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IDEA FEDERATION NEWSLETTER

ELECTRONIC COMPONENTS. AVAILABILITY. JUST IN TIME OR JUST TOO LATE?

LAURA BARONCHELLI, IDEA

In June/July 2020 the electronics industry started to see semiconductors lead-time moving out by a couple of weeks and in September-October this extended further for both semiconductors and passives.
In this period, Book:Bill ratio for most of the last 4 or 5 years was close to 1, but in the last six months it has became higher and is now 1.6 and moving towards 2.

On the 9th of June, IDEA – The International Distribution of Electronic Association held a webinar on "**Electronic Components. Availability. Just in Time or Just Too Late?**" to provide a better insight into the current situation.

SEMICONDUCTORS IN ALLOCATION

"In Q1, the book to bill ratio was 1.6 and in Q2 it could be even higher, closer to 2. This is a very interesting situation for our market."

During the IDEA webinar of the 9th of June, Frank Wolinski, EMEA VP, Head of Channel Sales for ST remarked on the very unusual situation for the semiconductors market.

During his speech, he reported some comments from the industry that can be summarized in the following points:

- "Everywhere you look, the global supply chain is a mess" says one customer – there is a supply disruption and not only in the semiconductor sectors, but also in steel, plastic and raw materials. As a consequence, there is a price increase everywhere, including in freight/transportation".
- "The semiconductor shortage could last longer than 2021, as demand will remain high vs a constrained capacity" (Jean-Marc Cherry – ST Microelectronics)
- "It will take more than 2021 to balance demand and capacity. The shortage will reach out into 2022" (Reinhard Ploss, Infineon)
- Gartner analysts predict the exit from the severe/moderate shortage zone will be Q2 2022 at the earliest.
- Intel has announced 20 billion dollars on two new chip factories in Arizona. Intel also said it could build a plant in Europe if it gets public funding. It will take 2-3 years to see an impact on capacity.

According to Wolinski, the question is "allocation" and how long it will last. Customers confirm that they will see a higher demand in 2022 than today. So the semiconductors industry is in a dilemma: demand is going to be higher but capacity constraints could extend to Q4 2022.

In the Automotive sector, for example, at the end of 2020 there was a lack of demand

JUNE/JULY 2021

ASSOCIATIONS

AREI - SOUTH AFRICA
Association of Representatives for Electronics Industry

ASPEC - RUSSIA
Association of Suppliers of Electronic Components

ASSODEL - ITALY
Associazione Nazionale Fornitori Elettronica

CEDA - CHINA
China Electronics Distributor Alliance

ECAANZ - AUSTRALIA
Electronic Components Association Australia and New Zealand

ECIA - UNITED STATES
Electronic Components Industry Association

ECSN - UNITED KINGDOM
Electronic Components Supply Network

ELCINA - INDIA
Electronic Industries Association of India

FBDI - GERMANY
Fachverband der Bauelemente Distribution

FEDELEC - TUNISIA
Tunisian Federation of Electric and Electronic Industries

SE - SWEDEN
Svensk Elektronik Trade Associations

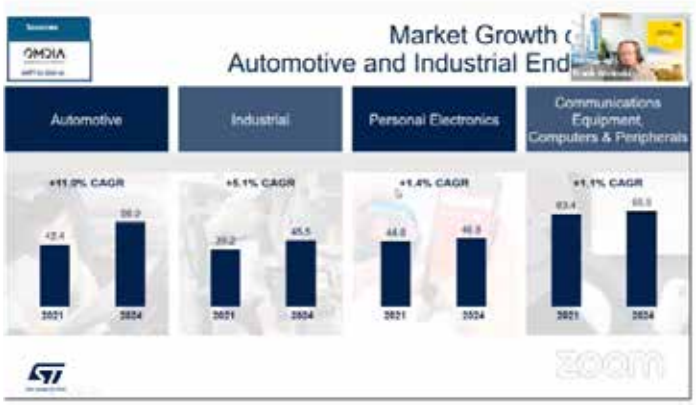
SPDEI - FRANCE
Syndicat Professionnel de la Distribution en Electronique Industrielle

and production of new cars went down. But to decrease capacity is easy, you simply stop producing. The other way round, to ramp up the production is a much longer process.

"Most of the customers still do not understand what is needed to ramp up the capacity. – said Wolinski – "For us it means that we need 20 weeks to come back to the previous production level. We are now producing at 100% of our capacity and the car makers want us to increase this further … But we will need 2 to 3 years to increase the volume capacity."

This is the issue as all industries are forecasting a continuous growth (see chart) and the capacity production of semiconductors is not able to follow this in such a short period.

ST will invest on capacity – around 2 bln dollars to make sure we will increase our capacity and we will also build a new factory in Milan, but we will not see an increase of production before 16-18 months. Actually the lead time production is +26 weeks for many semiconductor products and for others we are in allocation.



"We don't see any chance to come out of the allocation within the next 12 months. The situation will not change. Customers are in a panic mode and this is why we do see many more order coming…" concluded Wolinski.

THE EUROPEAN TECH DILEMMA

Speech by Georg Steinberger

Macroeconomics

The forecast is nice: the sun is shining almost everywere in the electronics industry.
Concerning GDP levels, advanced economies are recovering. +6% in 2021 for the global economy is very good. Looking by major country, there are Europe and Japan on one side and US and China on the other side (with a stronger growth).
Psychological aspects of SMEs are showing a confidence among companies for the future.
There are great expectations on growth and upturn.

Different forecasts for semiconductors market are also optimistic with a double digit expectation of growth of around 11%.

Distribution in Germany will see a growth between 15 and 25%.

"There a very high growth potential, linked to IoT, smart city, Cleantech directive, EU regulations… I am personally optimistic to see +15% growth" said Georg Steinberger, VP Communications at Avnet Electronics
President of IDEA and Chairman of DMASS during his presentation.

"MOST OF THE CUSTOMERS STILL DO NOT UNDERSTAND WHAT IS NEEDED TO RAMP UP THE CAPACITY"

Summarizing what's going to happen in the sector:

- There is growth ahead
- The shortages will last into 2022
- Distribution will grow back to pre-covid 19 levels
- What will fuel our future as a technology region? There is a lot of potential beyond

"Each market has its dynamics but when it comes to supply chain they are all linked together" – said Steinberger – "We are all depending on each other".

"CUSTOMERS ARE IN A PANIC MODE AND THIS IS WHY WE DO SEE MUCH MORE ORDER COMING"

"My personal opinion is that:
- The European economy will improve in 2021 but is seriously jeopardized by the components shortage
- European is sub-strategic and does not consume much leading edge semiconductor technology
- Even in such a situation governments favour one-sidedly a single industry over SME's

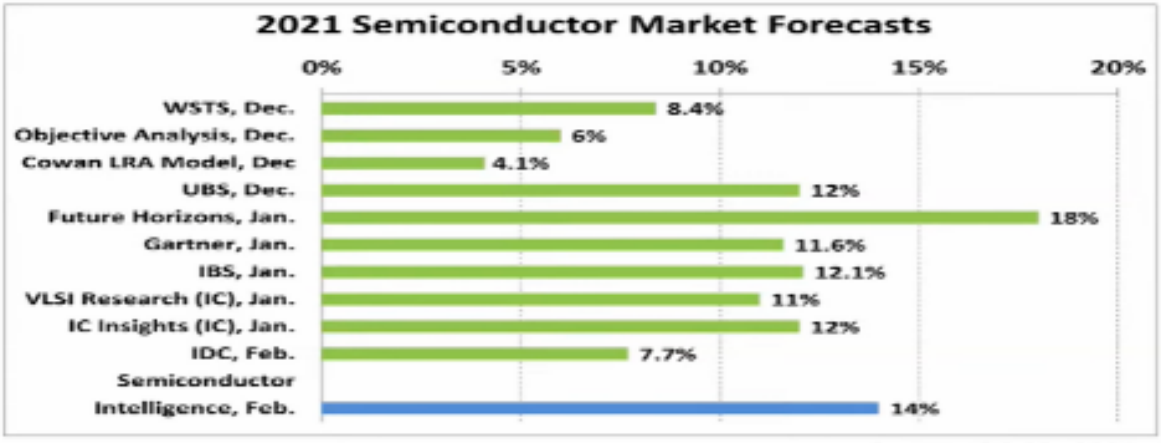
- Europe's salvation does not lie in 5nm-chip factories but in IP (intellectual property)

- The next wave where Europe could be central is with Cleantec 2.0

"WHAT EUROPE WOULD NEED IS A STRATEGY CENTERED ON IP"

Global Growth Projections I

Semi Market Forecast(s)



Q1 2021: Plenty of Orders but Sales still to recover

As the world continues to fight the COVID 19 virus, the global economic recovery has started. The large upswing in global demand has led to lengthening lead-times on many electronic components but especially for semiconductors. This has led to a surge in orders and customers and distributors rebuild stocks as demand increases. This build-up of orders during the first quarter of 2021 has not yet led to a corresponding increase in sales.

