

The background of the cover is a vibrant, abstract composition. It features a large, stylized world map in shades of orange and red, which is partially obscured by large, overlapping geometric shapes in yellow, white, and red. The bottom portion of the cover is a solid dark purple. The title "2018 META: ANNUAL REPORT" is prominently displayed in the lower half, with "2018 META:" in white and "ANNUAL REPORT" in large, bold yellow letters.

# 2018 META: **ANNUAL REPORT**

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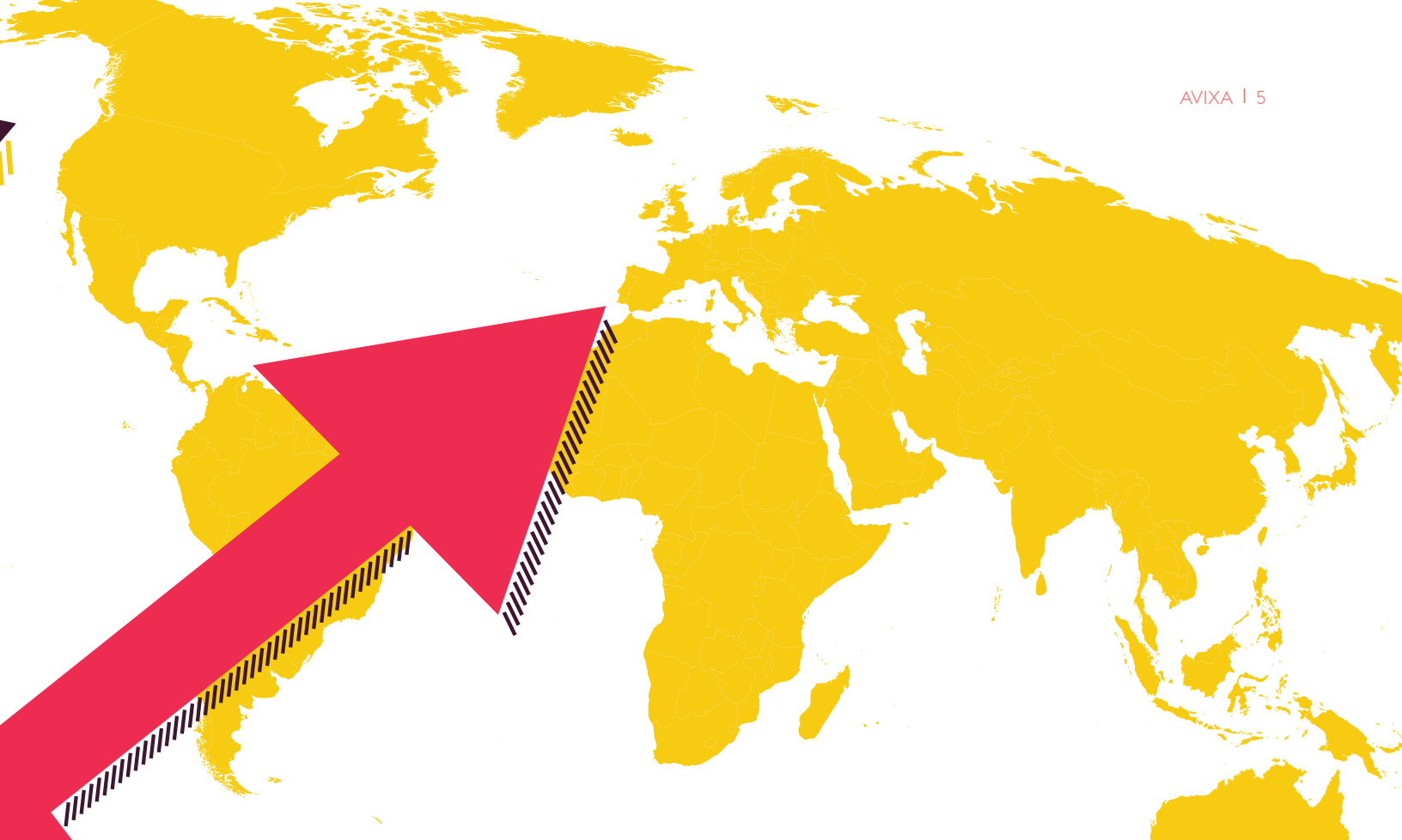


## Introduction, Scope, and Methodology

The Marco-Economic Trend Analysis (META) report is a comprehensive examination of global economic trends in 2018. The report starts with “The Macroeconomic Backdrop,” which consists of a data-driven, macroeconomic analysis of the five global regions: North America, Latin America, Middle East and Africa, Europe, and Asia-Pacific. This section focuses on the economic indicators that are most relevant to the professional audiovisual (pro-AV) industry. These include core economic concepts such as gross domestic product (GDP) and the unemployment rate, as well as spending in nonresidential construction sectors, which have significant links to demand for pro-AV products and services.

The macroeconomic analysis leads into a discussion of potential risks and

opportunities for the pro-AV industry, which is presented in the “Risks to the Outlook” and “Opportunities for Growth” sections. “Risks to the Outlook” examines current economic themes that pose potential threats to the industry. The section starts with a general overview of risks to the global economy by delving into topics such as nationalism and trade conflicts. Escalating global trade tensions, e.g., between U.S. and China, continue to be a major source of uncertainty in the global economy and will have an adverse effect on many industries. As with any technology-intensive industry, pro-AV is exposed to fluctuations in trade conditions; measures enacted for the sake of protectionism likely disrupt the industry. We discuss the adverse trade implications for high-tech industries.



“Opportunities for Growth” presents a data-driven exploration of pro-AV’s important vertical markets. These markets involve businesses in six verticals: sports, amusement, and recreation; arts, entertainment, and culture; accommodation and food services; retail trade; healthcare; and education. This analysis has important implications for pro-AV as the performance of these verticals is correlated with pro-AV demand. This section also highlights an evolving trend in pro-AV, namely, the rise of the entertainment industry. The competitive nature of that industry demands constant innovation and provides a major space for growth of the use of pro-AV products and services.

Definitions for activities conducted in each construction category as well as industry

verticals are in the glossary. All values are in real U.S. dollars (unless otherwise noted) to maintain consistency in comparisons and remove distortions from price changes.

It is important to note that the META report takes a more bearish stance on the global economy than the IOTA report released earlier this year. The dimmed outlook is driven by a combination of recent events that were factored into our forecasts. These events range from the economic and political volatility in Latin America to the recently escalated trade tensions between the U.S. and China. Overall, the global economy is slowing and, while 2019 still looks like it will be a relatively robust year for many regions, a deceleration is expected in 2020.

# The Macroeconomic Backdrop

The pro-AV industry is impacted by economic conditions throughout its supply chain. At the regional level, not only does understanding the pace of economic and sector growth provide insight into the performance of the industry, it also shines a light on the factors that are driving this growth.

The Macroeconomic Backdrop explores the macroeconomic trends that influence the pro-AV market. In this section, we provide a summary of current and future economic trends, followed by an assessment of the economic health of each region. We do this by analyzing its core economic indicators, namely, GDP and the unemployment rate from 2017 to 2022. GDP is the main measure of economic health and, when tracked over time, can provide a sense of a region's pace of growth or decline. The unemployment rate is another indicator for economic performance. Employment conditions are reflective of the economic well-being in a region, and experience volatility during downturns. For each region, the report focuses on the largest economies but also delves into the events that had an impact in smaller countries in 2018.

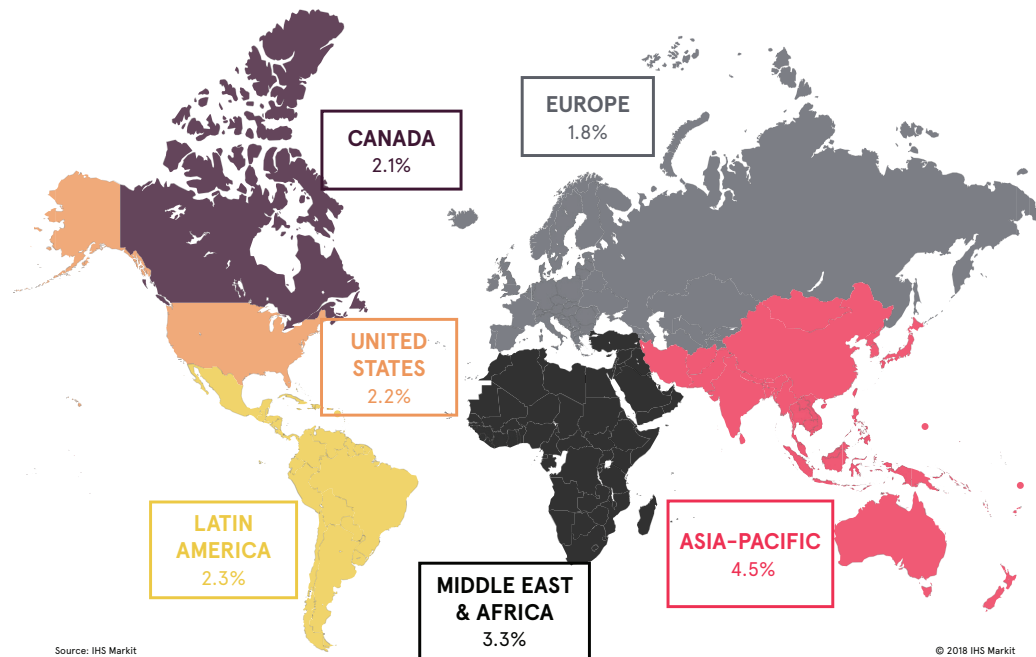
Fluctuations in nonresidential construction spending have important implications for assessing demand for pro-AV products and services as investment in these construction categories can translate into pro-AV sales. The report focuses on three categories of nonresidential construction: commercial, office, and institutional, as they are the most relevant to the industry.

Office construction includes investments in administrative, office, and professional buildings. The growing trend of smart buildings and video/webconferencing are a few instances where there is rising demand for pro-AV equipment and services. Furthermore, with a desire to improve collaboration, corporate leaders are often seeking innovative tools to expand in this space, leading to more pro-AV investment in the corporate setting.

Commercial construction includes investment in buildings and structures used by retail and other service industries alike (e.g., shopping centers, amusement and recreational structures, restaurants). Retailers and service industries rely heavily on digital signage for advertising, information, and entertainment.

Institutional construction includes investments in hospitals, schools, and sports and recreation complexes. Pro-AV products have become more and more relevant in this space as they have a wide range of uses. For instance, in hospitals, the adoption of digital signage has reduced the need for human interaction when informing visitors, and audiovisual equipment is being used more often as a tool to aid in surgical operations. Insight into the performance of construction builds a solid foundation to assess the impact of pro-AV equipment demand across regions and sectors.

## 2017-22 REAL GDP COMPOUND ANNUAL GROWTH RATE (CAGR)



## GLOBAL ECONOMIC GROWTH IS SLOWING

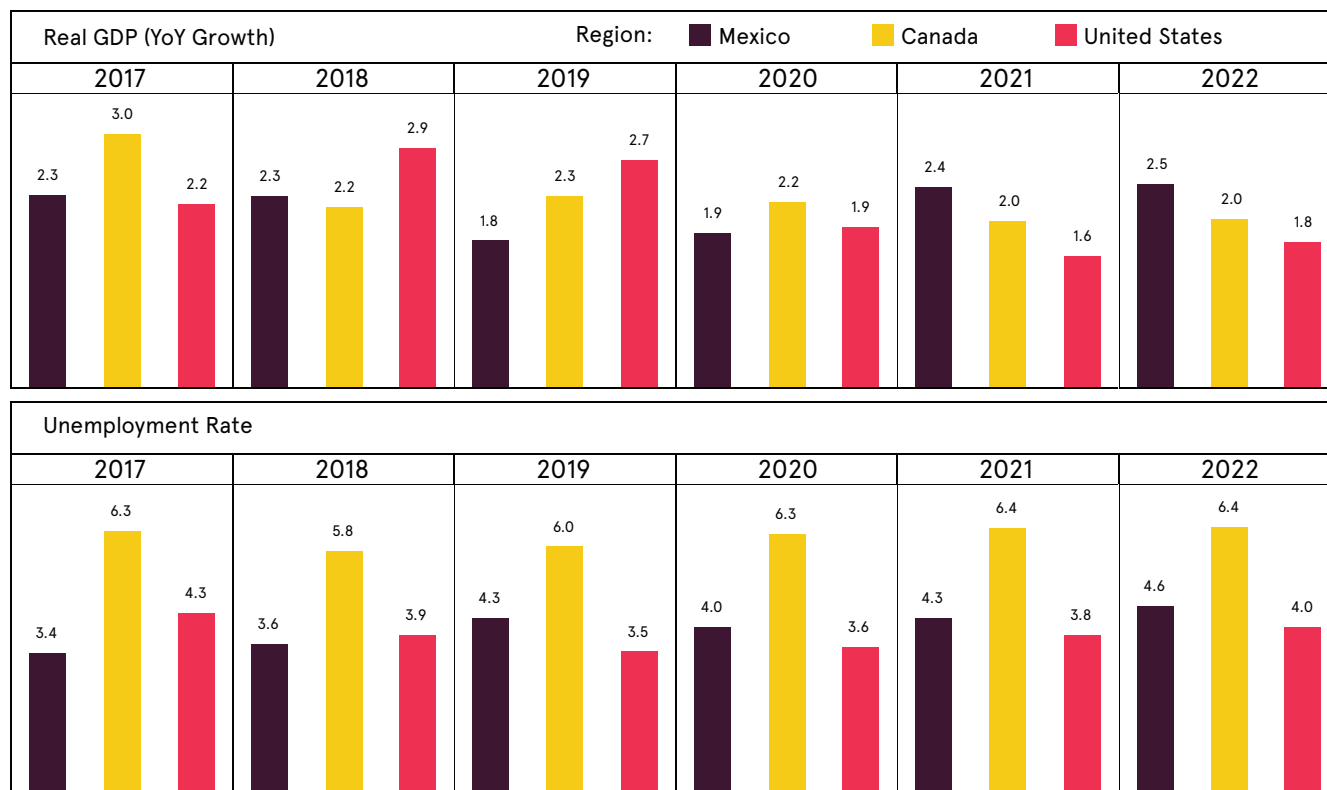
The global expansion has entered a precarious phase. Growth is slowing and risks are rising, but a downturn remains far from inevitable. IHS Markit expects global growth will hold at 3.2 percent this year before edging down to 3.1 percent in 2019 and 2.9 percent in 2020.

