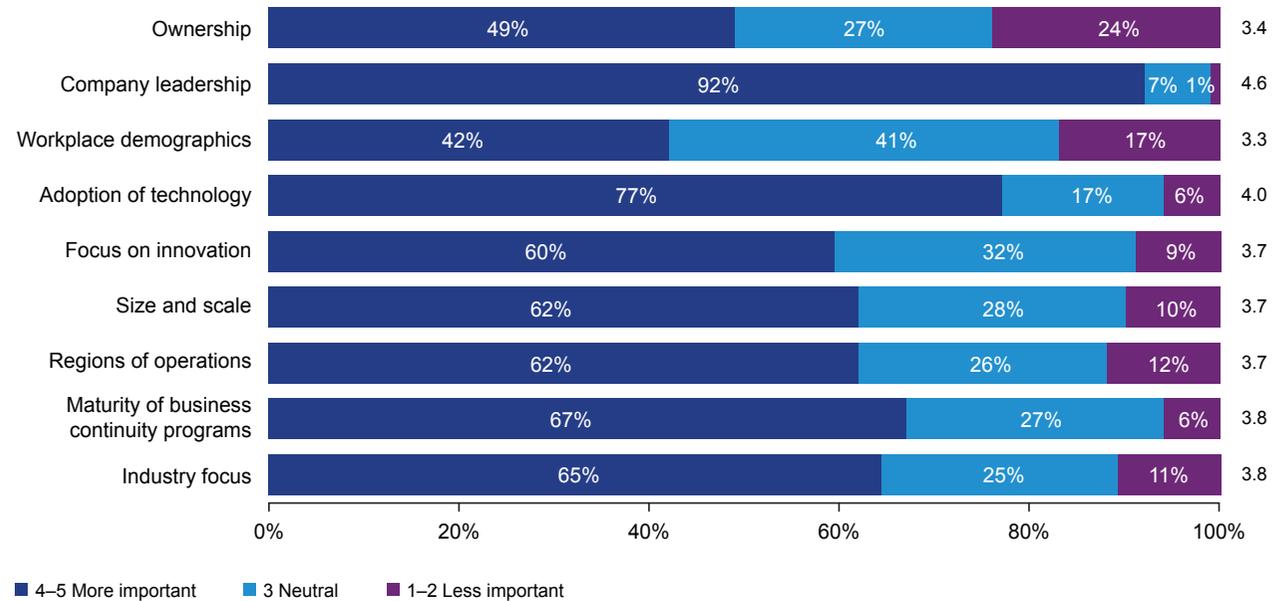
How did your organisation respond to the pandemic?



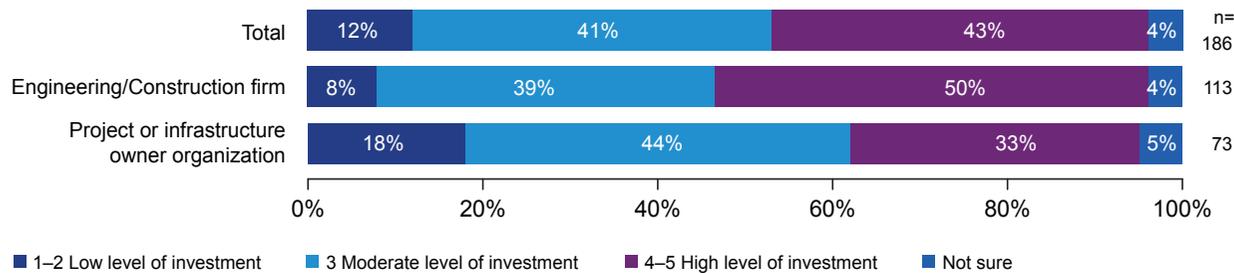
And so it was with COVID-19, where all over the world, projects continued in the face of remote working, lower workforce numbers allowed onsite, and illness. Although just 36 percent of respondents say they were 'well prepared' for the pandemic, the vast majority feel they were able to respond quickly and decisively recover

2021 Global Construction Survey

Rate the attributes that influence your organisation's success or failure in dealing with disruptive events