AUBREY DUNFORD, IDEA

As the global economy starts to recover, the European Electronic Components Distribution Market also started to show signs of recovery as shown by the Q1 2021 European Electronic Components Statistics. Billings are historically higher in the first quarter of each year when compared to the last quarter of the previous year. Measured across Europe billings in the first quarter of 2021 were 21.3% higher than in the last quarter of 2020 but were still 1% lower when compared to Q1 2020.

The dramatic change between Q1 2020 and Q1 2021 can be seen in the bookings where total bookings across Europe were 59.5% higher than in Q4 2020 and 52% higher than in Q1 2020 with a very consistent pattern in across all countries.

As can be seen in Graphic T1. The book:bill ratio having fallen for 7 successive quarters improved in the last quarter of 2019 and rose past unity in the first quarter of 2020 to 1.05. The effect of the COVID 19 pandemic drove the book:bill ratio down in the middle quarters of 2020 before rocketing up to 1.22 in Q4 2020 and rising to a staggering 1.61 in the first quarter of 2021.

As has been widely reported there are now extreme shortages in the supply chain for many electronic components and thus with lengthening lead-times and suppliers looking for longer term order cover the book:bill ratio has become severely inflated.

> "BOOKINGS ACROSS EUROPE WERE 59.5% HIGHER THAN IN Q4 2020"

Improved Outlook but High Uncertainty Remains.

According to the International Monetary Fund's World Economic Outlook (WEO) published in April 2021 – "One year into the COVID-19 pandemic, the accumulating human toll continues to raise concerns, even as growing vaccine coverage lifts sentiment. High uncertainty surrounds the global economic outlook, primarily related to the path of the pandemic. The contraction of activity in 2020 was unprecedented in living memory in its speed and synchronized nature. But it could have been a lot worse. Although difficult to pin down precisely, IMF staff estimates suggest that the contraction could have been three times as large if not for extraordinary policy support. Much remains to be done to beat back the pandemic and avoid divergence in income per capita across economies and persistent increases in inequality within countries.

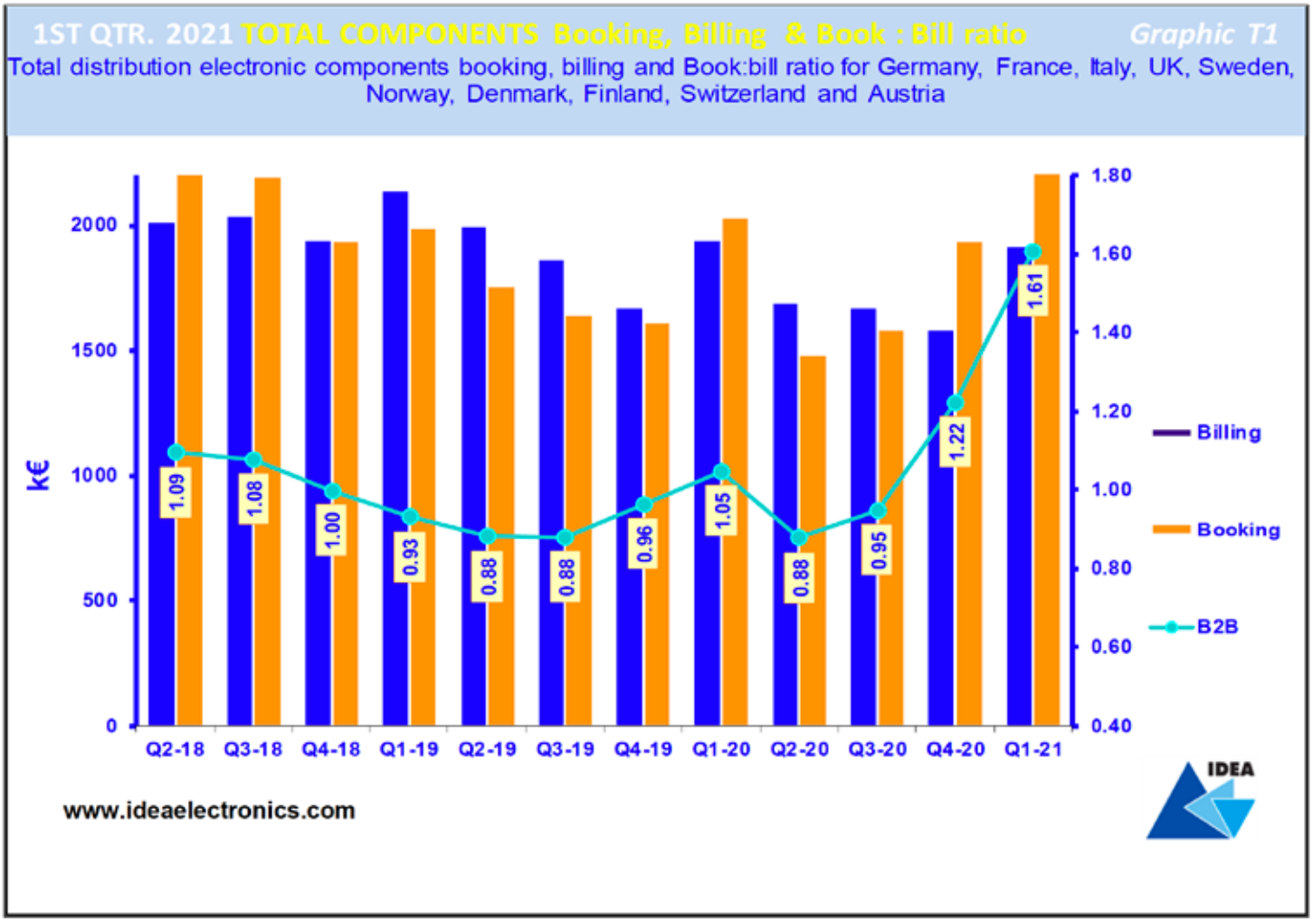
After an estimated contraction of –3.3 percent in 2020, the global economy is projected to grow at 6 percent in 2021, moderating to 4.4 percent in 2022. The contraction for 2020 is 1.1 percentage points smaller than projected in the October 2020 World Economic Outlook, reflecting the higher-than-expected growth out-turns in the second half of the year for most regions after lockdowns were eased and as economies adapted to new ways of working. The projections for 2021 and 2022 are 0.8 percentage point and 0.2 percentage point stronger than in the

October 2020 WEO, reflecting additional fiscal support in a few large economies and the anticipated vaccine-powered recovery in the second half of the year. Global growth is expected to moderate to 3.3 percent over the medium term—reflecting projected damage to supply potential and forces that predate the pandemic, including aging-related slower labour force growth in advanced economies and some emerging market economies. Thanks to unprecedented policy response, the COVID-19 recession is likely to leave smaller scars than the 2008 global financial crisis. However, emerging market economies and low-income developing countries have been hit harder and are expected to suffer more significant medium-term losses.

Future developments will depend on the path of the health crisis, including whether the new COVID-19 strains prove susceptible to vaccines, or they prolong the pandemic; the effectiveness of policy actions to limit persistent economic damage (scarring); the evolution of financial conditions and commodity prices; and the adjustment capacity of the economy. The ebb and

> "THE COVID-19 RECESSION IS LIKELY TO LEAVE SMALLER SCARS THAN THE 2008 GLOBAL FINANCIAL CRISIS"

flow of these drivers and their interaction with country-specific characteristics will determine the pace of the recovery and the extent of medium-term scarring across countries. In many aspects, this crisis is unique. In certain countries, policy support and lack of spending opportunities have led to large increases in savings that could be unleashed very quickly should uncertainty dissipate. At the same time, it is unclear how much of these savings will be spent, given the deterioration of many firms' and households' balance sheets (particularly among those with a high propensity to consume out of income) and the expiration of loan repayment moratoria. In summary, risks are assessed as balanced in the short term, but tilted to the upside later on. Considering the large uncertainty surrounding the outlook, policymakers should prioritize policies that would be prudent, regardless of the state of the world that prevails—for instance, strengthening social protection with wider eligibility for unemployment insurance to cover the self-employed and informally employed; ensuring adequate resources for health care, early childhood development programs, education, and vocational training;