Europe's growth is slowing but remains above its long-term trend; risks include higher oil prices, political changes in Italy and Spain, and the financial crisis in Turkey. China's growth is slowing because of excesses in industrial capacity, debt, and shadow banking, as well as rising U.S.-China trade friction.

The news on emerging markets continues to be subpar and emerging-market equities are in bear territory. South Africa is in a recession and Turkey is headed there. Argentina has been forced to raise interest rates to 60

percent (more than double the rate at the beginning of the year) to support its crashing currency. Other emerging markets — such as Indonesia and the Philippines — have been sucked into the vortex, even though on the surface they look much better off than the hardest-hit economies.

Who could be next? IHS Markit has ranked the vulnerability of emerging markets based on four factors: the current-account deficit as a share of GDP, the ratio of external debt to foreign currency earnings, the rate of inflation, and an index of political instability. Based on these factors, Argentina and Turkey are outliers among the large emerging markets. Whereas not nearly as fragile, other countries such as Chile, Colombia, Indonesia, and South Africa are vulnerable, while India and the Philippines are less so.

**NORTH AMERICA: ECONOMIC INDICATORS (%)**

Source: IHS Markit

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**NORTH AMERICA'S GROWTH IS PEAKING**

With U.S. output near or above potential, economic growth will eventually slow. Aided by a fiscal stimulus and supportive financial conditions, real GDP is projected to increase by 2.9 percent in 2018, pushing the unemployment rate down to 3.4 percent. Wages and benefits are accelerating in response to a tightening U.S. labor market. This is putting upward pressure on inflation. The Federal Reserve is expected to raise the federal funds rate to a high near 3.5 percent in 2020, temporarily overshooting its long-run equilibrium of 2.75 percent. In response to rising interest rates, diminishing support from fiscal stimulus, and capacity constraints, economic growth is expected to subside to 2.7 percent in 2019 and 2.0 percent in 2020.

Steady real GDP growth just above 2.0 percent is expected throughout the forecast horizon in Canada. With a shrinking working population, most of the increase in real GDP growth will have to come from productivity gains, which should advance nearly 1.4 percent throughout the forecast horizon. This is a reasonable forecast as the federal government strongly supports high-technology firms with the goal of making Canada a leader in green and advanced technologies. A strong outlook for private-sector investment and rising business confidence will see business nonresidential investment strengthen. Rising commodity prices will also help Canada's terms of trade as well as nominal GDP growth and will advance the country's wealth.



**Tight fiscal and monetary policies are clouding the outlook for the Mexican economy.** Tariffs imposed on Mexican exports of aluminum and steel and retaliation by Mexican authorities also add risk to the outlook. The government needs to reduce the fiscal deficit while the central bank fights relatively high inflation. Real GDP is expected to grow 2.0 percent in 2018 and 1.9 percent in 2019. These are certainly modest rates for an emerging economy. A big constraint to growth has been the decline in public investment and the outlook does not look promising. A key assumption of this forecast is that the uncertainty about economic policy and its implementation will hurt business sentiment, investment, and economic growth in 2019.

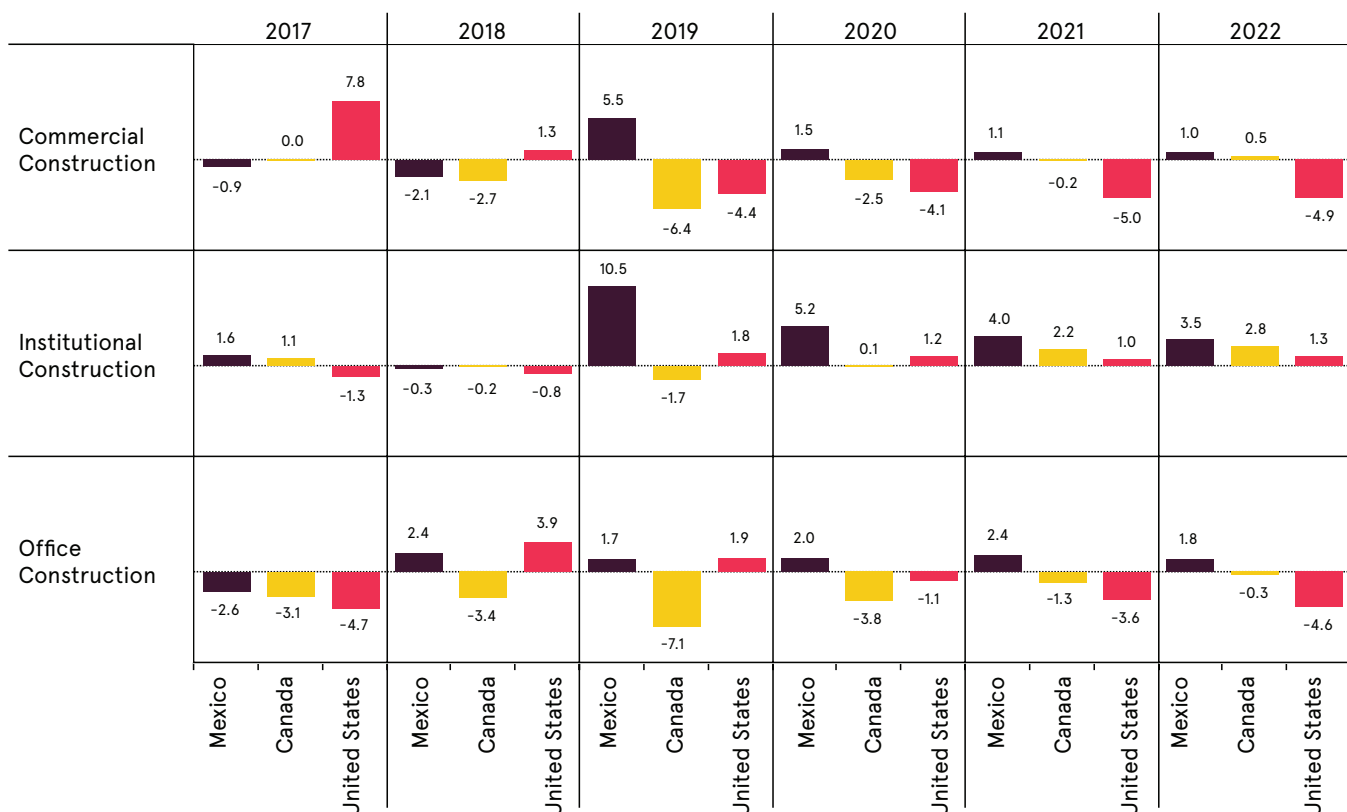
North America is slowing – and even unraveling – in nonresidential construction, largely stemming from the poor prospects for the region’s two largest economies. Canada

has the dimmest outlook, particularly in the office and commercial segments, with declines throughout the forecast horizon.

Similar weakness is found in the U.S., though office construction still has some life in it. Spending will expand, albeit slowly, in the office segment in the U.S. next year (2019), but declines are expected thereafter and through 2022.

Mexico is the bright spot in the region with each segment posting gains through the forecast. The fastest growth will be in the institutional segment, particularly in 2019–2020. A steady pace averaging 2.0 percent is expected in the 2019–2022 period for office construction. Expansions in the automotive sector is likely to support growth in the overall commercial segment but, after a rebound in 2019, spending in this segment will likely start to decline.

#### NORTH AMERICA: REAL COMMERCIAL, OFFICE, AND INSTITUTIONAL CONSTRUCTION GROWTH (%)



**Bottom Line:** North America's growth is slowing; however, there are some upsides that should support growth for pro-AV. Although U.S. growth is projected to eventually peak, there is positive momentum in capital expenditures stemming from the Tax Cuts and Jobs Act (TCJA). Incentives in the TCJA are reinforcing a boost to equipment spending from broad output growth, raising growth of equipment spending from 6.1 percent last year to 7.3 percent this year. The growth in equipment spending has positive implications for pro-AV, as parts of the industry fall within this spending category. Canada's modest growth expectations, supported primarily by rising productivity gains and business confidence, imply a neutral outlook for pro-AV in the country. Pro-AV will seek to benefit from the rise in nonresidential investment and the federal government's push to make Canada a leader in advanced technologies. However, the negative growth projections for commercial and office construction dim the outlook for the industry in that country. Mexico's weak GDP growth, accompanied by conservative fiscal policies and low public investment, does not inspire confidence for the pro-AV space in that country. On the upside, new trade agreements, along with the brighter outlook for office and institutional construction, are potential tailwinds for growth in the industry.

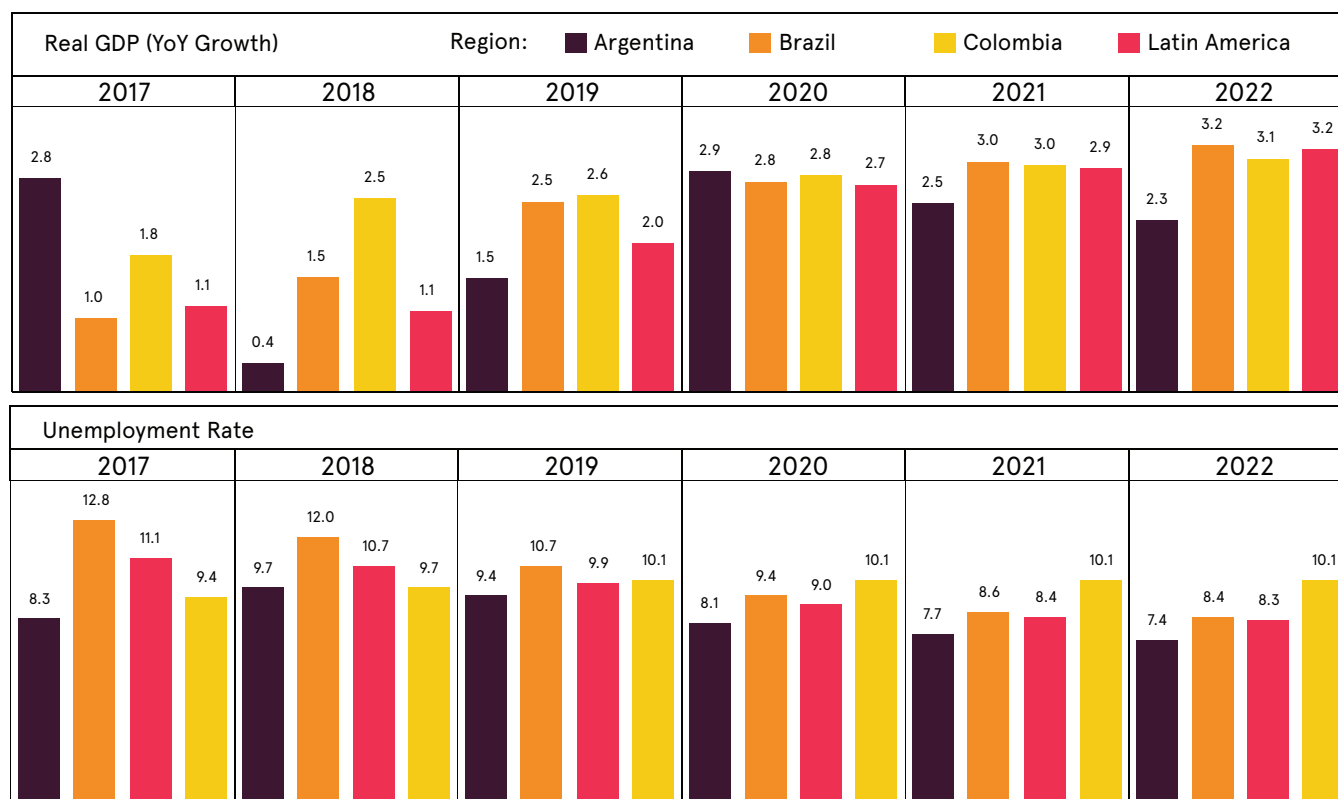
#### ISSUE TO WATCH

Canada and the United States reached agreement on the outline of a renegotiated North American Free Trade Agreement (NAFTA), now called the United States-Mexico-Canada Agreement (USMCA) on September 30, 2018. The agreement comes at the last possible moment before an important deadline which, if not met, would have made the agreement's legislative approval in the United States and official adoption by Mexico more challenging. The deal meets all of Canada's requirements, in particular, the preservation of the Chapter 19 interstate dispute settlement mechanism, includes increased U.S. access to the protected Canadian dairy market, and maintains relatively consistent trade in automotive.

The new USMCA deal has a total of 34 chapters on issues ranging from agriculture, rules of origin, and trade remedies to customs and trade facilitation, the environment, and labor. Some of the most important changes include raising local content requirements for the auto industry to 75 percent from 62.5 percent, out of which 40 percent needs to be made in plants paying workers at least US\$16 per hour. The U.S. will continue charging tariffs on steel and aluminum to both Canada and Mexico and has offered accommodations only on any future auto tariffs.