Planned technology investment for your capital program

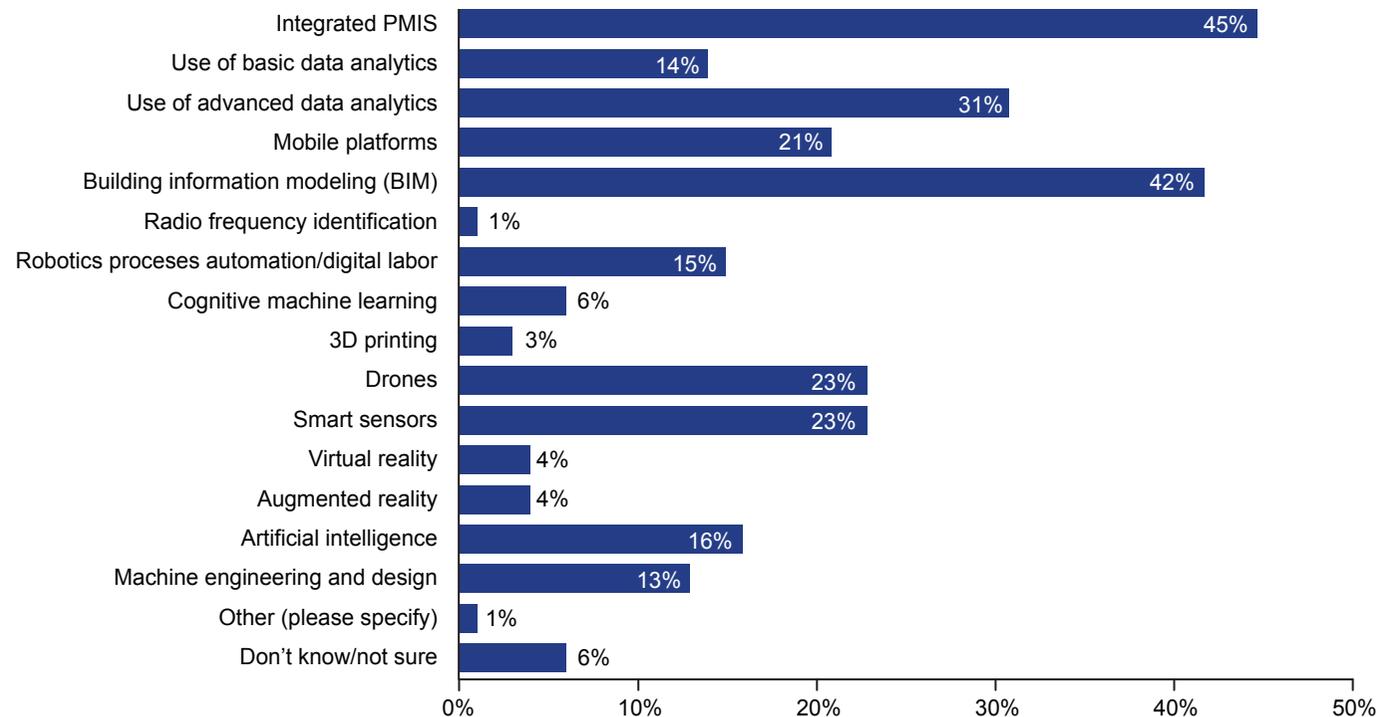


The desire to adopt technology appears strong, with most of the respondents reporting that their companies plan a moderate or high level of investment. But there's a noticeable gap between owners and contractors, with the latter considerably more likely to invest heavily (50 percent versus just 33 percent for owners)

2021 Global Construction Survey

When asked which technologies have the greatest potential, the top three responses are integrated PMIS, Building Information Modeling (BIM) and advanced data and analytics. Both owners and engineering and construction companies believe these innovations can give a healthy return on investment by increasing efficiency and improving decision-making.

Technologies with the potential to deliver the greatest overall return on investment to your organisation



Key Messages



House Prices

In the pandemic era, house prices are rising; Despite the weak economic activity, low borrowing capability and household saving boosted demand for house purchases



Sector' Positive Outlook

As the Greek economy gradually reopens and the government re-focuses on measures related to housing and infrastructure, Construction Sector signals for substantial grow



Raw Materials

Supply chain disruption along with the demand peak in Real Estate & Construction services are both the determinants for the increased prices in materials



Emerging Themes

Green Constructions, new Data & Logistics Centres are here to stay and appear as emerging themes in the post COVID-19 era



Change Drivers

Digitalization, IoT, 3D mapping, and buildings' sustainability are the drivers that rapidly change the both the real estate & construction sectors



Innovation Trends

Integrated PMIS, BIMs and data analytics placed as the top innovation trends with healthy return on investment

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