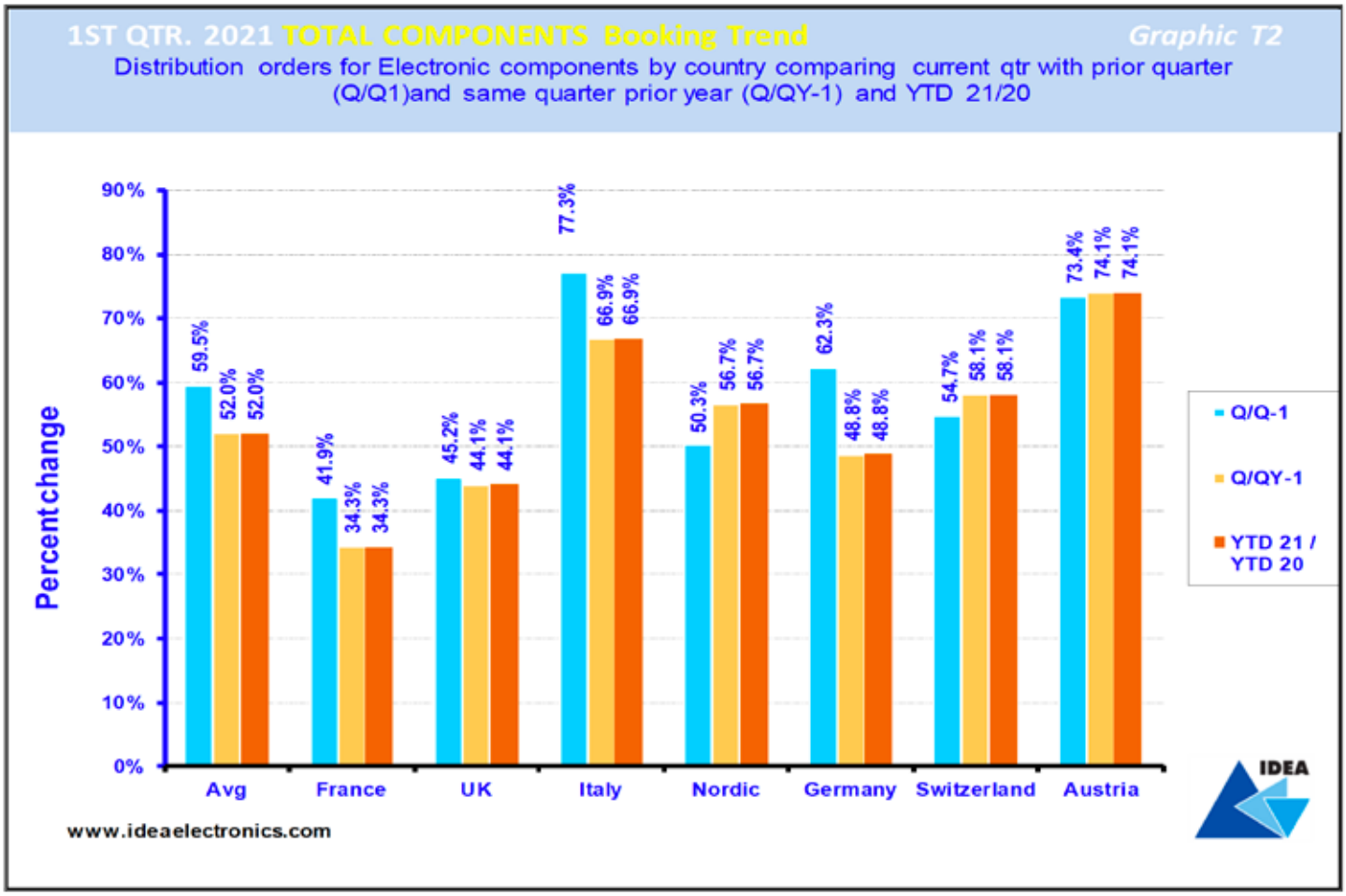


and investing in green infrastructure to hasten the transition to lower carbon dependence. Moreover, they should be prepared to flexibly adjust policy support, for example, by shifting from lifelines to reallocation as the pandemic evolves, and linked to improvements in activity, while they safeguard social spending and avoid locking in inefficient spending outlays. It is important to anchor short-term support in credible medium-term frameworks. Where elevated debt levels limit scope for action, effort should also be directed at creating space through increased revenue collection (fewer breaks, better coverage of registries, and switching to well-designed value-added taxes), greater tax progressivity, and by reducing wasteful subsidies."

"WHERE ELEVATED DEBT LEVELS LIMIT SCOPE FOR ACTION, EFFORT SHOULD BE DIRECTED AT REDUCING WASTEFUL SUBSIDIES"

China's National Bureau of Statistics reported that its gross domestic product grew by a record 18.3% in the first quarter of 2021 in comparison to the same period last year. The figure indicates that China's economy is roaring back to pre-pandemic levels, marking China's highest annual growth rate since it first began recording the statistic in 1993. At the same time, China's growth fell two ticks below Bloomberg's analyst consensus estimate of 18.5% growth, and below Reuters' consensus estimate of 19%. And when China's first quarter was compared to the fourth quarter of 2020, China's economic numbers showed even more signs of sluggishness. China's economy grew 0.6% in the first quarter of 2021 compared to the final quarter of 2020, below the 2.6% growth between the third and fourth quarters of 2020.

According to an estimate, Japan's GDP decreased 3.9% in seasonally-adjusted annualized terms (SAAR) in the first quarter, somewhat above the decrease of 5.1% from a preliminary estimate but markedly contrasting the 11.7% expansion recorded in the fourth quarter of 2020. On an annual basis, GDP contracted 1.6% in Q1, deteriorating from Q4 2020's 1.1% decline. Externally, growth in exports of goods and services slowed in Q1, moderating to 9.2% in SAAR terms from Q4 2020's 55.7% figure, in part due to shortages in semiconductor supplies. Similarly, growth in imports of goods and services moderated to 16.5% in the quarter (Q4 2020: +20.7%). As such, the external sector subtracted 0.9 percentage points from overall growth in Q1, contrasting with the 4.2