As of the printing of this report, the deal was likely to be signed by the end of November, before the current Mexican presidential administration leaves office on December 1, 2018. The impact on pro-AV is likely to be minimal and the tariff on steel and aluminum has already been incorporated into our forecasts.

## LATIN AMERICA: ECONOMIC INDICATORS COMPARED TO ARGENTINA, BRAZIL & COLOMBIA (%)



Source: IHS Markit

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## LATIN AMERICA IS IN THE MIDST OF A POLITICAL AND ECONOMIC SHIFT

**Latin America is experiencing significant economic volatility.** The region's two major economies, Argentina and Brazil, are both undergoing economic and political shifts.

**The Argentine economy is in recession, and a major fiscal and monetary policy adjustment is needed.** A confidence crisis has erupted, and the government lacks the ability to appease economic agents. That may result in the recession lasting longer than anticipated. The agreement with the International Monetary Fund (IMF) – to increase available resources by US\$19 billion through the end of 2019 – implies a significant effort on the fiscal front that will need to be accompanied by severe spending cuts. A concern is that social unrest may

follow as social programs become defunded and subsidies on utilities are withdrawn. Very tight monetary conditions and a severe adjustment to fiscal accounts are on the way. The central bank has increased the policy rate from 45 percent to 60 percent and clearly stated that it will not cut the rate before December 2018. This will dampen gross fixed investment and private sector consumption. As a result, real GDP is expected to fall by 2.3 percent in 2018 and 1.7 percent in 2019.

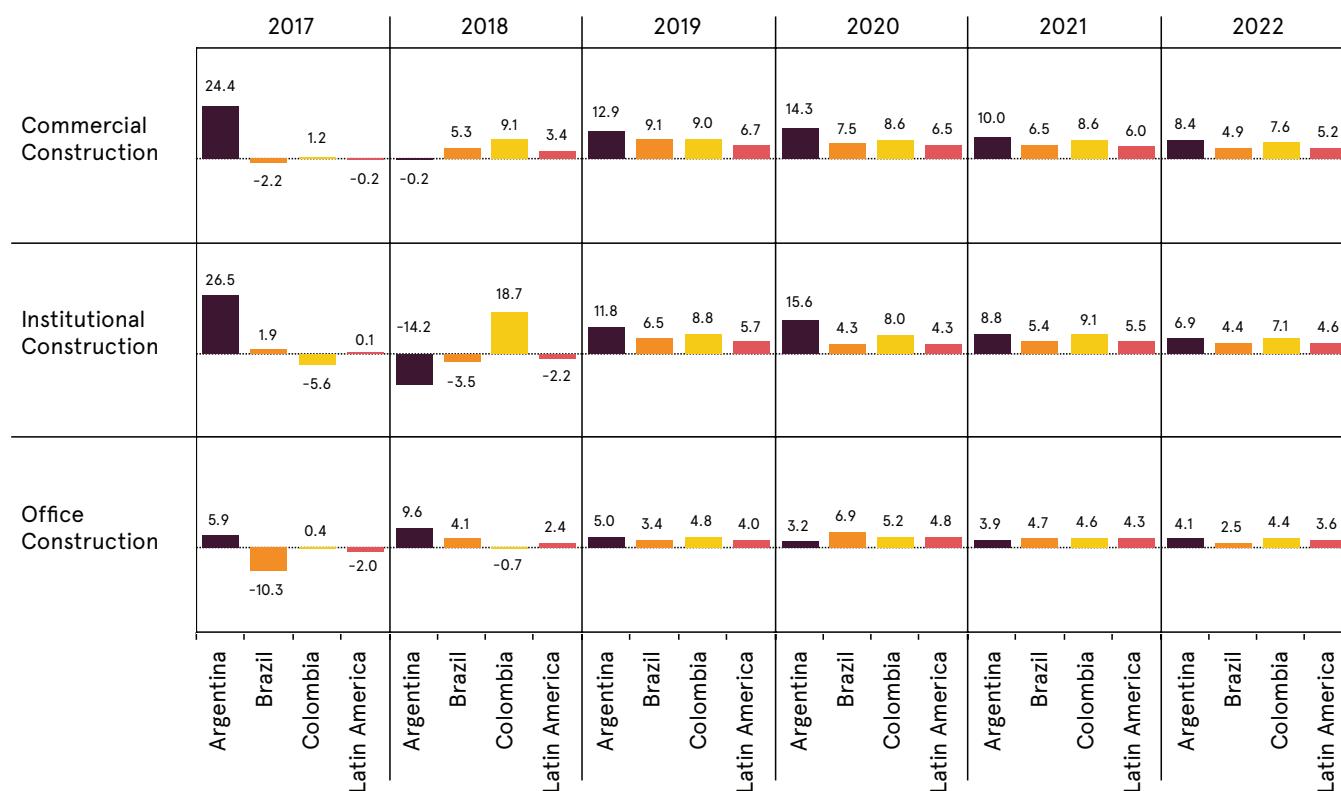
**Brazil has just gone through a challenging political transition,** in which two anti-establishment presidential candidates vied for office. The far-right candidate Jair Bolsonaro has now won the presidential

election. The unpopular government of President Michel Temer, who leaves office this year, managed to get the economy out of recession, but failed to implement the reforms needed to tackle a fiscal deficit that has reached unsustainable levels. Brazil's business confidence has been undermined by the general election, with it being far from clear if the next government will count on support in Congress to implement the austerity measures needed to restore fiscal sustainability and reverse rapid growth of the public debt burden. Looking forward, the deterioration in business sentiment will hurt consumption and investment, and the IHS Markit purchasing managers' indexes for services and manufacturing point to contraction. Real GDP is expected to advance only at a sluggish 1.5 percent rate in 2018.

**Despite the volatility in Brazil and Argentina, the economic outlook for Colombia has improved.** Moderating inflation, higher global oil prices, increased business confidence, and strong private consumption support expected real GDP growth rates of 2.5 percent and 2.6 percent in 2018 and 2019, respectively. The pro-business agenda of recently elected President Iván Duque supports this forecast, as he aims to reduce the corporate tax and take a hard line on security issues.

IHS Markit expects some positive, albeit slow, momentum in the construction sector, which will benefit pro-AV in the near term. After a prolonged contraction, investment in Brazil's nonresidential structures market has begun to expand, resulting in more balanced and sustainable growth. Compared

#### LATIN AMERICA: REAL COMMERCIAL, OFFICE, AND INSTITUTIONAL CONSTRUCTION GROWTH VS. ARGENTINA, BRAZIL & COLOMBIA (%)



with the recession years (2015–2016), business sentiment has improved, but has still not reached pre-crisis levels. However, the recent general elections in October 2018, coupled with ongoing political uncertainty, will delay some investments. Brazil's commercial, institutional, and office construction segments are expected to experience solid growth during 2019–2022.

Argentina's recent economic downturn, along with higher interest rates, will dampen gross fixed investment and private-sector consumption. Furthermore, the country's efforts to attract new investments have not materialized in sizable projects so far, partly because of the tight monetary policy stance and the damage it did to domestic demand. However, policy continuity has reduced uncertainty somewhat and will likely result in investment rising significantly in the next couple of years, as shown in solid growth projections for commercial, office, and institutional construction.

The outlook for Colombia's nonresidential structures market has dimmed slightly, reflecting the uncertainties in the investment environment. Factors undermining the market sentiment include

the weaker-than-expected growth in advanced economies, uncertainties regarding the U.S. Federal Reserve's next moves, hurdles to the implementation of the peace agreement, and a sharper-than-expected slowdown in China. However, projections for commercial, office, and institutional construction remain solid.

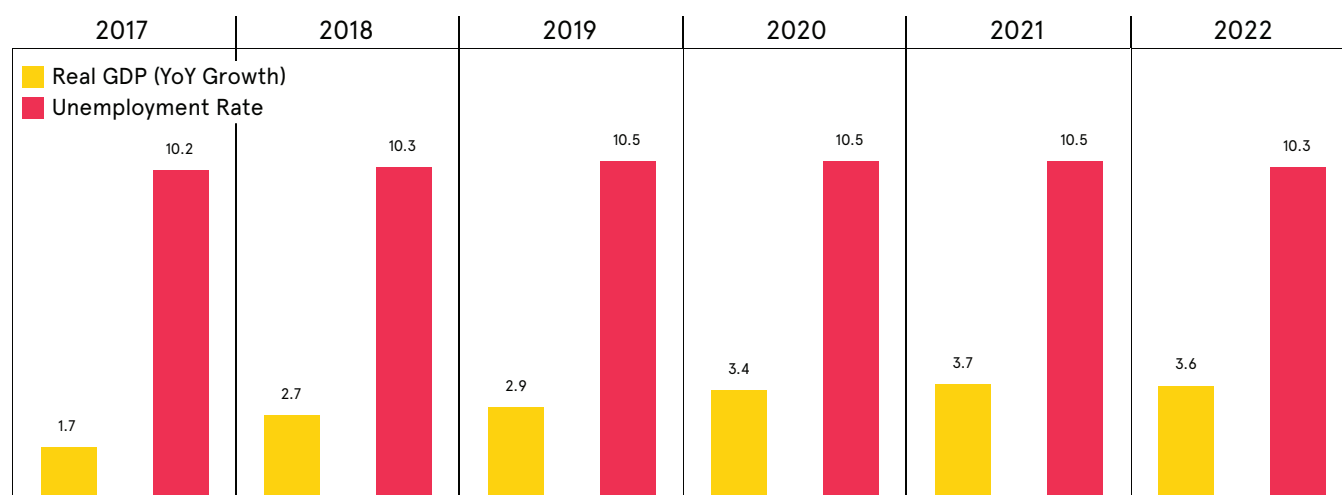
**Bottom Line:** Although the dim economic outlook for Latin America does not inspire confidence for pro-AV, a more favorable external environment with faster global growth and higher commodity prices will help the region in 2018. This is indicated by the positive, albeit slow, momentum in GDP growth and a lower unemployment rate for the region. Conditions in Brazil and Argentina drive the bleak outlook for the region, as political uncertainties in Brazil and the economic downturn in Argentina constrain investment. However, the region will benefit from a stronger growth sentiment in Colombia. Although real total construction declined in 2017, IHS Markit expects some positive momentum in the construction market (led by an uptick in the nonresidential sector), benefiting pro-AV in the near term.

## ISSUE TO WATCH

The situation in Venezuela has turned from economic depression to a humanitarian crisis. Hundreds of thousands of Venezuelans are fleeing the country as scarcity of basic staples is widespread in the whole country. Hyperinflation erodes the purchasing power of salaries almost immediately and, despite a new economic program aimed at solving this problem, the chances that economic stability and growth may return are very low. The military, which exercises direct influence over important sectors of the economy, is likely to support President Nicolás Maduro amid severe food shortages, unless protests and unabated looting escalate beyond the capacity of security

forces to contain them. Security forces are capable of containing protests before they become widespread, and discontented Venezuelans are opting to migrate. The opposition is divided, demoralized, and demobilized following strong repression and claims of electoral fraud in the May 20, 2018, presidential election in which Maduro was re-elected to hold office until 2025. Price and foreign-exchange controls already impede the operating environment and a potential new constitution in the two-year outlook poses further regulatory, expropriation, and tax risks for businesses. Homicide, theft, extortion, and kidnapping risks are already extremely high by global standards and continue rising.

## Middle East & Africa: Real GDP Growth Rate vs. The Unemployment Rate (%)



Source: IHS Markit

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## GROWTH IS EXPECTED TO IMPROVE IN MIDDLE EAST AND AFRICA

**GDP growth for the Middle East and Africa (MEA) region is expected to improve in 2018 due to rebounding oil prices and higher production quotas under the revised Vienna Alliance agreement.** OPEC and non-OPEC members will benefit from the increase in quotas and the higher oil prices as market concerns over Iranian and Venezuelan production continue. There remains much uncertainty regarding the oil market, including Libya's ability to sustain the recovery in its oil output, security and technical issues affecting Nigerian production, and other geopolitical developments. Economic conditions in Qatar, the United Arab Emirates (UAE), and Iran have created much of the volatility and can explain the economic momentum in the Middle East.

**The economy of Qatar is expected to remain stable despite the economic and diplomatic boycott by Saudi Arabia, UAE, Bahrain, and Egypt.** It is being supported by Qatar's diversification of its trade routes,

higher global oil prices, and its main export, liquid natural gas.

**The UAE's economy will benefit from the increase in oil output under the revised OPEC quotas and higher oil prices.** Furthermore, Dubai's preparation to host Expo 2020 will provide a further engine for growth, with non-oil GDP growth momentum expected to pick up during 2018 as projects are initiated.

**Iran's GDP growth is expected to decline sharply to 0.2 percent in 2018, followed by a contraction of -1.0 percent in 2019.** Tensions between U.S. and Iran have heightened as the U.S. no longer participates in the Iran nuclear agreement. The U.S. sanctions will prohibit non-U.S. trade, investment, and transactions involving Iran's strategic, financial, energy, and petrochemical, and automotive sectors.

