

Forecast Report

Framework Conditions: Future Development of the Economy as a Whole and the Jenoptik Sectors

At the beginning of 2022, the global economy is in a weaker position than previously forecast by the International Monetary Fund (IMF) in October. Before the outbreak of war in Ukraine, the IMF saw economic recovery as significantly impeded by supply chain issues, high levels of inflation, and the spread of coronavirus/Omicron. In addition, the two largest economic areas have not grown as strongly as was assumed in October. In the US, the administration’s investment package was not approved by the US Congress, while the Chinese economy has been weakened by problems in the real estate sector, coronavirus regulations, and low levels of consumer spending. The IMF therefore cut back its forecast for the global economy by 0.5 percentage points and is now expecting global growth in 2022 to increase 4.4 percent on the prior year.

At the beginning of March 2022, the IMF, together with the World Bank, reported that the war in Ukraine would cause commodity prices to rise further, fueling already high inflation. Distortions in the financial markets would worsen if the conflict continued. In addition, the sanctions against Russia would have an impact on the economy.

Experts particularly see China’s inflexible coronavirus policy as a risk to global trade and global supply chains. According to the IMF, China’s economy had lost momentum by the end of 2021, and this slowdown will continue into 2022. Reasons, according to the IMF, include a restrictive fiscal policy, as the focus has shifted from supporting the economy to reducing debt, isolation related to the zero-Covid strategy, increased raw material costs and energy shortages, and a crisis in the real estate market, which has recently cooled sharply, among other things driven by uncertainties surrounding a highly indebted real estate group.

Following a weak fourth quarter 2021, Germany began the new year with subdued momentum. Experts expect the Omicron wave to burden the economy in the first quarter 2022, making a technical recession possible – if economic output falls in two successive quarters. From the second quarter 2022 on, economists are anticipating a noticeable recovery if the pandemic subsidies and consumer spending picks up. For 2022, the German government is forecasting economic growth of 3.6 percent on the prior year, and an increase of 2.3 percent in 2023. According to experts, indicators such as the recent rise in industry order intakes suggest dynamic economic development – if the gradual resolution of supply bottlenecks means that the high order backlog can be worked off.

Thanks to digitization, the **photonics** industry remains part of a growing field, according to the Spectaris industry association. The use of lighting technologies is making an essential contribution to global market growth and has become indispensable for many innovations, e.g., as a basic technology for autonomous driving, for industry 4.0 and big data applications, for the so-called smart laboratory in analytical and biotechnology, and through the use of quantum technology, which may provide photonics with its next source of growth momentum. According to Spectaris, efforts to better protect the climate and promote sustainability are expected to make a positive contribution. Light-based technologies deployed in the service of “green photonics” are key here. The use of photonic solutions will save 3 billion tons of CO₂ emissions by 2030, according to Spectaris.

T62 Gross domestic product forecast (in percent)

	2022*	2023*
World	4.4	3.8
US	4.0	2.6
Eurozone	3.9	2.5
Germany	3.8	2.5
China	4.8	5.2
India	9.0	7.1
Emerging countries	4.8	4.7

Source: International Monetary Fund, World Economic Outlook (Update), January 2022
 * Forecast

Industry experts expect a compound annual growth rate (CAGR) for the global [photonics](#) industry of at least 6 percent in the coming years: Market researcher Tematys (together with Photonics21) is forecasting a CAGR of 6 percent, to 900 billion euros in 2025, MarketsAndMarkets 7.1 percent to 837.8 billion US dollars by 2025, and Triton 8.1 percent to 921.7 billion US dollars by 2028. Growth will primarily be driven by the increasing use of photonics products in the healthcare sector, in industry, and in IT and communications, where photonics can facilitate data generation, transmission, storage, and usage. Due to immense demand for cloud computing applications, the optical transceiver market alone is expected to grow at an average annual rate of 15.2 percent, from 7.0 billion US dollars in 2021 to 14.3 billion US dollars by 2026, according to MarketsAndMarkets.

Potential risks may arise from disruptions to supply chains caused by the pandemic, for example with delays in the roll-out of 5G in some countries or price increases for fiber optics because production in countries such as China has been or can be affected.

In the [laser material processing](#) market, the market researchers at ResearchAndMarkets are expecting stable revenue growth of an annual average of 7.8 percent to 2026. From 11.1 billion US dollars in the base year 2019, the market will grow to a value of 18.7 billion US dollars. In the laser-based micro material processing market segment, an important segment for Jenoptik, revenue with short-pulse laser sources is expected to grow by an average of 16.6 percent each year from 2021 through 2026.

According to Spectaris, the drivers of growth in the [medical technology industry](#) remain intact, and include opportunities arising from demographic changes, especially in industrial nations, and high levels of healthcare investment in many emerging economies. The pandemic has further intensified digitization within the industry; as a consequence, manufacturers' business models are moving from traditional instrument engineering via solution providers in the current decade toward suppliers of digital and holistic healthcare solutions in the next decade. Based on conservative assessments by Frost & Sullivan, the global medical technology market will grow by an average of over 6 percent a year to a value of 582 billion US dollars in 2025.

The growth prospects for the [machine vision industry](#) remain good for the next few years, according to VDMA Machine Vision, which sees revenue in the European industry growing 7 percent in 2022. The trend toward "seeing machines" remains unbroken; machine vision is a key component in the automation industry and the combination of embedded vision and deep learning will generate new growth momentum.