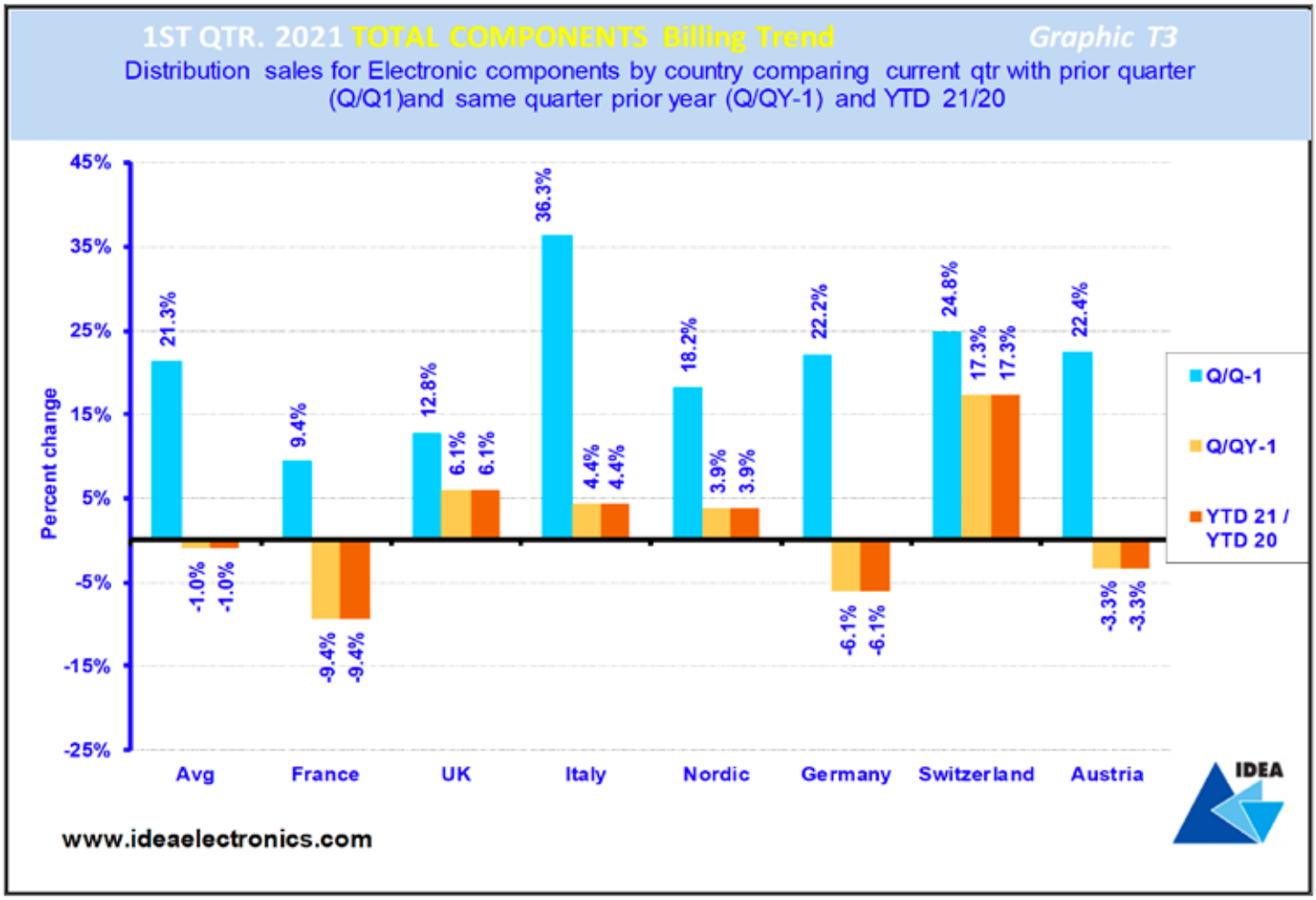


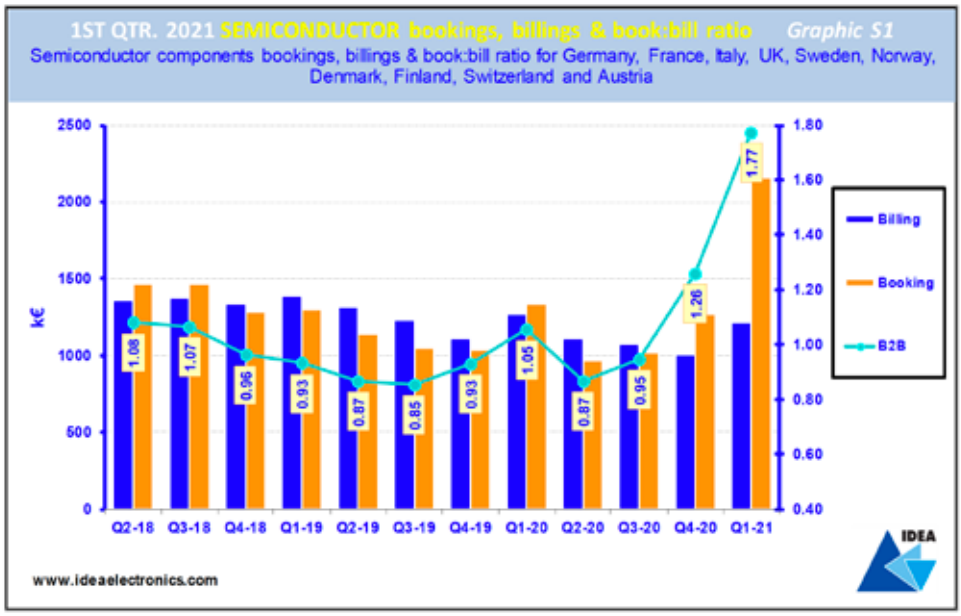
percentage-point contribution in Q4 2020. Looking ahead, the economy is projected to expand slightly in the second quarter of 2021 as returning capital and consumer spending are bolstered by growth in government spending. However, the announcement in late April of a third state of emergency —and its subsequent expansion in mid-May to cover nine major regions, including Tokyo—is likely to impede the rebound in activity somewhat.

GDP in the USA increased at an annual rate of 6.4 percent in the first quarter of 2021, according to the "second" estimate released by the Bureau of Economic Analysis. In the fourth quarter of 2020, real GDP increased 4.3 percent. The increase in first quarter GDP reflected the continued economic recovery, reopening of establishments, and continued government response related to the COVID-19 pandemic. In the first quarter, government assistance payments, such as direct economic impact payments, expanded unemployment benefits, and "Pay-check Protection Program" loans, were distributed to households and businesses through the Coronavirus Response and Relief Supplemental Appropriations Act and the American Rescue Plan Act. The Conference Board forecasts that US Real GDP growth will rise to 9.0 percent (annualized rate) in Q2 2021 and 6.6 percent (year-over-year) in 2021.

Following solid economic growth in Q1 2021 they expect the recovery to continue through the remainder the year. Looking further ahead, they forecast economic growth of 3.8 percent (year-over-year) in 2022 and 2.5 percent (year-over-year) in 2023. As the economy fully reopens and consumer confidence continues to rise, they expect consumer spending to help drive the recovery forward - especially spending on in-person services. These outlays will be underpinned by a strengthening labour market and a large pool of savings derived from three rounds of fiscal stimulus checks dispersed over the last year. Furthermore, the launch of a new wave of monthly government checks to families with children, worth more than $100 billion, is set to launch on July 15th. This program should further strengthen spending in the second half of the year.

In the first quarter of 2021, seasonally adjusted GDP decreased by 0.6% in the Euro area and by 0.4% in the European Union, compared with the previous quarter, according to a flash estimate published by Eurostat, the statistical office of the European Union. These declines follow falls in the fourth quarter of 2020 (-0.7% in the euro area and -0.5% in the EU) after a strong rebound in the third quarter of 2020 (+12.5% in the euro area and +11.7% in the EU) and the sharpest decreases since the time series started in 1995 observed in the second quarter of 2020 (-11.6% in the euro area and -11.2% in the EU). It

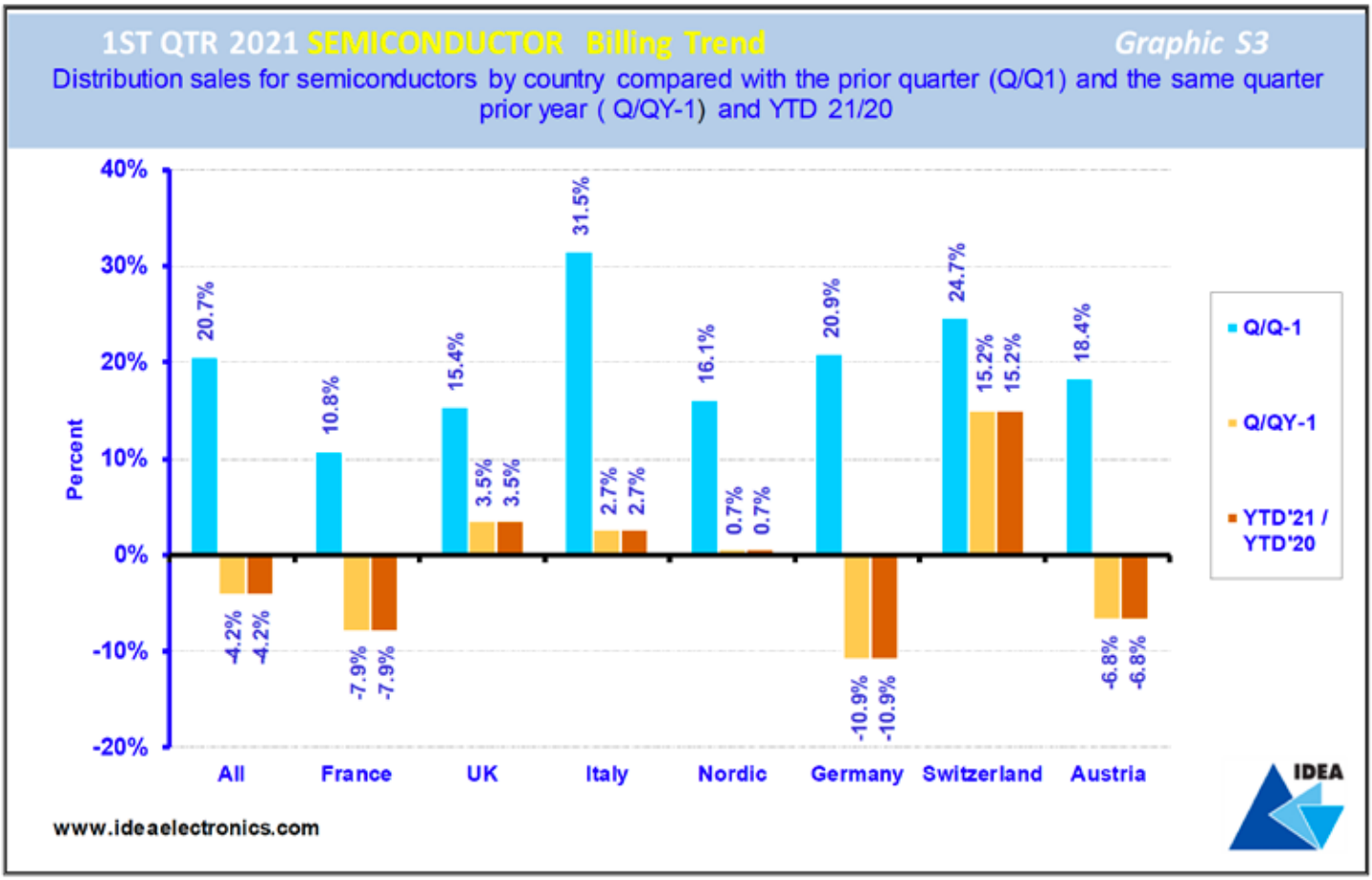




marks the second consecutive quarter of contractions, meaning the region is in a technical recession, although economists are optimistic about growth looking ahead.

Most of the region's largest economies — Germany, Italy and Spain — saw a decline in activity during the first three months of the year. The sharpest fall in activity occurred in Portugal, which has faced a wave of new Covid cases and led to the country's second lockdown. France was an exception, with the euro zone's second-largest economy posting better-than-expected growth of 0.4% in the first quarter. Though the French economy remains below its pre-Covid levels, the growth numbers will bring some reassurance going into the second quarter. The economy of the European Union is expected to grow by 4.2 percent in 2021 as the continent emerges from the pandemic. Compared with the previous year, the Spanish economy is anticipated to be the fastest growing at 5.9 percent.