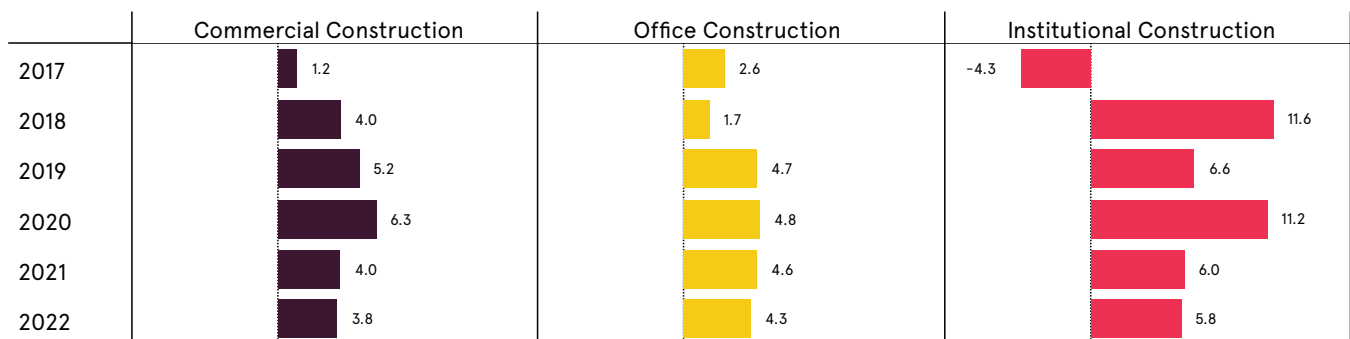
**Strong commodity and rebounding oil prices will contribute to Sub-Saharan Africa (SSA) growth.**

Projections for commercial, office, and institutional construction investment signal a likely boost in demand for pro-AV products, especially in the Middle East. This expectation is further supported by recent events, such as Saudi Arabia's announcement of a US\$64 billion investment in its entertainment industry and measures to boost investment in the UAE. In the UAE, these range from new investments planned for Abu Dhabi, particularly in the oil and gas sector, to targeted VAT relaxation and efforts to reduce the costs of doing business. As such, the latest announcements are consistent with government efforts to promote a more pro-business environment. Furthermore, in an effort to boost economic growth, the UAE cabinet recently

announced a resolution to relax the 51 percent local ownership requirement, which has taken the UAE business sector by surprise.

**Bottom Line:** The positive momentum in GDP will support pro-AV growth in the MEA region. This will be further supported by the upward momentum in real total construction spending, led by solid growth projections for the nonresidential sector. Developments in the UAE such as Expo 2020 and Saudi Arabia's investment in its entertainment sector will also support pro-AV demand in the near term. However, political uncertainties and trade conditions could be a hindrance.

#### MIDDLE EAST & AFRICA: REAL COMMERCIAL, OFFICE, AND INSTITUTIONAL CONSTRUCTION GROWTH (%)

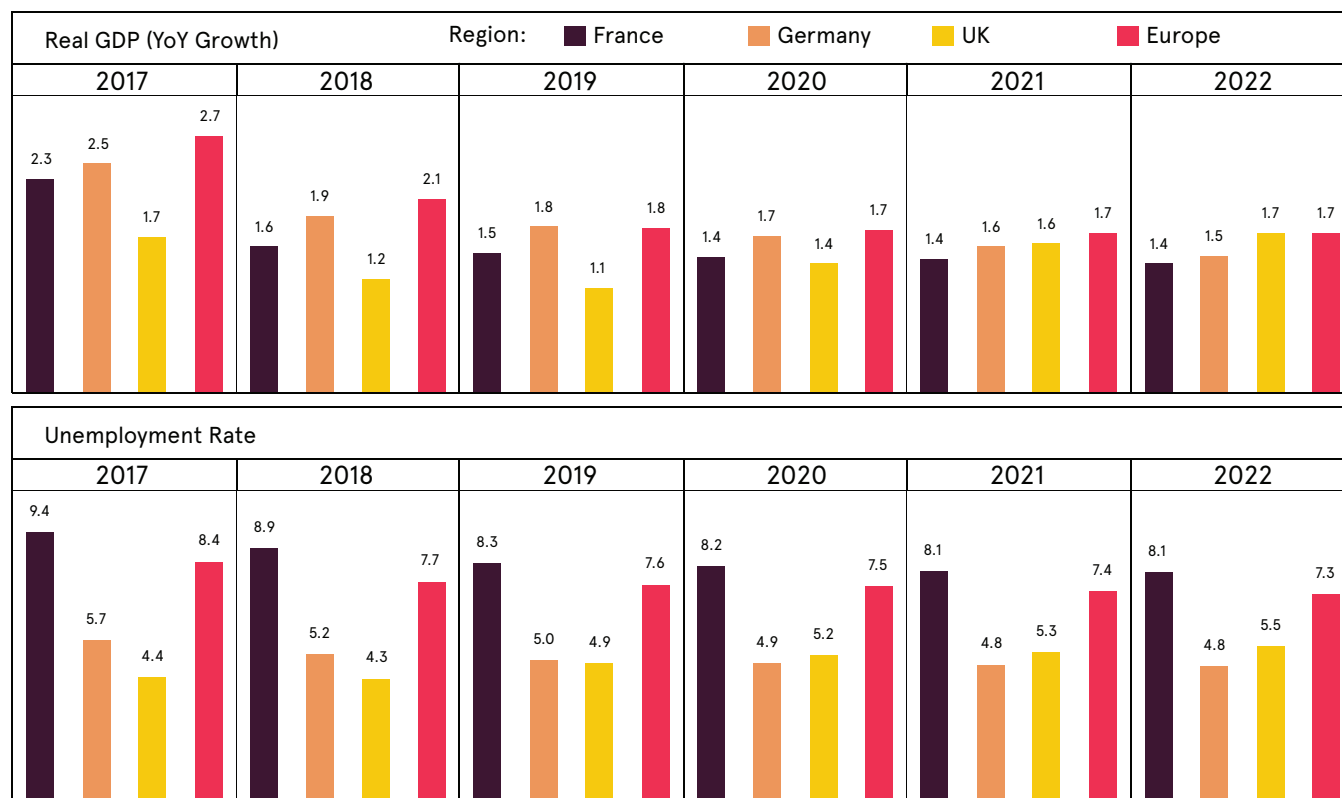


Source: IHS Markit

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## EUROPE: ECONOMIC INDICATORS COMPARED TO FRANCE, GERMANY & THE UK (%)



Source: IHS Markit

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## EUROPE'S GROWTH IS SLOWING BUT REMAINS ABOVE ITS LONG-TERM TREND

The Eurozone economy is experiencing a slowdown, led by its manufacturing and export sectors. Improving net-trade contributions generated a growth spurt in 2017, but this effect has reversed, exacerbated by the lagged effects of currency appreciation. In addition, higher oil prices have pushed up inflation, crimping households' real income growth, which has dampened consumption. IHS Markit expects Eurozone real GDP growth of 2.1 percent and 1.8 percent for 2018 and 2019, respectively. The main factor driving the low projections is the high uncertainty of global trade relations that leads to weaker investment. Although the Eurozone labor market remains in good shape, IHS Markit expects some loss in momentum, given the weaker

performance of the economy compared to 2017.

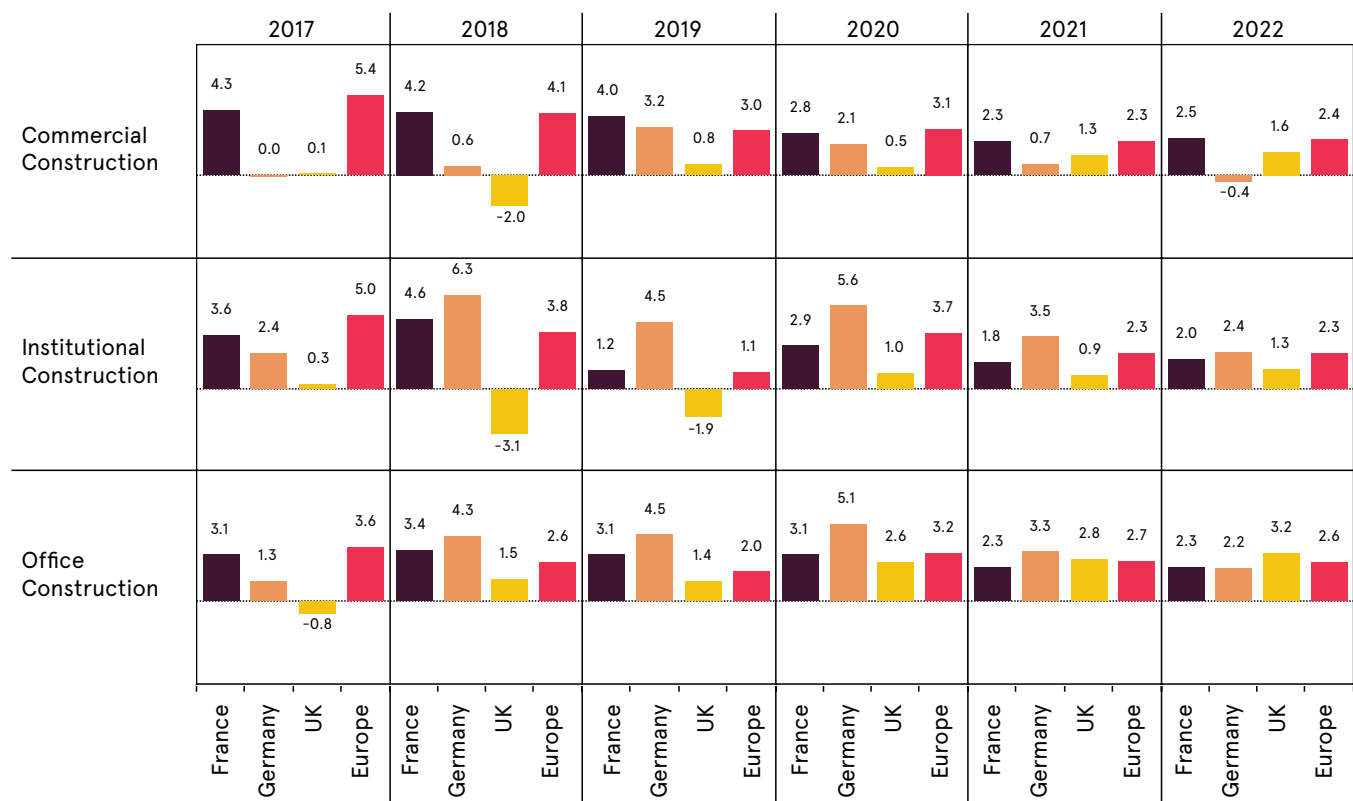
**The UK economy is expected to remain locked into a moderate growth profile at 1.2 percent in 2018 and 1.1 percent in 2019.** Consumer purchasing power has weakened, and business uncertainty and caution about investment remain on the risk radar because of Brexit and growth concerns. Brexit talks have entered the most challenging phase: deciding on the future trading relationship between the UK and the Eurozone. IHS Markit suspects UK negotiations with the EU concerning the future trading relationship and access to the single market will prove difficult – EU leaders will not want to set a precedent for an easy withdrawal by other countries that

would like to reconsider their own status. As a result, this could trigger delayed or cancelled investment projects, soften employment intentions, and make firms increasingly cautious about wage awards.

In addition, there is concern that an extended inability to access capital has held back smaller companies from innovating and investing. There is also concern about the effects of "zombie" companies that have essentially been kept alive by low interest rates and banks' reluctance to write off loans. Not only are these companies generally less productive, but there is concern they are preventing credit and resources from being reallocated to newer companies and backing new products and processes.

**The French economy is expected to grow at a decent rate in 2018 and 2019 but will not return to 2017 highs. IHS Markit estimates GDP growth of 1.6 percent in 2018 and 1.5 percent in 2019.** Although nonfinancial corporations' investment may be boosted by rising demand and accommodative credit conditions, we expect that growth to moderate in 2019 and beyond as the economy cools. Additional downward pressure could result from risks due to external factors, including a potential trade war, a resurfacing of tensions in Italy, and a "hard" Brexit. GDP growth accelerated to a six-year high in 2017, standing at 2.3 percent. Domestic demand was the main driver of growth in 2017, contributing 1.9 percentage points to the total change in demand.

#### EUROPE: COMMERCIAL, OFFICE, AND INSTITUTIONAL CONSTRUCTION GROWTH VS. FRANCE, GERMANY & THE UK (%)



**Germany's annual growth is expected to weaken from 2.5 percent in 2017 to 1.9 percent in 2018 and 1.8 percent in 2019.**

This slowdown, although likely induced by a retreat of key leading indicators (manufacturing PMIs and the IFO business climate index) from their all-time highs in end-2017, may be overstated or exacerbated by various one-off dampening factors (such as strikes, the flu epidemic, and the timing of Easter). Domestic demand will remain the most reliable contributor to German GDP growth in 2018–2019, thereby limiting the impact of more subdued external trade owing to recent decisions by the Trump administration in the U.S. (such as trade protectionism and withdrawal from the Iran nuclear accord along with the re-imposition of sanctions that will also affect other countries). Disruptions linked to Brexit also remain a threat to trade, but they carry less shock potential for the business cycle given the existing agreement on a transition deal. Meanwhile, corrective euro depreciation since mid-April 2018 will likely support exports by improving price competitiveness.

The outlook on UK's construction segments has dampened. The consequences from Brexit could trigger delayed or cancelled investment projects, soften employment intentions, and make firms increasingly cautious about wage awards. Furthermore, the outcome from Brexit has induced uncertainty across trading conditions in the region, which can hinder investment.