UK gross domestic product (GDP) is estimated to have contracted by 1.5% in Quarter 1 (Jan to Mar) 2021. The level of GDP in the UK is now 8.7% below where it was prior to the pandemic at the end of 2019. Compared with the same quarter a year ago, when the initial economic impacts of the coronavirus (COVID-19) pandemic began to show, the UK economy fell by 6.1%. Economists polled by Reuters had expected GDP to shrink by 1.7%, with stringent restrictions having been in place throughout the first three months of the year as the country tried

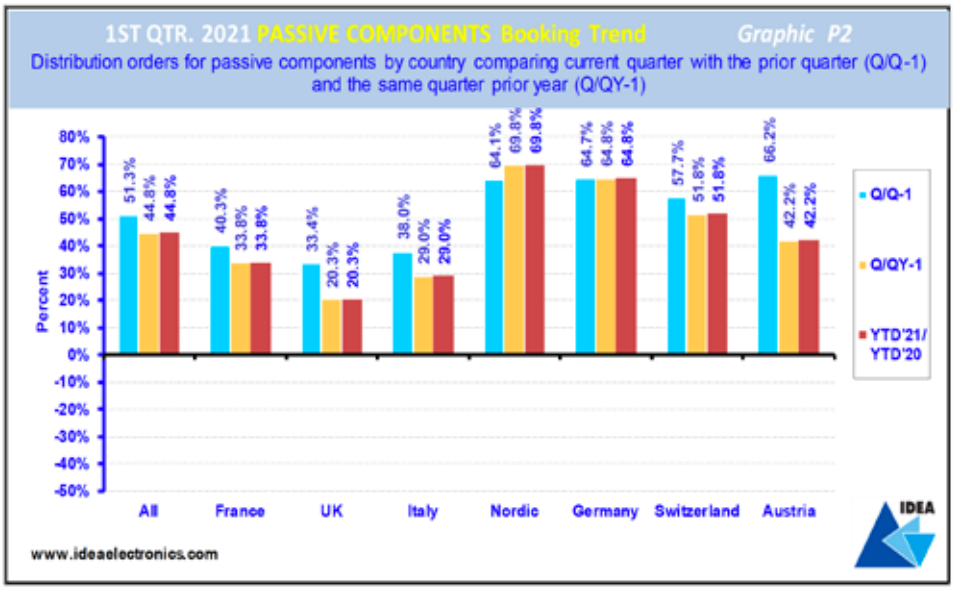


to contain spiralling Covid-19 cases. However, with lockdown measures now being phased out and the economy reopening, the country is expected to see a sharp rebound for the remainder of the year. The International Monetary Fund expects U.K. GDP to grow 5.3% in 2021, partially recovering from last year when the economy saw its largest annual contraction since "The Great Frost" of 1709.

Looking at the data from the Q1 2021 European Electronic Components Statistics we can see:

Billings are stable but bookings go wild.

As can be seen in Graphic T3 there was an increase in billings (sales) Q1 2021 over Q4 2020 in all countries, so for Europe as a whole, the increase was 21.3%, but compared with the first quarter of 2020 there was an overall decrease in sales of 1%. Europe's largest market, Germany, declined by 6.1% and France by 9.4%. Apart from Austria, all other countries showed a increase compared to Q1 2020



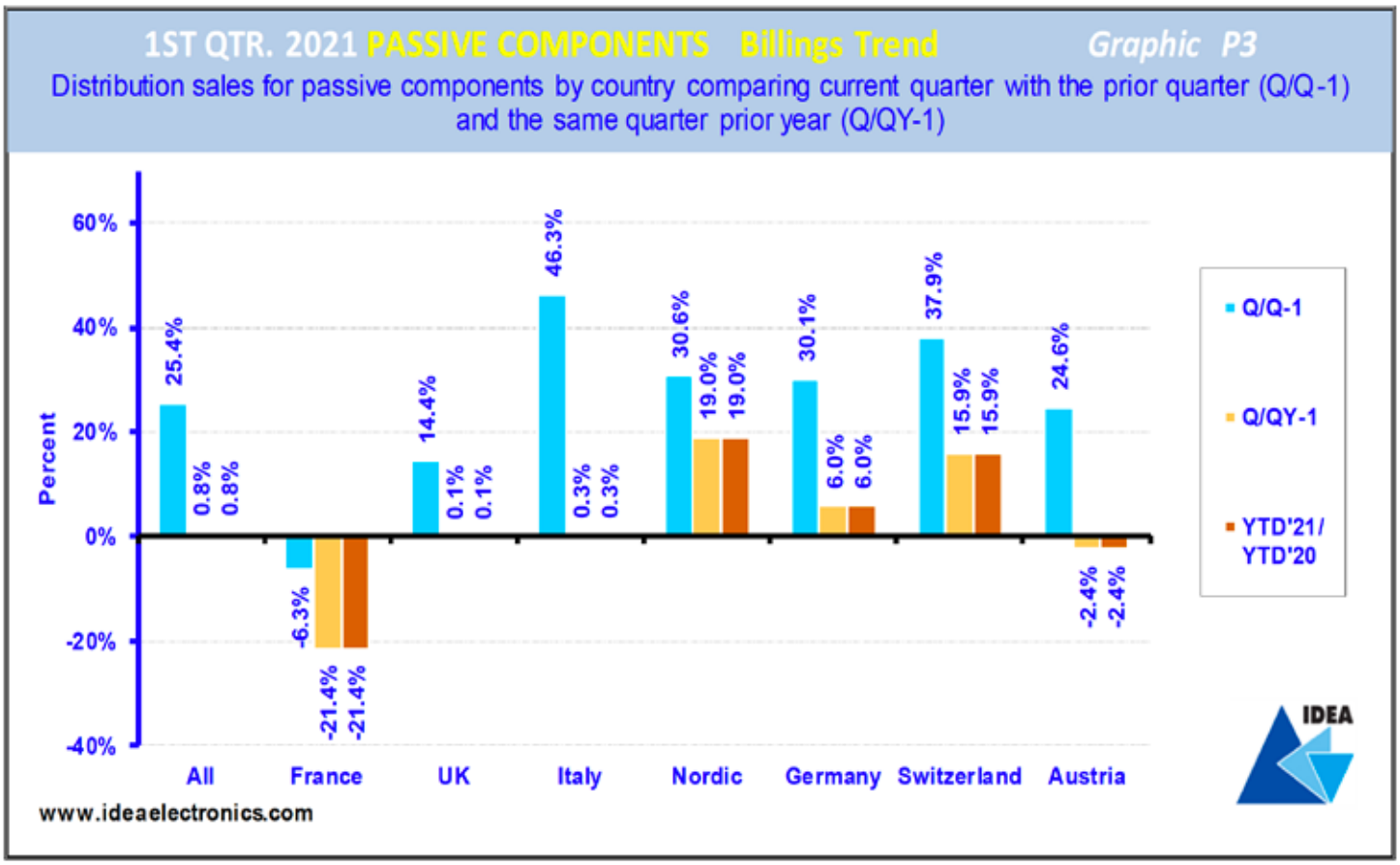
The figures shown in Graphic T2 show that bookings in Q1 2021 were overall 59.5% higher than Q4 2020 and 52% higher than in Q1 2020. There was an increase in all countries.

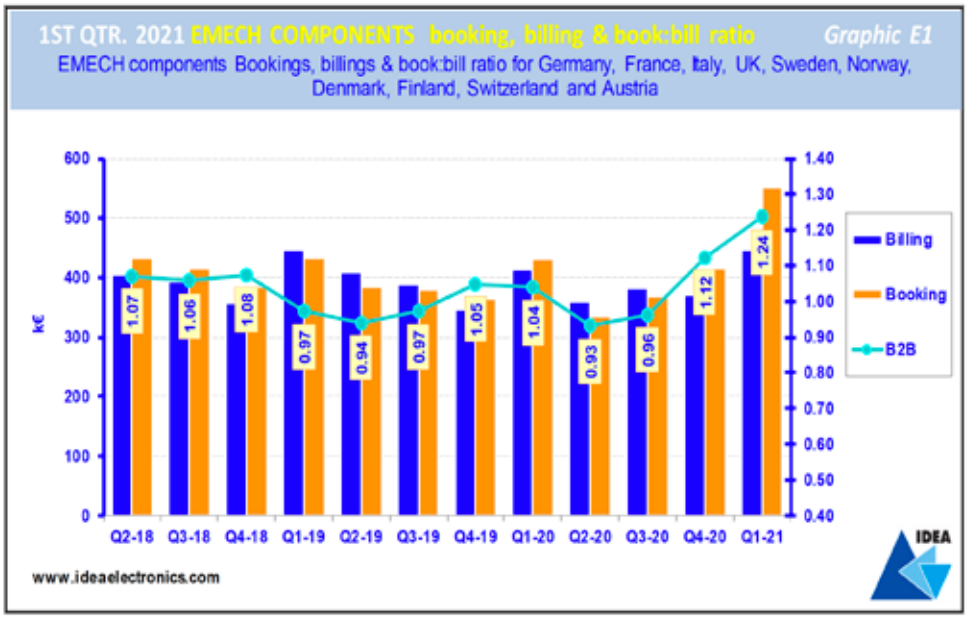
Quarterly Sales by Product Family

As we do each quarter, we look at the booking and billing trends by product and regional market.

Semiconductors

The book:bill ratio for semiconductors as shown in Graphic S1 shows the same pattern as for the total components with 6 quarters with the ratio declining but then increasing in the fourth quarter

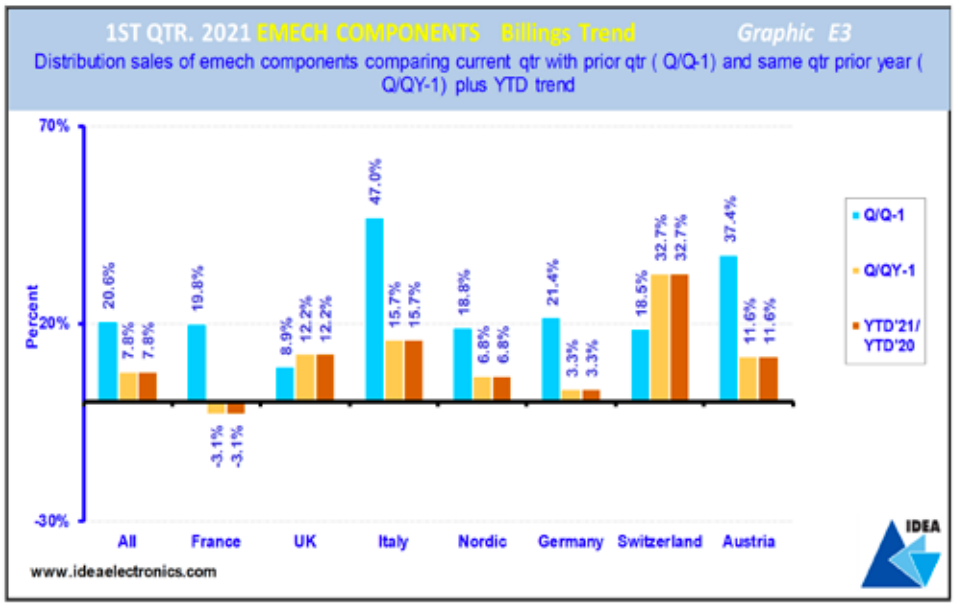




of 2019, in the first quarter of 2020 passing back into positive at 1.05 before dropping down to 0.87 in the second quarter before recovering. In the last quarter of 2020 the ratio rocketed to 1.26 and in Q1 2021 has hit 1.77. This picture within the semiconductor market in Europe continues to be consistent with figures from other sources showing that as product shortages and lengthening lead-times, customers are booking orders in order to secure product. With product lead times extended it is difficult to estimate what the increase in the underlying demand actually is.

"IN THE LAST QUARTER OF 2020 THE SEMICONDUCTOR BOOK:BILL RATIO ROCKETED TO 1.26 AND IN Q1 2021 HAS HIT 1.77"

As can be seen in Graphic S3 Billings in Q1 2021 were 20.7% higher than in Q4 2020 but 4.2% lower compared with Q1 2020. The decrease in billings compared to Q1 2020 were most pronounced in Germany and France, with billings in Germany decreasing by nearly 11% on this measure showing that recovery still has some way to go.



Passives

In the Passives Sector the book:bill ratio dropped below unity at the start of 2019 but then rebounded nearly to unity in the last quarter of 2019 and having improved slightly in Q1 2020 passing back past unity, dropped back to 0.83 in the second quarter, before increasing to 1.21 in Q4 2020 and 1.46 in Q1 2021. As can be seen from Graphic P3 passives is showing the same general picture as semiconductors with sales in Q1 2021, 25.4% higher than in Q4 2020 but only 0.8% higher than in Q1 2020. and total sales in 2020 being 13. There is a similar picture across the European countries with the exception of France where there was a 6.3% decline in Q1 2021 compared to Q4 2020. As shown in Graphic P2 there has been strong bookings in all countries with bookings overall in Q1 2021 were 51.3% higher than in the last quarter of 2020 and 44.8% higher than the first quarter of 2010.

E-Mech and Other Components

As can be seen from the graphic E1 the trend for the book:bill ratio is more stable than the other two product categories but still shows the same basic pattern including the upswing in the past two quarters. The ratio was around unity until the third quarter of 2020 but then increased to 1.12 in Q4 2020 and 1.24 in Q1 2021.

Graphic E3 shows that overall, there was an increase of 20.6% in billings in the first quarter of 2021 compared to the last quarter of 2021 and a 7.8% increase over the first quarter of 2020 and there was a similar picture across the different countries, although again the exception was in France where billings declined by 3.1% in Q1 2021 over Q1 2020.

Total Bookings for Q1 2021 were 32.9% higher than in Q4 2020 and 28.3% higher than in Q1 2020.

Playing "Whac-A-Mole"…

Invented in 1975 by Kazuo Yamada the popular arcade and children's game "Whac-A-Mole", challenges players to strike 'moles' as they emerge from their holes quickly and with sufficient force to make them retreat. At first the moles appear singularly and slowly but their numbers rapidly and progressively increase while the time available to 'whac 'em' before they retreat decreases, making it harder for the player to score. In this article Adam Fletcher, Chairman, the electronic components supply network (ecsn) and IDEA, compares the current situation in the global electronic components to the a "Whac-A-Mole" game and identifies a new "mole" that players will need to deal with…

ADAM FLETCHER, ECSN

Across the global electronic components supply network ecsn and IDEA members and their customers are engaged in a commercial game of "Whac-A-Mole": New challenges (moles) are popping up all the time and just when you think you have dealt with one, another appears. In truth, it was always thus in the electronic components industry but currently challenges are emerging surprisingly quickly, are often interconnected and just as in the game, it's often impossible for a player to satisfactorily deal with them all.

CURRENT "MOLES"

In previous articles I have tried to highlight emerging challenges by covering topics such as Brexit, Covid-19, extending manufacturer lead-times, price increases, trade wars, new legislation, mergers and acquisitions, counterfeit components, international-to-last-mile logistics issues etc. To these I could add the recent blocking of the Suez Canal, the fire at a Renesas foundry in Japan, electricity 'outages' in Texas that brought output at Infineon, NXP, and Samsung wafer foundries to a standstill, and the lack of regional investment in semiconductor manufacturing capacity.

RARE EARTH ELEMENTS / METALS

Rare Earth Elements (REE) / metals are widely used in the production of electronic components particularly in magnets, lasers, batteries, fuel cells, LEDs, semiconductors etc. In 2017 China accounted for 81% of the global supply of REE materials, while Australia occupied second place with a market share of 15%. The global demand for REE is growing **due to increased demand for renewable energy, smartphones and electric vehicles** but recycling rates are currently low because REE are generally difficult and uneconomic to recover from the wide variety of finished products in which they are found.

Following consolidation of the REE producers under its control, the Chinese government has imposed production and export quotas, claiming the need to "reduce over exploitation". In 2010 these actions triggered a **World Trade Organisation (WTO) lawsuit** on behalf of the US, EU and Japan, appealing against the level of export restriction.

Four years later the WTO ruled that China had broken the free trade agreements and stated, *"the overall effect of the foreign and domestic restrictions is to encourage domestic extraction and secure preferential use of [REE] materials by Chinese manufacturers."* In response China agreed to withdraw the quotas but said, "it would need some time to do so".

Yeah right! In 2019 the Chinese market share of REE was estimated to have increased to nearer 85% and **for many REE, China now has between 85% and 95% market share** despite significant mining investment in the US and Australia. Concerns are also mounting that the ongoing trade war between the US and China may further exacerbate the supply situation. No surprise then that the market price for all REE continues to rise.

MORE PRECIOUS METALS – IMPACT ON THICK FILM RESISTORS…

Ruthenium is another rare transition metal and is used in the manufacture of **Thick Film Chip Resistors (TFCRs).** It is a minor constituent of the platinum ore predominantly mined in South Africa by organisations many of whom are now under Chinese ownership where there have been ongoing trade disputes. In 2017 the annual production of Ruthenium was estimated to be 36M tonnes of which almost 45% was destined for use in electronic applications, within that share an estimated >85% being used as ruthenium dioxide, which is combined with lead, bismuth ruthenates and binding

agents to be used in the manufacture in TFCR's.

The market price of Ruthenium increased by **60%** in 2017 and the price held, and in March '21 it jumped up once again by circa 22%, has held firm and looks likely to increase further.

TFCR are ubiquitous components used in the design and manufacture of all electronic products and are produced in unbelievable volumes that are measured in the multi-trillions p.a. All electronic equipment's use TFCR's, a standard mobile phone for example uses many hundreds per phone and there is no viable alternative technology available at anywhere close to the existing price points.

There are **significant "barriers-to-entry" in the manufacturing of TFCR's** of which the massive economies of scale required in production and the constant incremental fine

"CONCERNS ARE ALSO MOUNTING THAT THE ONGOING TRADE WAR BETWEEN THE US AND CHINA MAY FURTHER EXACERBATE THE SUPPLY SITUATION"

process tuning required to maintain or improve device performance and smaller physical size, when coupled with an unacceptably low return on capital employed (ROCE) discourage any new investment in manufacturing capacity.