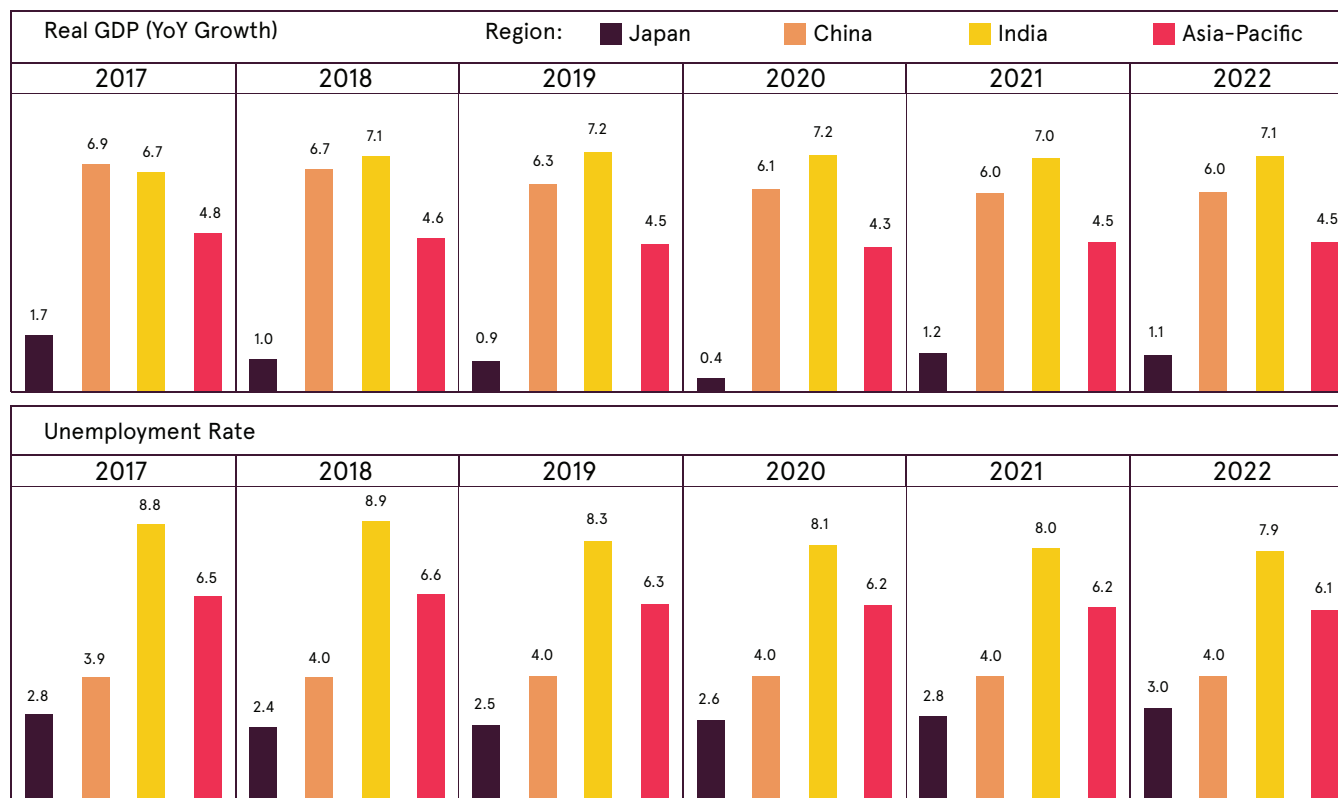
Growth projections for Germany's nonresidential construction sectors remain in line with those for the region. The outlook remains uncertain as external demand

adjusts to opposing influences. Although the recent agreements on a transition deal make the consequences of Brexit appear more manageable, the Trump administration's protectionist measures in the U.S. dampen the growth outlook for Germany, especially by affecting global trade flows.

In France, the recovery in investment is expected to keep its positive momentum, as domestic and external demands remain robust. Commercial interest rates are at record lows and credit conditions support further growth in 2018. The positive momentum in investment will benefit France's commercial, institutional, and office construction, as shown by the solid growth projections.

**Bottom line:** Despite the projected slowdown in output growth, capital investment in Europe is expected to pick up. The increase can be attributed to a combination of factors, including improved access to bank financing, lower borrowing costs, rising corporate profits, high capacity utilization rates, and confidence in future demand prospects. This is supported by the recent recovery in investment in France (despite rising corporate concerns about Brexit) and continued growth in Germany's equipment spending. The implications for pro-AV are positive as strength in capital investment translates into demand for products and services in the industry. Furthermore, pro-AV will benefit from the steady pace of growth in the region's nonresidential construction sector. However, the specter of Brexit will continue to dampen the outlook for the pro-AV industry by making future investment uncertain.

## ASIA-PACIFIC: ECONOMIC INDICATORS COMPARED TO JAPAN, CHINA &amp; INDIA



Source: IHS Markit

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## ASIA-PACIFIC CONTINUES TO LEAD GLOBAL GROWTH

The Asia-Pacific (APAC) region started 2018 on a solid footing, but rising headwinds are expected to slow things down. In relative terms, the APAC region continues to lead global growth; the region is projected to expand by 4.6 percent in 2018 – considerably stronger than the projected world average growth rate of 3.2 percent. The greatest area of concern for the regional economy is the impact of U.S.-China trade tensions, given that the situation remains fluid and most of the region has significant trade ties with China. This will have an impact on the supply chain relationships for goods and put constraints on commodity prices. The U.S.-China trade tensions will likely be a hindrance for many industries, including pro-AV.

IHS Markit expects China, the region's largest economy, to expand by 6.7 percent in 2018 before growth slows slightly to 6.3 percent in 2019. The government has begun to rebalance its policies to support economic growth, even as the U.S. administration threatens to impose more tariffs on Chinese goods. There have been some moves to ease the U.S. government's deleveraging campaign – an important step to stabilizing domestic demand as tariffs weaken external demand. The U.S.-China trade tensions will extend to the rest of Asia, particularly Southeast and East Asia, affecting supply chain relationships for manufactured goods and constraining commodities prices and export volumes. A healthy outlook for advanced economies may partially mitigate the negative impact

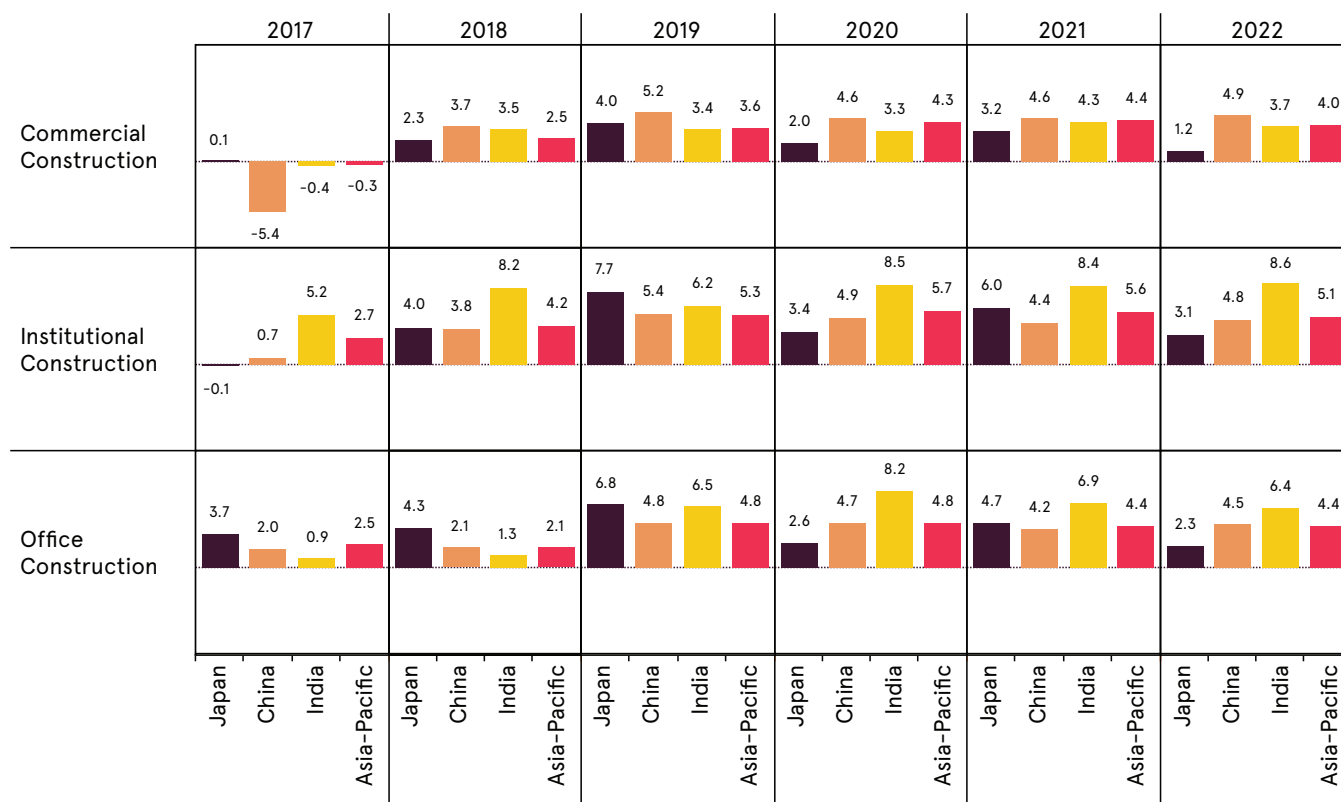
of the tariffs on broader Asia, although it will take some time to shift supply chains.

**The Japanese economy is expected to expand by 1.0 percent for 2018 and 0.9 percent in 2019.** The lower forecast stems from the trade-tension-related weakening of external demand alongside an anticipated correction in electronics exports.

**India (the second largest economy in Asia), less exposed to trade with China, is expected to record a meaningful uptick in growth during 2018.** The economy will continue its slow recovery from the impact of demonetization and the implementation of the unified goods and services tax (GST). As a result, India's GDP growth is forecast to come in at 7.1 percent in 2018, before picking up to 7.2 percent in 2019.

The strong rebound in fixed investment growth earlier this year along with recent improvements in credit growth and capacity utilization point to a tentative recovery in business investment in India. If sustained, this would induce a much-anticipated turnaround in the investment cycle in 2018. The normalization of business activity – after the disruptions from the GST – and improving domestic and external demand should bode well for further capacity expansion. However, tighter global and domestic financial conditions, rising input costs, and growing anti-emerging-market sentiment may slow or even reverse the investment recovery, particularly as the abundance of bad loans within India's state-run banks continues to weigh on business sentiment and investments.

#### ASIA-PACIFIC: REAL COMMERCIAL, OFFICE, AND INSTITUTIONAL CONSTRUCTION GROWTH VS. JAPAN, CHINA & INDIA (%)



The nonresidential construction market in India is expected to benefit from the improved investment outlook, experiencing solid growth in commercial, institutional, and office segments from 2018–2022.

IHS Markit estimates that most regions in China will need more than 10 years to utilize the nonresidential properties currently available. For instance, the weakness in mall construction is due to the country's rising e-commerce business, which is increasingly competing with offline retailers. China's retail sales growth is among the world's fastest, at around 10 percent year over year, but an increasing proportion of this spending is attributed to e-commerce. Slowing mall construction growth may weigh on China's real estate investment in the coming years. Real estate investment accounted for about 22 percent of China's total fixed-asset investment, with commercial business building accounting for 15 percent of real estate investment. Investment in nonresidential structures

in Japan is also expected to increase. The three types of nonresidential construction are expected to post solid growth in 2019 before slowing in 2020.

**Bottom Line:** Despite strong economic growth, APAC's economic performance relies heavily on trade. The U.S.–China trade tensions continue to be a source of uncertainty for many industries, including pro-AV. The trade tensions will also be felt across the rest of Asia, affecting the supply chain relationships for goods and constraining commodity prices. Thanks to reduced exposure to the U.S.–China trade conflicts, India has been experiencing solid growth in real fixed investment. This stems from improvements in corporate profits, credit growth, and capacity utilization, and points to continued growth. Despite the uncertainties with trade, pro-AV will likely benefit from the solid growth projections for construction (especially office and institutional).

# Risks to the Outlook

## THE MUTING EFFECTS OF ECONOMIC NATIONALISM

One of the most consequential long-term threats to the global economy stems from a possible surge in economic nationalism and escalating trade conflict. Economic nationalism undermines trade liberalization and financial globalization, which have been major contributing factors to the world economy's robust growth for the past two decades. A rise in economic nationalism and trade conflict would have a cumulative adverse impact on global economic welfare over the long term, as was the case during the 1930s and, to a lesser extent, in the late 1960s and 1970s.

Fortunately, the rapid progress of globalization during the last two decades has created a substantial constituency for liberal economic policies — which did not exist in the earlier decades or in the 1930s. The existence of that constituency will reduce the likelihood that economic nationalism and trade conflict would get out of hand to such an extent as to significantly harm the global economy's growth.

## GROWING TRADE CONFLICT LEAVES HIGH-TECH INDUSTRIES VULNERABLE

Much has been made of the global trade slowdown since the onset of the Great Recession. Growth has decelerated substantially, and trade's share of global GDP has reeled backward. It is a problem that has plagued almost all major economies in recent years, including the U.S., China, and Japan.

Just as the situation appears to be turning a corner for the better, trade tensions are threatening to hit a boiling point. Given the fast-moving situation at play, trade analysis can become dated as soon as it reaches print. Therefore, this research takes care to maintain extended relevancy by examining structural trends over time, particularly along the technological value chain, whereas most published research has examined trade flows in aggregate, by commodity, or by stage of production.

As mentioned in previous sections, the global economy is in a strong state, with a 3.2 percent projected growth rate in 2018 — the best showing since 2011 and more geographically well-rounded. Trade in goods and services will expand by 4.0 percent this year, down slightly from 5.3 percent in 2017, but still much quicker than world GDP growth. Trade's share of the total global economy is finally starting to rise again. Global trade as a percent of GDP slid from a high of 60 percent in 2008 to 53 percent in 2016. In 2017, we saw the first inkling of a rebound, with global trade rising to 55 percent of world GDP. However, little attention has been paid to where along the value chain that acceleration in global trade is taking place. If tariffs or counteractions are levied on those already fast-growing areas, the growth impulses could, very quickly, turn into drags.



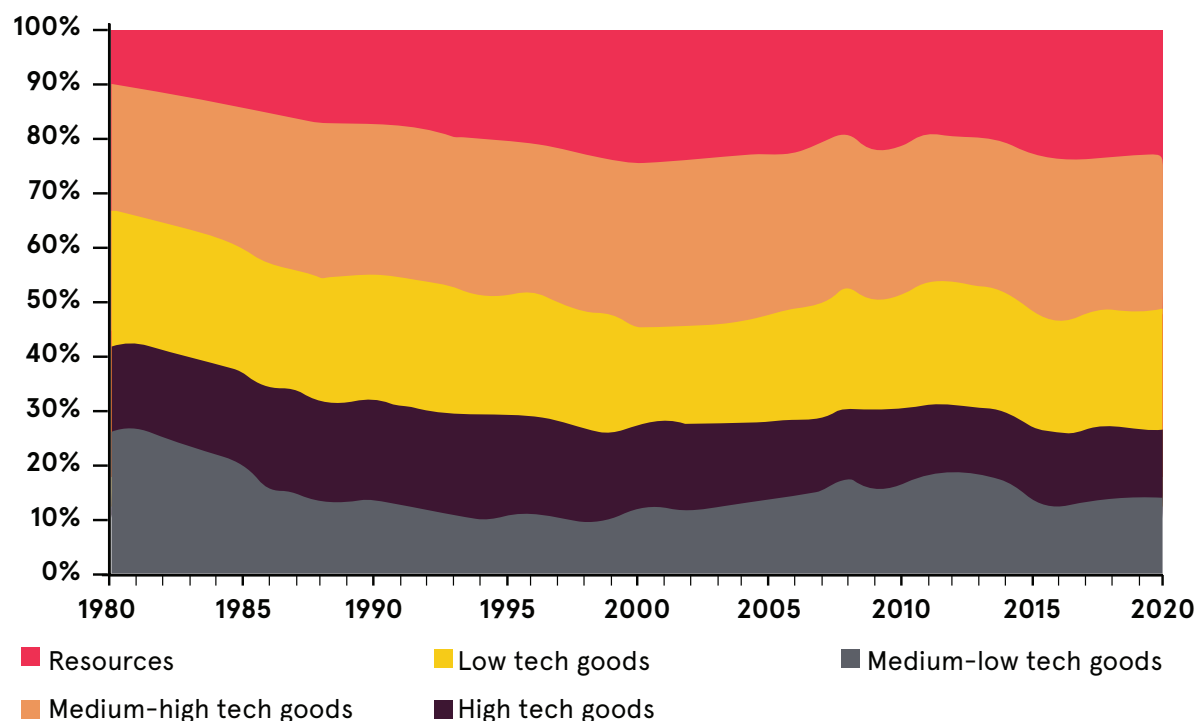
High-tech industries now account for 21 percent of international goods trade, up considerably from a 10 percent share in 1980, a strong statement on the effects of globalization and technological advancement. Correspondingly, the share of trade in low-tech goods and resources is proportionally much smaller than in recent history. Trade action in the advanced manufacturing space could be particularly disruptive as high-technology and export-oriented jobs are associated with higher wages and greater levels of productivity.

If cooler heads ultimately prevail, our view holds that global trade has room for a slight acceleration over its recent pace, led by high-tech industries where growth could more than double based on strong market demand. Semiconductor and LCD shipments are likely to expand, with handset makers rolling out new flagship products.

The risk that trade in high-tech goods could be tamped down remains serious, particularly as this area is expected to be the primary growth driver through 2020. With high-tech goods constituting more than one-fifth of global trade, the ripple effects from trade retaliation in this space could be more severe than ever.

Value chain framework - Developed by OECD Constructed using industry R&D as share of sales (%)	
HIGH-TECH GOODS	LOW-TECH GOODS
Computer, electronic, optical products	Wood, pulp, paper
Aircraft and spacecraft	Food and beverage
Pharmaceuticals	Textiles and related
MEDIUM-HIGH TECH GOODS	RESOURCES
Electrical machinery	Oil and gas drilling
Industrial machinery	Coal mining
Automotives and parts	Mining of metals and minerals
Chemicals	Agriculture
Railroad equipment	
MEDIUM-LOW TECH GOODS	
Shipbuilding	
Rubber and plastic products	
Refined petroleum, coke	
Non-metallic mineral products	
Basic and fabricated metals	

#### SHARE OF GLOBAL GOODS TRADE (%)





# Opportunities for Growth

## A VIEW INTO GLOBAL VERTICAL MARKETS

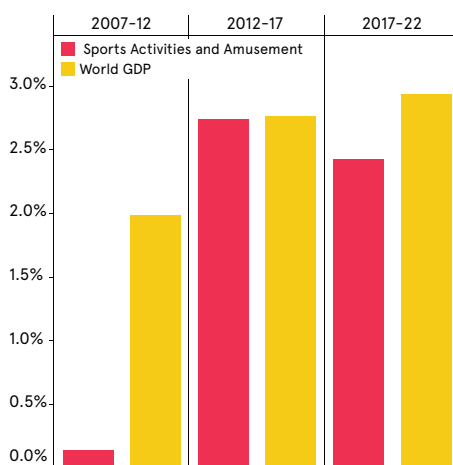
From digital signage used by retailers to video/webconferencing in corporate settings, the proliferation of pro-AV solutions touches companies across a variety of industries. In turn, these verticals play a significant role in the direction and adoption of pro-AV products. Understanding the health of these markets lends insight into future business activity for pro-AV.

### SPORTS, AMUSEMENT, AND RECREATION

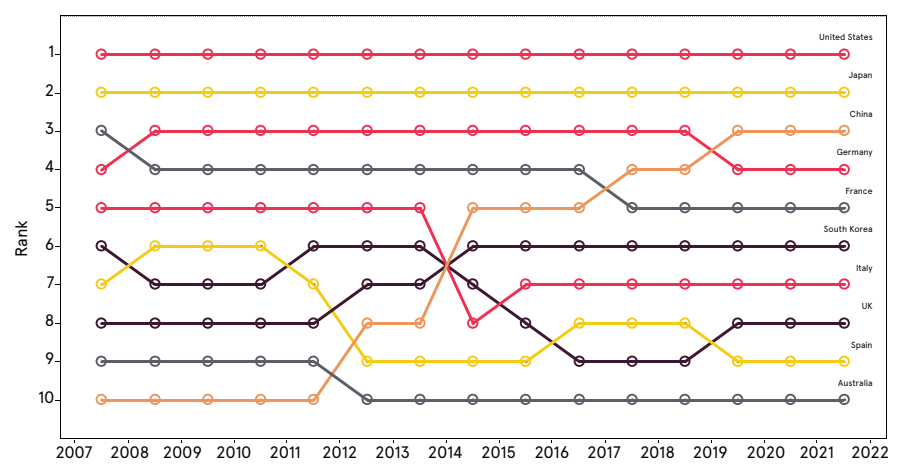
Sports, amusement, and recreation activities have been growing in step with the global economy. The slowdown in economic growth during the global financial crisis impacted this vertical severely, particularly as growth stalled to a glacial pace. This vertical performs well when the unemployment rate is low and household income can support discretionary spending – conditions typically present in a healthy economic environment. However, we expect the growth of this vertical to be slower than global economic growth over the 2017–2022 period.

#### SPORTS ACTIVITIES AND AMUSEMENT AND RECREATION ACTIVITIES

REAL VALUE ADDED: 5-YEAR CAGR



NOMINAL GROSS OUTPUT RANKINGS



Sports, amusement, and recreation activities are heavily concentrated globally, with just three countries accounting for the majority of global output. The U.S. has the largest share at 39 percent, followed by Japan at 8 percent, and Germany with 6 percent. Since the global financial crisis, the rankings have been shifting among the top-10 performers

and China has been gaining more share. We anticipate this will continue to be the trend. Over the coming years, there will be a change among the top-10 players, as China rises from fifth in the rankings to third and Germany and France drop to fourth and fifth place, respectively.

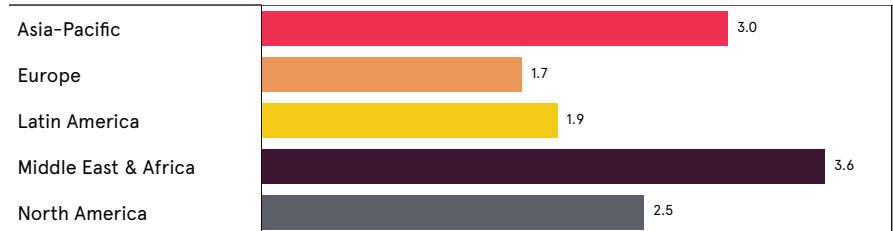
MEA's real output in this vertical is expected to grow the fastest in the 2017–2022 period with a 3.6 percent CAGR. Expanding output in this industry requires expenditures on facilities, equipment, technology, etc. CapEx is expected to grow the fastest in Europe next year with a 7.6 percent increase, while Latin America will experience the slowest advance. APAC companies in this sector allocate more than half (58 percent to be exact) of their sales to capital expenditures, which is the highest among the regions. APAC companies in this sector also have the highest growth rate of capital spending currently although that is expected to decline over time.

## SPORTS ACTIVITIES AND AMUSEMENT AND RECREATION ACTIVITIES

REAL CAPEX GROWTH (%)

Region	2017	2018	2019	2020	2021	2022
Asia-Pacific	11.5	5.0	6.1	4.8	4.6	4.9
Europe	4.5	0.8	7.6	3.7	4.8	3.3
Latin America	-12.3	0.7	1.9	1.2	3.3	4.3
Middle East & Africa	2.9	6.0	2.4	2.0	4.0	3.2
North America	3.9	3.8	4.4	3.9	3.4	3.2

REAL OUTPUT 2017–22 CAGR (%)



Source: IHS Markit

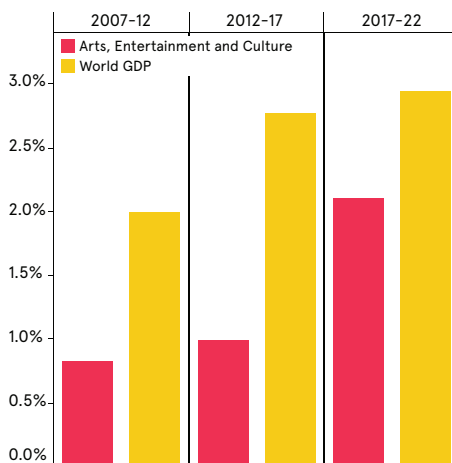
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## ARTS, ENTERTAINMENT, AND CULTURE

Arts, entertainment, and culture activities – which include live performances, events or exhibits intended for public viewing, museums, zoos, etc. (see Glossary) – have historically followed overall economic growth. At the global level, real value added by this vertical has lagged the world economy but the gap is closing.

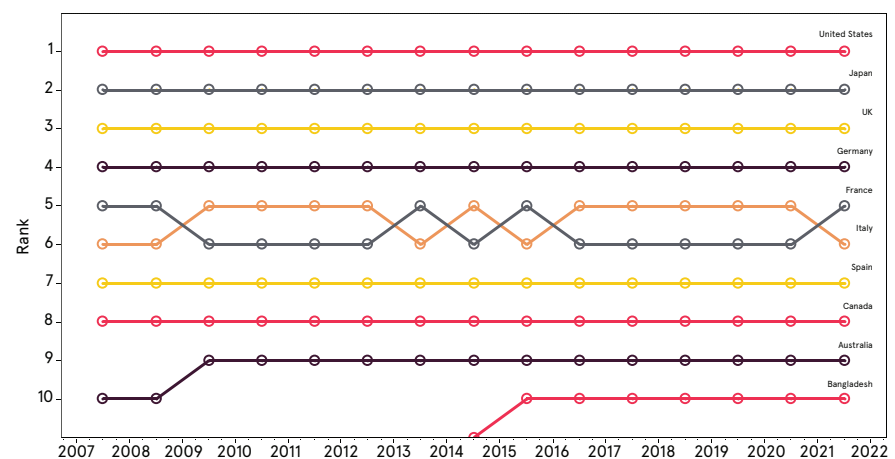
### ARTS, ENTERTAINMENT AND CULTURE

REAL VALUE ADDED: 5-YEAR CAGR



Source: IHS Markit

NOMINAL GROSS OUTPUT RANKINGS



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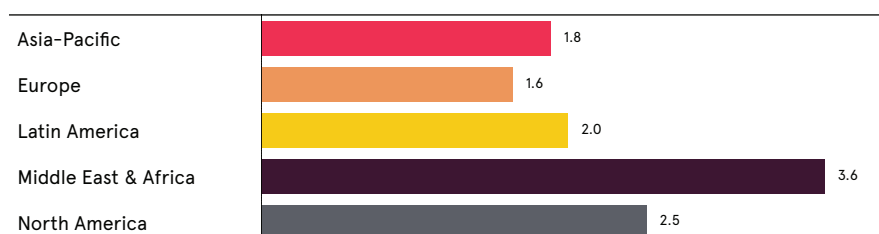
Output of arts, entertainment, and culture activities is concentrated in a few countries. The U.S. dominates the supply chain for this vertical with 41 percent of the world output (estimated for 2018). Countries ranked second to tenth make up another 36 percent. Bangladesh has been gaining ground and entered the top-10 list in 2016. While concentration should be relatively unchanged over the forecast period, we anticipate Italy to replace France as fifth in the ranking.