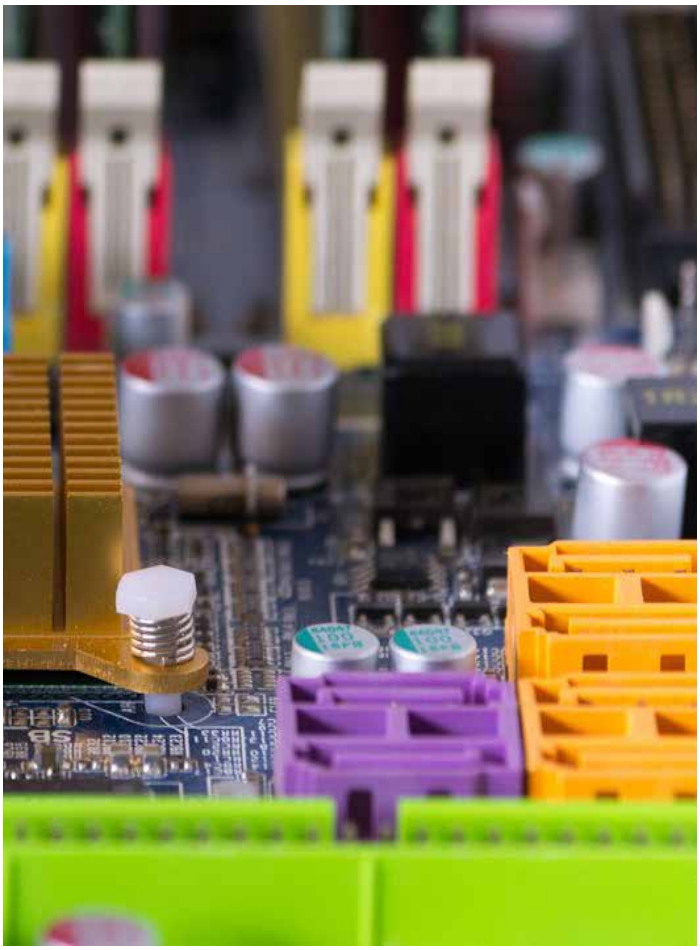
The existing "captive manufacturers" of these products are primarily based in China and Japan but due to aggressive competition have little control over the selling prices. TFCR's are what is described as "Merchant Market Commodity Products" and are traded like "commodities" with effectively "spot" pricing being determined by supply and demand in the market.
The price of TFCR's are now likely to rise in-line with the increases in raw material costs, failing to achieve this may result in market mayhem if just one of the few TFCR manufacturers decides to stop their production.

As I suggested in previous articles, when supply and demand are imbalanced it's not the Super "A" class expensive items like single sourced semiconductors that are likely to cause customer line-stops, it's the multitude of "C" class, very low price, high volume commodity products that are often taken for granted.

THE GOOD NEWS

Across the electronic components supply network suppliers and customers are managing to work through all the current and emerging challenges collaboratively confirming that supply difficulties can be mitigated by effective engagement with partners both up and down the supply network. Sharing business intelligence in this way can make an effective contribution to the performance of all organisations.

Unlike a "Whac-A-Mole" game the process of constant challenges in the electronic components supply network will never come to an end. I do however predict that the severity of some of the supply and demand challenges will decrease into the 2H'21, before becoming more acute in 1H'22, it really depends on how strong the underlying economic growth really is and that Mole's not yet known.



SCIP Database: Added Value or Extra Work?

New EU SCIP database for SVHC substances - reporting obligation under the REACh Regulation

Since January 5th, manufacturers and suppliers are obliged to report information about substances of very high concern (SVHC) in their articles in the EU, which contain SVHCs (substances of the REACh candidate list) with a content of more than 0.1%, also to the ECHA (European Chemicals Agency).

ANDREAS FALKE, FBDi association

Based on Article 9 of the Waste Framework Directive (WFD (EU) 2018/851), this agency has been commissioned by the EU to set up a European database for this purpose - the SCIP database. It supplements the notification and reporting obligations under the REACH Regulation for substances on the candidate list, and is therefore intended to enable uniform collection of information at European level. The required information relates to the safe use of articles and products with a certain SVHC content. With the SCIP database, ECHA aims to improve knowledge about hazardous chemicals contained in articles and products throughout their life cycle - including disposal. The reported information should lead to transparent supply chains, drive recycling and the development of pollutant-free products.

"REPORT INFORMATION ABOUT SUBSTANCES OF VERY HIGH CONCERN (SVHC)"

The following information must be provided for the entry:
- Identification data of the article.
- Name, concentration range and location of the candidate list substance contained in the article in question.
- Other information on the safe use of the article, in particular on its proper treatment as waste.

In the absence of an implementing regulation from the German Federal Ministry for the Environment, however, there is currently a lack of clarity regarding 'mandatory' and 'optional' data. Already in the run-up, several associations (e.g. FBDi, VDMA) asked for postponement and structural improvement, which were not granted. The FBDi association supports its members with special white papers, which are developed in working groups and are tailored to the specific needs of distribution.

"SUCH UNCLEAR FRAMEWORK CONDITIONS ARE POISON FOR THE ECONOMY, EUROPE AND THE ENVIRONMENT"

The FBDi would like to see more legal certainty here, as this unclear situation is not sustainable and forces many companies into a European quandary due to differing or missing national implementing regulations: "Such unclear framework conditions are poison for the economy, Europe and the environment. Those who take the requirements seriously incur extra work and costs and lose competitive advantages compared to those who unilaterally exploit the definition gaps in their favor.

This makes it all the more difficult to understand why the database is being expanded at the same time to include query fields beyond REACH §33.1, which even the recycling industry does not consider useful. The "sauce will be much more expensive than the roast," all the more so as the structure of the database is not sustainable due to a lack of ergonomics, but a lot of energy is "burned".

What sticks is: "Another European Moloch! That is at least as wrong as it is bad for Europe! But also for Europe it is not the first time that a good idea is condemned because of poor implementation."

The Industrial Market for Connectors in a Changing World

by Bishop & Associates

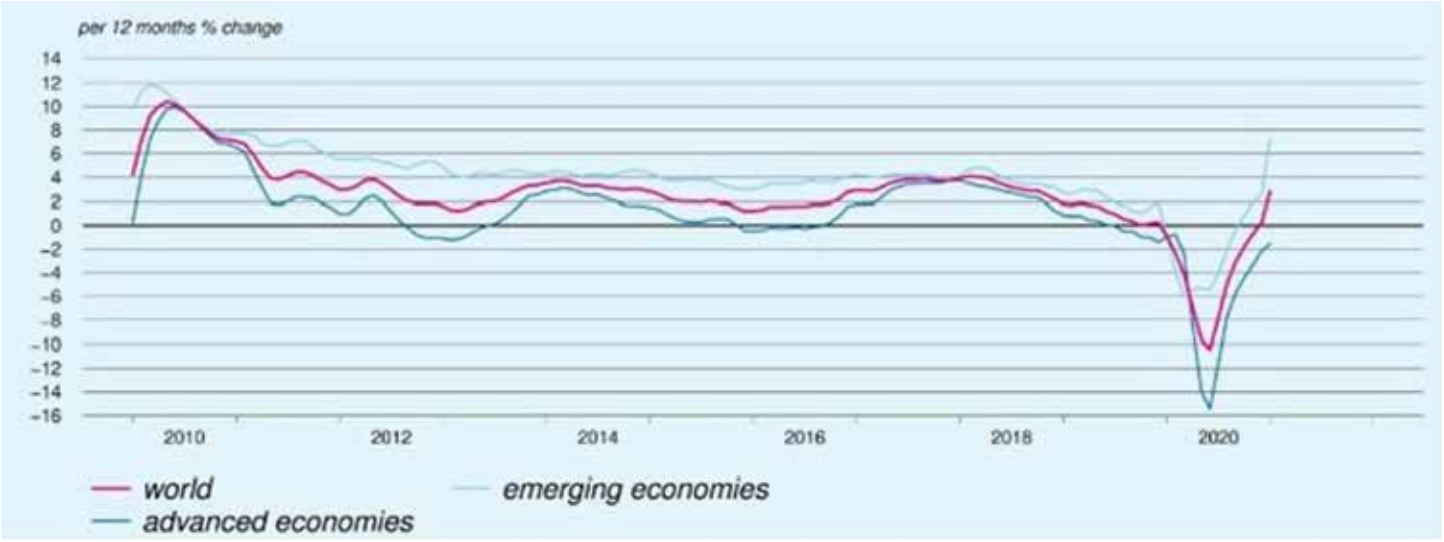
The pandemic, supply chain restructuring, changing energy sources, and industrial automation are among the factors that are shaping the outlook for the industrial market for connectors and the technologies that will drive it in the years to come.