## ARTS, ENTERTAINMENT AND CULTURE

REAL CAPEX GROWTH (%)

Region	2017	2018	2019	2020	2021	2022
Asia-Pacific	9.1	2.7	4.5	3.2	3.2	3.5
Europe	5.0	-1.7	3.4	-0.2	1.1	0.0
Latin America	-13.0	0.9	0.1	-0.7	1.4	2.5
Middle East & Africa	2.3	4.7	0.7	0.2	2.4	1.5
North America	3.0	0.8	0.9	0.6	0.3	0.3

REAL OUTPUT 2017-22 CAGR (%)



Source: IHS Markit

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MEA will have the fastest real output growth in arts and entertainment industry with a 3.6 percent CAGR over the 2017-2022 period. Europe will be the worst performer with a 1.6 percent output CAGR during this period.

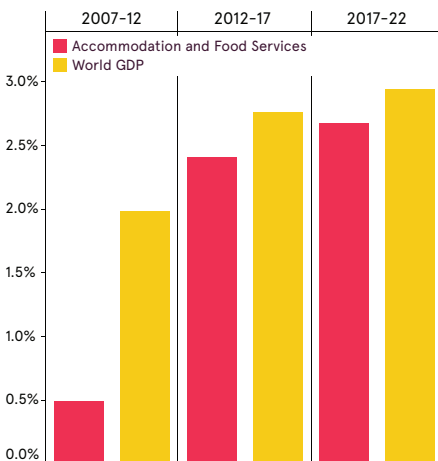
APAC is expected to lead the vertical in capital expenditures. APAC companies in this vertical tend to allocate over 60 percent of their sales to CapEx while companies in the other regions allocate around 12 percent or less. The other four regions will see declines or muted CapEx growth by 2020 in this vertical.

## ACCOMMODATION AND FOOD SERVICE

Similar to the industries discussed above, accommodation and food service activities are closely tied to economic growth. Consumers dine at restaurants and travel more frequently when there is more income to spend on discretionary goods and services. Thus, as economic conditions improve so does the health of this vertical.

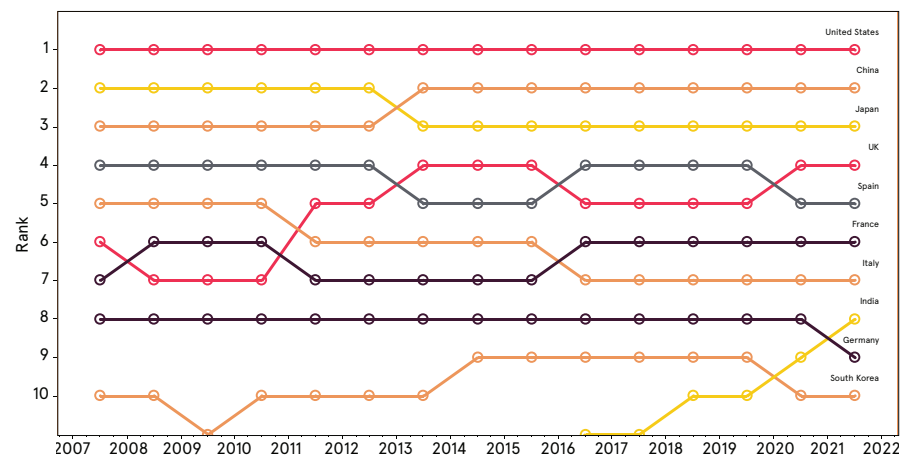
## ACCOMMODATION AND FOOD SERVICES

REAL VALUE ADDED: 5-YEAR CAGR



Source: IHS Markit

NOMINAL GROSS OUTPUT RANKINGS



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APAC and North America both have the largest shares of global hotel and restaurant output at about 32 percent each. At the country level, the U.S. accounts for 29 percent of output, followed by China at 12 percent. Japan and Spain make up a further 12 percent. Over the next 10 years, supply concentration will decrease, and one country will enter the top-10 list of biggest suppliers – India will likely make its way to number eight, while South Korea will likely drop to last.

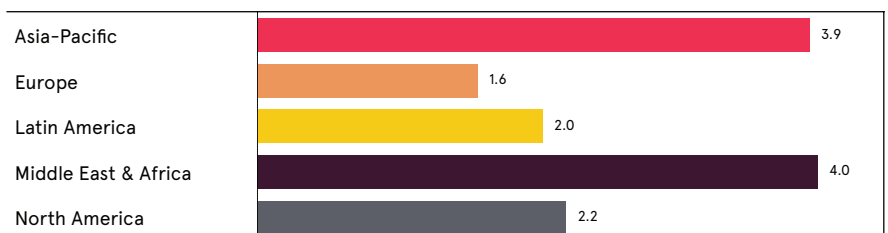
MEA and APAC are expected to experience the fastest real output growth among the regions, while Europe may be the slowest. Although capital expenditures declined in Europe this year, the region is expected to pick up growth in 2019. All told, the next few years are expected to see expansion in capital outlays across regions. Demand will be stronger in APAC given its size and outlook on growth. Although MEA only accounts for 3 percent of global capital purchases, it is also expected to post robust growth through 2022.

## ACCOMMODATION AND FOOD SERVICE ACTIVITIES

REAL CAPEX GROWTH (%)

Region	2017	2018	2019	2020	2021	2022
Asia-Pacific	5.0	4.8	6.4	5.4	5.4	5.6
Europe	4.4	-0.8	5.1	1.3	2.8	1.9
Latin America	1.0	6.7	0.6	2.3	2.2	2.4
Middle East & Africa	7.4	4.2	2.8	2.5	4.5	4.2
North America	1.5	2.3	2.8	2.5	2.1	2.4

REAL OUTPUT 2017-22 CAGR (%)



Source: IHS Markit

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## RETAIL TRADE

Retail trade (excluding automotive) continues to grow hand in hand with the global economy. Global revenue concentration is high. The U.S. and China alone account for nearly half of real output in this vertical. In 2018, the U.S. has a 24 percent share with China close behind at 22 percent. The third largest supplier is Brazil with a relatively meager 7 percent share. Over the next 10 years, supply concentration is expected to remain the same with a fight for first place between China and the U.S.

### RETAIL TRADE, EXCEPT OF MOTOR VEHICLES AND MOTORCYCLES



Retailers in APAC will experience the fastest real output growth over the 2017-2022 period with a CAGR of 4.6 percent. This will also push China to the number one position as the leader of global output. APAC is also the largest CapEx spender among the regions, though only about 6 percent of revenues is used to support CapEx. MEA retailers are expected to increase their capital spending by 6.6 percent next year, the fastest among the regions in this vertical. This region is expected to lead CapEx growth in this vertical through 2022.

### RETAIL TRADE, EXCEPT OF MOTOR VEHICLES AND MOTORCYCLES

REAL CAPEX GROWTH (%)						
Region	2017	2018	2019	2020	2021	2022
Asia-Pacific	1.7	2.1	1.4	1.6	3.4	2.6
Europe	3.0	6.9	0.4	4.1	2.9	4.1
Latin America	-0.9	-1.8	-0.7	3.7	4.2	4.7
Middle East & Africa	-0.6	5.3	6.6	8.6	4.7	4.9
North America	2.4	6.9	5.8	3.9	2.5	2.3

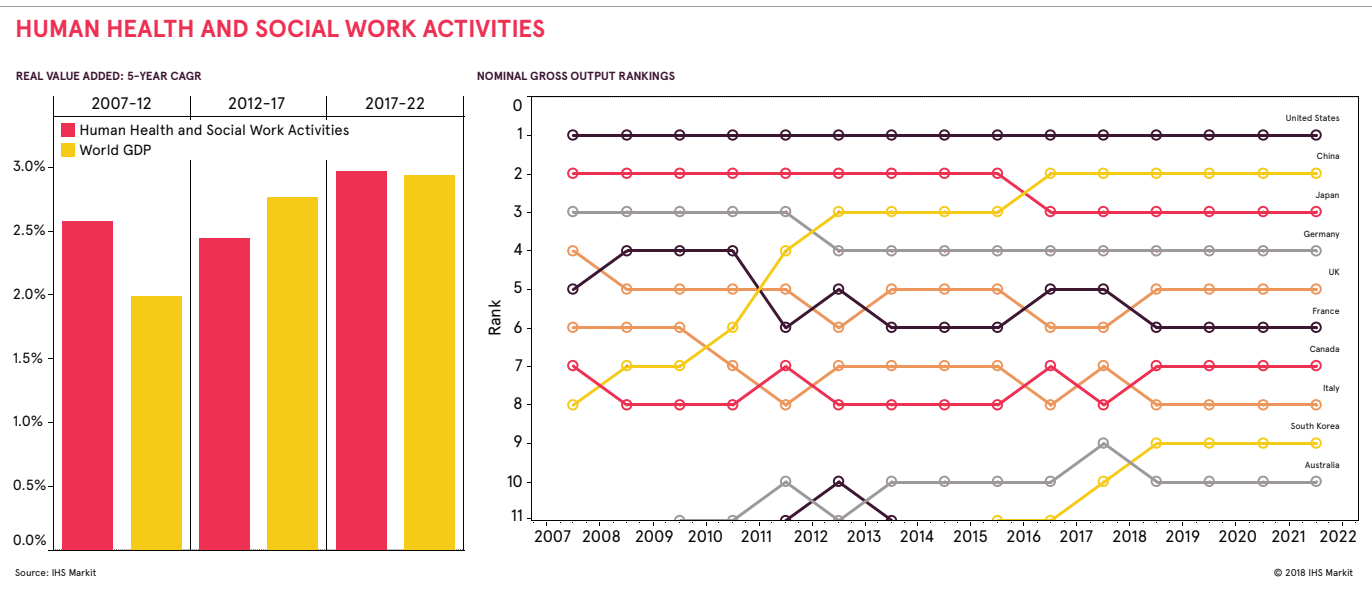
REAL OUTPUT 2017-22 CAGR (%)	
Asia-Pacific	4.6
Europe	1.3
Latin America	1.8
Middle East & Africa	2.9
North America	2.8

Source: IHS Markit

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## HEALTHCARE

Healthcare has strong growth potential for pro-AV. As institutions continue to leverage the power of AV to improve patient care, more facilities will require pro-AV solutions.



Demand in the healthcare vertical mostly emanates from households. Thus, the top-10 rankings of biggest suppliers and countries with the highest private spending are almost identical. U.S., China, and Japan account for more than half the global output, with shares of 35 percent, 10 percent, and 9 percent, respectively.

Healthcare is expected to grow the fastest in APAC over the 2017-22 period. China, Japan, and Australia lead the region, as they place in the top 10 countries in healthcare output.

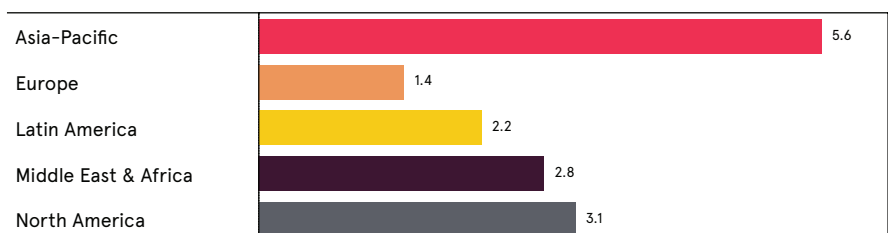
MEA is expected to increase capital expenditures in the next two years, and to surpass APAC by 2020. Meanwhile, as the population continues to age and technology advances in North America, output and capital spending in this vertical will continue to post robust growth.

### HUMAN HEALTH AND SOCIAL WORK ACTIVITIES

REAL CAPEX GROWTH (%)

Region	2017	2018	2019	2020	2021	2022
Asia-Pacific	11.1	7.7	7.9	6.9	8.0	6.8
Europe	4.2	9.8	2.2	5.8	4.7	5.6
Latin America	-0.4	-2.1	5.9	2.7	4.5	6.1
Middle East & Africa	3.7	2.4	6.9	11.3	7.2	8.2
North America	4.4	10.0	11.7	9.5	6.1	4.6

REAL OUTPUT 2017-22 CAGR (%)



Source: IHS Markit

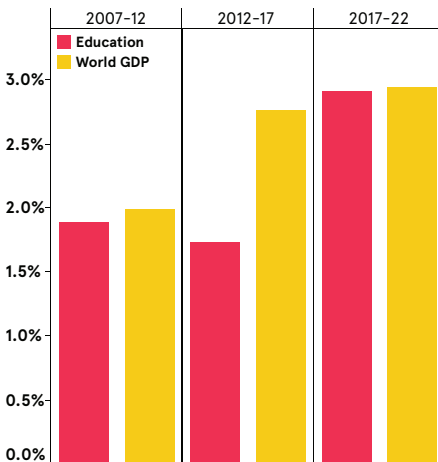
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## EDUCATION

Education is another vertical with strong growth potential for pro-AV in the next five years. The industry will grow on par with the global economy in real terms. The impact of progressive pro-AV technology will become greater as institutions continue to upgrade and implement new tools that enhance the learning experience.

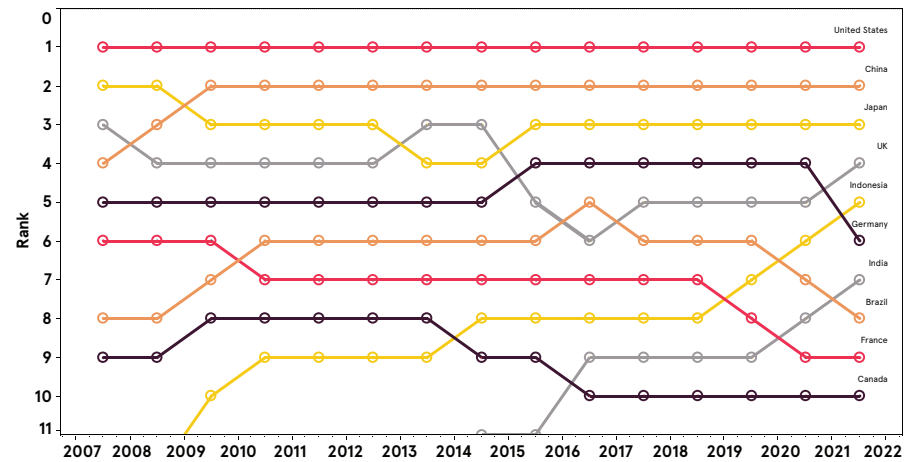
### EDUCATION

REAL VALUE ADDED: 5-YEAR CAGR



Source: IHS Markit

NOMINAL GROSS OUTPUT RANKINGS



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Concentration of global output of education mirrors that of the global economy. In 2018, the U.S., China, and Japan accounted for roughly half the global output, with shares of 30 percent, 16 percent, and 5 percent, respectively. In the coming years, supply concentration is expected to decrease. India and Indonesia will likely rise in the rankings while Brazil and France will likely drop.

Along with APAC, organizations focused on expansion in the education vertical should look out for opportunities in MEA. MEA will be the second fastest growing producer in the education vertical (after APAC), but will lead in expanding capital outlays by 2020. APAC converts sales into CapEx at a higher rate (18 percent) than any other region. MEA has the second highest conversion rate at 14 percent, but that rate is increasing and is expected to outpace APAC's by 2022.

### EDUCATION

REAL CAPEX GROWTH (%)

Region	2017	2018	2019	2020	2021	2022
Asia-Pacific	14.0	6.0	6.3	5.5	6.0	6.0
Europe	4.3	5.3	-0.1	3.2	2.3	3.5
Latin America	-0.2	-1.9	5.3	2.7	4.5	5.9
Middle East & Africa	4.7	2.6	4.6	9.1	8.8	9.0
North America	1.8	7.7	5.5	4.3	2.7	2.3

REAL OUTPUT 2017-22 CAGR (%)

Asia-Pacific	6.1
Europe	1.2
Latin America	2.1
Middle East & Africa	3.4
North America	1.8

Source: IHS Markit

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## Conclusions

Global economic growth is key to the growth prospects for pro-AV products and services. Overall economic growth worldwide (measured by changes in real GDP) is expected to remain robust in 2018 and 2019, but current indications are that a slowdown is in the offing beyond 2019. However, economic growth is expected to vary widely across the five major regions of the world, namely, North America, Latin America, Europe, Middle East and Africa (MEA), and Asia-Pacific (APAC). Growth in North America is expected to peak soon, remain volatile and low in Latin America, and decline in Europe. On the flip side, it is expected to remain robust or even rise in MEA and APAC. The latter two regions will also likely experience the highest CapEx rates into the foreseeable future. Any economic deceleration that occurs in 2020 and beyond could be a consequence of several emerging risks, including economic nationalism, trade tensions and conflicts, global oil price shocks, tighter monetary and fiscal policies, rising interest rates and debt.

Six vertical markets, namely, (1) sports, amusement, and recreation, (2) arts, entertainment, and culture, (3) accommodation and food service, (4) retail trade, (5) healthcare, and (6) education, are key sources of demand for pro-AV products and services, and their expected growth performance provides a clue about future

pro-AV demand. However, as with overall economic growth, the growth performance and capital spending performance in the six key verticals are expected to vary widely across the five regions of the world.

Pro-AV demand is expected to shadow overall growth patterns worldwide over the next several years. Among the six verticals, the most promising from a growth perspective will likely be healthcare, education, and retail trade (in that order). The best regions for growth in these verticals are expected to be MEA and APAC. In particular, education and healthcare will be significant sources of demand for pro-AV products and services in APAC. Despite slowing economic growth in North America (which is the most prominent region for pro-AV demand), healthcare, retail trade, and sports and amusement are expected to continue to perform reasonably strongly and thus sustain pro-AV demand growth.

In conclusion, the future of pro-AV demand appears strong in the near term (through at least 2019) and, based on emerging risks, somewhat less so in 2020 and beyond. However, the latter prospect is far from inevitable. If many of the identified risks — which are mainly political in nature, but with economic implications — do not materialize, then the future of pro-AV may remain just as robust after 2019 as it is currently.



# Behind the Data

## GLOSSARY

**GROSS DOMESTIC PRODUCT (GDP)** is a measure of the total size of an economy. It represents the total market value of all final goods and services within a country in a given period of time. There are several approaches to calculating GDP, all of which should in theory produce the same result. Real GDP is adjusted to reflect changing prices and, hence, gives a better indication of the changes in economic activity over time. The percentage change in Real GDP is what is commonly known as "GDP growth." When converted into U.S. dollars, a fixed exchange rate is used to ensure comparability.

**VALUE ADDED** represents what remains of total sales revenue after the purchases of inputs and supplies required for production are taken out. The sum of value added across industries equals the economy's GDP. Value added is calculated in nominal terms, as gross output minus purchases of inputs and supplies. "Real" value added is calculated by deflating nominal value added by the industry's own output prices.

**GROSS OUTPUT** (or total sales revenue) of an industry is the revenue from the sale of a product to all users, whether final or intermediate, in a given period of time. Gross output for the overall economy is greater than just GDP because the latter does not include sales to intermediate users. "Real" gross output is calculated by deflating the nominal gross output by the industry or overall inflation rate.

**CAPITAL EXPENDITURES** (CapEx, also called Gross Fixed Capital Formation) is the value of expenditures on fixed assets including tangibles (plant and machinery, equipment, vehicles, land improvement, and buildings) and intangibles (intellectual property, artwork, software).

**CONSTRUCTION SPENDING** is the value of construction work done in a country. It includes new construction as well as additions and renovations. Major repairs (replacement of a roof or heating system) are also included. The data do not include routine maintenance such as replacement of a few shingles, cleaning or tuning a heating system, repainting, or redecorating. Data estimates include the cost of labor and materials, cost of architectural and engineering work, overhead costs, interest and taxes paid during construction, and contractors' profits.

**OFFICE CONSTRUCTION** includes administrative buildings, computer centers, office and professional buildings, as well as construction for banks, financial institutions, building and loans, savings and loans, and credit unions. In addition, office construction includes motion picture, television, and radio offices. Office buildings at manufacturing sites are classified as "manufacturing"; however, an office building owned by a manufacturing company that is not located at a manufacturing site is classified as "office."

**COMMERCIAL CONSTRUCTION** includes buildings and structures used by the retail, wholesale, and selected service industries. Such structures include:

- Stores, shopping centers, and shopping malls
- Restaurants and bars
- Hotels, motels, resort lodging, tourist courts and cabins, and related facilities
- Amusement and recreational structures such as movie theaters, amusement parks, sports and fitness facilities, casinos
- Motor vehicle and motorcycle dealerships, motor vehicle service, repair and parts centers, car washes, car rental centers, and commercial parking lots and garages
- Commercial warehouses, storage buildings and distribution centers, and self-storage centers
- Beauty salons, florists, and veterinary clinics

**INSTITUTIONAL CONSTRUCTION** is comprised of hospitals, clinics, medical offices, medical labs, doctor and dentist offices, outpatient clinics, nursing homes, hospices, drug clinics, rehabilitation centers, and adult day-care centers. This category also includes childcare and day-care centers, nurseries, preschools, primary and secondary schools, parochial schools, vocational schools, and structures associated with higher education, such as classroom buildings, dormitories, and sports and recreation complexes. Additionally, institutional construction encompasses zoos, planetariums and observatories, art galleries, cultural centers, museums, libraries, houses of worship, and government buildings.

## **INDUSTRY CATEGORY DEFINITIONS:**

**SPORTS, AMUSEMENT, AND RECREATION (ISIC 93)** includes the operation of sports facilities; activities of sports teams or clubs primarily participating in live sports events before a paying audience; independent athletes engaged in participating in live sporting or racing events before a paying audience; owners of racing participants such as cars, dogs, horses, primarily engaged in entering them in racing events or other spectator sports events; sports trainers providing specialized services to support participants in sports events or competitions; operators of arenas and stadiums; and other activities of organizing, promoting, or managing sports events. Also included are the activities of a wide range of units that operate facilities or provide services to meet the varied recreational interests of their patrons, including the operation of a variety of attractions, such as mechanical rides, water rides, games, shows, theme exhibits, and picnic grounds.

**ARTS, ENTERTAINMENT, AND CULTURE (ISIC 90–92)** is the composite of ISIC sectors 90, 91, and 92. ISIC 90 includes the operation of facilities and provision of services to meet the cultural and entertainment interests of their customers. This includes the production and promotion of, and participation in, live performances, events, or exhibits intended for public viewing; the provision of artistic, creative, or technical skills for the production of artistic products and live performances. ISIC 91 encompasses the activities of libraries and archives; the operation of museums of all kinds and botanical and zoological gardens; and the operation of historical sites and nature reserves activities. It also includes the preservation and exhibition of objects, sites and natural wonders of historical, cultural, or educational interest (e.g., world heritage sites). ISIC 92 contains the operation of gambling facilities such as casinos, bingo halls, and video gaming terminals and the provision of gambling services, such as lotteries and off-track betting.

**ACCOMMODATION AND FOOD SERVICE (ISIC 55–56)** activities include the provision of short-stay accommodation for visitors and other travelers and the provision of complete meals and drinks fit for immediate consumption. The amount and type of supplementary services provided within this section can vary widely.

**RETAIL TRADE (ISIC 47)** includes the resale (sale without transformation) of new and used goods, mainly to the general public for personal or household consumption or utilization, by shops, department stores, stalls, mail-order houses, hawkers and peddlers, consumer cooperatives. The goods sold in this division are limited to goods usually referred to as consumer goods or retail goods. Therefore, goods not usually entering the retail trade, such as cereal grains, ores, industrial machinery, are excluded. This division also includes units engaged primarily in selling to the general public, from displayed goods, products such as personal computers, stationery, paint or timber, although these sales may not be for personal or household use. Some processing of goods may be involved, but only when incidental to selling, e.g., sorting or repackaging of goods, installation of a domestic appliance. This division also includes the retail sale by commission agents and activities of retail auctioning houses.

**HEALTHCARE (ISIC 86–88)** includes the provision of health and social work activities. These include a wide range, namely, healthcare provided by trained medical professionals in hospitals and other facilities, residential care that involves a degree of healthcare, and social work activities that do not involve healthcare professionals.

**EDUCATION (ISIC 85)** includes training at any level or for any profession, oral or written, as well as by radio and television or other means of communication. It includes education by the different institutions in the regular school system at its different levels as well as adult education, literacy programs, etc. Also included are military schools and academies, prison schools, etc. The sector includes public as well as private education.

## IHS MARKIT METHODOLOGY AND MACROECONOMIC MODELS

The basic tools of IHS Markit's international macro forecasting process are our models: econometric models for each economy and central checks to validate consistency and trade linkages. Detailed quarterly frequency models provide coverage for each of the G7 economies; another 70–75 countries are forecast with medium-sized econometric models based on annual frequency data; and 120–125 more countries use small annual frequency models. Although basic model structure and equation specifications are similar across countries, we take account, where appropriate, of national institutions and economic structures. In addition, centralized processes ensure consistency between world import demand and world export supply and among exchange rate movements, financial flows, import prices, and export prices.

### FORECASTING PROCESS: DETAILED FORECASTS, UPDATED QUARTERLY

Every quarter, IHS Markit produces a detailed economic forecast for all 205 countries. To do this, we begin by drawing upon the advice of our many industry and country experts, as well as our clients, to discover assumptions, nuances, and structural changes that may not be capable of being reflected fully in a modeling system. This process also ensures that the forecasts are consistent both internally and with other IHS Markit services. During the forecast cycle, vast amounts of both disaggregated and aggregated information are assimilated, then molded into a forecast, and finally scrutinized by many seasoned professionals. The completion of a detailed international economic forecast cycle takes approximately one month, and the major steps of the process are outlined in the following.

Each quarterly update of the forecast receives input from several sources, including:

1. IHS Markit's International Forecast Council, comprised of the senior economic forecasters and political analysts for each region of the world and senior forecasters for key industry sectors, led by IHS Markit Chief Economist Nariman Behravesh, meets each month.
2. The prior quarter's detailed forecast is an important input, as is the latest monthly interim forecast.
3. Client feedback, which is solicited informally through daily contact by telephone and on-site meetings, and more formally through the regular IHS Markit Forums, is used when possible as a valuable source of bottom-up input.
4. New quarterly national income account data are key inputs to the economic models.
5. High-frequency data for other indicators add a richness and immediacy to the statistical input and often serve as leading indicators.
6. IHS Markit experts in other services constantly provide feedback information, about both their own areas of expertise and any inconsistencies or questions that their detailed use of the macroeconomic forecasts uncover.





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