During 2020, making accurate predictions about the impact of the COVID-19 pandemic on the world economy turned out to be a difficult exercise. Even today, with the vaccination roll-out well underway in many countries, it remains to be seen how effective these will be against variations of the virus and how long it will take before we all need to be re-vaccinated. This uncertainty makes it difficult to predict the future outlook and performance for many industries, including the industrial market.

Apart from these considerations, there are other, less visible consequences of the pandemic. For example, how has and how will the COVID-19 pandemic influence our global supply chains? How will it affect our industries? And, as a result of all this, how will it affect the industrial market for connectors? To find out, we need to take a closer look at the manufacturing industry and energy sectors.

When we go back to the third quarter of 2020, the first surprise was that, after industrial production took a nosedive earlier in the year, the recovery was strong. Before the year was over, production output was back at 2019 levels. Instead of a long, drawn-out recovery, it turned out to be, at least for now, a V-shaped recovery. Global connector sales even broke records in Q42020.

WORLD INDUSTRIAL PRODUCTION 2010-2020



(Source: CPB.nl)

Bishop & Associates believes the connector sales growth experienced in 2020 largely came from a shift in demand, as societies around the world turned their focus away from services (dining out, travel, etc.) and instead focused on consumption of consumer goods (laptops, tablets, and white goods). Students and workers required new equipment as their schools and offices shut down and hospitals required additional equipment to treat the influx of COVID-19 patients. These conditions persist in many regions. Additional shifts came from a rise in demand for bandwidth capacity as more devices came online, requiring buildouts of server infrastructure. All of these conditions resulted in a skyrocketing demand for electronic components, as is clearly illustrated in the growth we have seen in the connector industry since mid-2020.

"SOCIETIES AROUND THE WORLD TURNED THEIR FOCUS AWAY FROM SERVICES AND INSTEAD FOCUSED ON CONSUMPTION OF CONSUMER"

These trends favor the computer and telecom/datacom sectors and do not necessarily boost all industrial markets. It is also important, however, to recognize there were already some megatrends shaping the manufacturing and energy sectors before the pandemic. These key trends include:

- Digital transformation of the manufacturing industry, most notably the implementation of IIoT and Industry 4.0
- Focus on energy consumption and a shift to cleaner, renewable, energy sources
- Re-shoring of manufacturing (research from MIT Sloan School of Management and others indicate that some companies are restructuring their supply chains to get closer to the customer)

"DIGITAL TRANSFORMATION OF THE MANUFACTURING INDUSTRY, MOST NOTABLY THE IMPLEMENTATION OF IIOT AND INDUSTRY 4.0"

If the pandemic did anything to the manufacturing industry — apart from disrupting it in the immediate short-term — it has probably accelerated the implementation of these megatrends. Digital transformation enables companies to improve their productivity and become more competitive, which will also allow them to shorten their supply chains and create regional production centers to serve regional customers better — of course, with the added advantage that shorter supply chains are less prone to disruptions.

While some companies were already beginning to shift their supply chains from global to regional structures, effectively optimizing them on a global scale to bring production facilities closer to the end user, the need to do this became more apparent during the pandemic. Shorter supply chains are more robust and positioning production closer to the point of consumption (closer to the customer) brings the advantage of being able to adapt quickly to changes in the market and customer demand, and to better anticipate changes in the industry's cost structures. The international competition we witnessed during the COVID-19 pandemic for medical equipment, vaccines, and other resources only reinforced the need and the thinking that supply chains better be short (i.e. preferably domestic) and manageable. When re-shoring — or in the other direction, offshoring —several important elements are usually taken into consideration:

- **Cost:** Sectors with low labor costs and high logistics costs may bring production back home if the labor advantage in distant production areas is significantly reduced.

• Level of automation: Sectors that can increase productivity by means of advanced automation technologies are likely to bring production back home.
• **Innovation and intellectual property:** Sectors with relatively high R&D spending, particularly valuable intellectual property (IP) embedded within the manufacturing process, or significant patent applications may choose to manufacture at home to protect their IP.
• **Product quality and safety:** Sectors with stricter quality and safety regulations (e.g., food, drugs) are also unlikely to offshore production.
• **Essential business designation:** Businesses, sectors, or products officially designated as critical or essential by governmental authorities may not be allowed to offshore their production or certain parts of it. Military equipment would be a good example. Another example: Serum Institute of India (SII), based in Pune, is the world's largest vaccine manufacturer, but the Indian government has restricted its exports, as there is a shortage of vaccines in India. Domestic need may outweigh obligations to service foreign customers.

• **Environmental regulations:** Criteria and costs to meet or exceed local emissions or pollution regulations may influence production location.
• **Politics and geopolitical issues:** As we have seen in many trade disputes and also during the COVID pandemic, political tensions, trade disputes, and national interests can play an important role in the decision-making process to re-shore businesses. This would include (tax) incentives by (local) governments to attract new investments and companies.

Finally, the trend to curb energy consumption and increase the use of cleaner and renewable energy sources is accelerating. Although most of our primary energy still comes from natural gas, petroleum, and coal, this trend is here to stay. The pandemic may have had a short-term positive impact on our energy consumption, but it may also have had a short-term reverse effect on our transition to cleaner energy sources, as the prices of fossil fuels were under severe pressure during 2020 due to the drop in demand. In the meantime, these prices have recovered to pre-pandemic levels (early 2021 crude oil was back at about $60/barrel), so the effect may be short-lived. If, however, supply chains become shorter and the volume of products being shipped back and forth around the globe (by sea, air, rail, road) decreases, the demand for fossil energy sources used for this activity may decrease, or at least slow.

"THE PANDEMIC MAY HAVE HAD A SHORT-TERM POSITIVE IMPACT ON OUR ENERGY CONSUMPTION"

While many are optimistic about the post-pandemic manufacturing industry, especially in the light of the exceptional revival in some sectors, others are less optimistic about the midterm effects. A recent report by CreditSafe said, "The manufacturing industry in the United States is standing at the precipice of severe negative impacts due to COVID-19 and many manufacturers could see a significant decrease in their revenue." Specific industries most likely to be severely impacted (in the U.S.) include:

- Printing and publishing
- Miscellaneous manufacturing
- Industrial machinery and equipment
- Fabricated metal products
- Apparel and other textile products

Re-shoring and changing supply chains to adapt to a new situation is costly and will take time, and the above findings will probably not be limited to the U.S. This could potentially harm the existing manufacturing industry, but, as always, it will

"RE-SHORING AND CHANGING SUPPLY CHAINS TO ADAPT TO A NEW SITUATION IS COSTLY AND WILL TAKE TIME, AND THE ABOVE FINDINGS WILL PROBABLY NOT BE LIMITED TO THE U.S."

also offer new opportunities for those companies that can offer products and solutions that fit into emerging manufacturing strategies and supply chain solutions.

In January and February of 2021, Chinese industrial output surged in the pandemic rebound, with an increase of 35% versus the first two months of 2020 and +17% up from the same period in 2019. In the U.S., the situation is slightly different: After rising 1.5% in December, industrial production again contracted by -1.6% in January 2021.

Recovery in the manufacturing industry is more fragile, but a successful vaccination strategy, combined with increased consumer spending, will boost industry here as well. As far as job creation is concerned, the U.S. is already doing very well. Europe will probably lag behind China and the U.S. The climb out of the pandemic for these countries is slow and so is the vaccination roll-out, which is probably the reason the European countries are struggling to exit from the pandemic. Some

"RECOVERY IN THE MANUFACTURING INDUSTRY IS MORE FRAGILE, BUT A SUCCESSFUL VACCINATION STRATEGY, COMBINED WITH INCREASED CONSUMER SPENDING, WILL BOOST INDUSTRY HERE AS WELL"

industries, like the German car industry, were doing quite well in the fourth quarter of 2020. As long as demand continues to be strong, from exports markets as well as domestic customers, the European manufacturing industry should rebound as well. This is good news for the connector industry, and it is already reflected in the very strong booking and billings data Bishop & Associates has been tracking in the Bishop Report. It also means two other things: Connector manufacturers must, like everybody else, rethink their supply chains and production locations, and, again like everybody else, think about what it can mean for the connector industry when the digital transformation accelerates. As more new energy sources are integrated into

the grid and smart cities and buildings become the norm, demand will expand for connectivity solutions. This is where we will find new opportunities and plenty of room for innovation and exciting new products.

What it means for the industrial market for connectors will be determined by many factors, not just how the pandemic plays out. We'll see how stimulus packages contribute to economic recovery, to what extend digital transformation in the manufacturing sectors accelerate, how we reorganize our supply chains, and, last but not least, how consumption patterns will develop in the aftermath of the pandemic.

For 2021, we expect mid-single digit growth in the industrial market for connectors versus 2020. Over the next six-year period (from 2020 to 2026), we expect the industrial market for connectors to grow with a compound annual growth rate of +5.7%, which is just slightly below the global connector market growth rate.

For more detailed information on the industrial connector market, see Bishop & Associates new report The World Industrial Market for Connectors 2021-2016.

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