The boom in the [semiconductor industry](#) shows no signs of ending: Consulting firm McKinsey is expecting annual industry revenue growth of 6 to 8 percent through 2030. Market researcher IC Insight is projecting a revenue increase of 11 percent, to a record high of 680.6 billion euros in the current year, while the Semiconductor Industry Association (SIA) expects revenue 8.8 percent up on the prior year. The chip industry is seeing huge expansion, especially in China. The SIA predicts that if China maintains the strong momentum seen in recent years, with average growth of 30 percent in the next three years, and growth rates remain stable in other regions, China will be the third largest chip market, after the US and South Korea, by 2024. Following a record year in 2021, the [semiconductor equipment](#) market will continue to grow in the current year, according to the Semiconductor Equipment and Materials International (SEMI) industry association. Revenue is expected to grow from 103 billion US dollars in 2021 to 114 billion US dollars in 2022. The wafer fab equipment segment is expected to see double-digit growth to a figure of around 99 billion US dollars, after which a slight 0.5-percent decline is anticipated in 2023. The test equipment and back-end assembly and packaging segment will also contribute to grow in 2022, according to SEMI, in part driven by 5G applications and high-performance computing.

In view of strong chip demand in many industries, but also potential trade conflicts, countries and regions such as the US or the EU plan to increase their own chip capacities with support programs and thus become less dependent on supplies from abroad. Under the auspices of the European Chips Act, the EU Commission plans to build new chip factories in Europe in the medium to long term, doubling Europe's share of global chip production to 20 percent by 2030. The EU Commission plans to mobilize around 43 billion euros for this purpose, in part from its own budget, in part from member state budgets. The US also intends to invest 52 billion US dollars in establish-

ing its own chip production industry under the “CHIPS for America Act”.

According to the German Electrical and Electronic Manufacturers’ Association (ZVEI), the German **electrical and digital industry** will see production growth of 4 percent in 2022. Capacity utilization in the industry was very high, 88.5 percent, at the beginning of the first quarter 2022; the order range of 4.8 production months is a historical high. On the other hand, many industry companies are having to contend with shortages of materials and skilled workers.

The German Mechanical Engineering Industry Association (VDMA) is expecting production in the German **mechanical and plant engineering industry** to again increase by 7 percent in 2022. The industry started the current year with a high order backlog, which provides certainty for the full year, although supply bottlenecks mean these orders cannot be processed quickly. Electromobility is one driver of industry growth, reflected in rising demand for production technology, for example for battery cells.

In the **robotics industry**, the VDMA Robotics and Automation sector group expects industry revenue to reach pre-crisis levels again in 2022, with industry revenue of 14.7 billion euros in Germany. This is dependent on disruptions to supply chains not significantly worsening, as reported by the VDMA in late 2021. In China, under a new Five-Year Plan for the robotics industry, innovation will be given targeted government support to make the country a leading location for robot technology. To date, the rapid automation of Chinese industry has primarily rested on supplies from foreign manufacturers, according to the International Federation of Robotics (IFR).

Slow improvement is expected in the **automotive industry**: The German Association of the Automotive Industry (VDA) believes the German market will grow around 7 percent to a figure of 2.8 million new registrations in 2022. For the global market, the VDA is anticipating growth of 4 percent, to around 75 million vehicles, which would be similar to prior-year growth, but 13 percent down on the record figure of 84 million units in 2017. A new “Future Fund” with a volume of 1 billion euros is being set up for the German car industry to promote the shift to

electromobility and more digitization. The first automakers want to phase out internal combustion engines by 2035. The transformation could engender new dependencies in the raw materials market and lead to sharp price rises for important metals. The semiconductor shortage that has plagued the industry for months could last well into the current year or not end in a balance of supply and demand until 2023, according to chip manufacturer estimates.

The global **traffic safety** market is expected to grow by an annual average 12.4 percent, to 6.6 billion US dollars, from 2021 through 2028, according to the US market research company Grand View Research in its May 2021 market report. The further development of smart systems and initiatives for greater road safety, including “Vision Zero,” in which any road traffic fatalities are considered unacceptable, play a key role here. Within the speed monitoring segment, automatic license plate recognition (ALPR) accounts for a significant portion of industry revenue, and demand here is forecast to remain solid through 2028. Also becoming more important are services, or the ability to provide end-to-end monitoring and maintenance services. The vehicle-to-everything (V2X) market also pursues objectives such as greater road safety, autonomous driving, energy saving, and the optimization of traffic flows. Here, market researchers such as Astute Analytica expect a CAGR of 33.8 percent from 2022 through 2027 and an increase in market volume from 3.3 billion US dollars in 2021 to almost 18.9 billion US dollars by 2027. V2X is a technology for real-time communication between vehicles and their surrounding environment.

In June 2021, the European Parliament’s Transport Committee adopted a document confirming the EU Commission’s strategy for greater **traffic safety**: Under its plans, road traffic injuries and fatalities are to be reduced by 50 percent by 2030, key performance indicators (KPIs) for road safety will be defined by 2023, and speed limits will be recommended for the different EU states. This will help to reduce traffic noise, accidents, and CO₂ emissions. The World Health Organization (WHO) is also calling for a speed limit in urban areas of 30 km/h, or 20 mph in the Anglo-American system. In the summer of 2021, the German government initiated an amendment to the law on automatic license plate recognition, which would extend the recognition already possible for manhunts to cover other inves-

tigative purposes. Belgium wants to achieve the goal of zero road traffic fatalities by 2050 with a national "Vision Zero" plan. In addition, automatic detection of phone use at the wheel and the installation of cameras for section control will be made possible. According to an EU regulation, all new vehicle types must be equipped with an Intelligent Speed Assistant (ISA) from July 6, 2022 on. This assistance system is to become a supporting speed brake in the vehicle by means of sensor fusion between traffic sign recognition, cruise control, and navigation system. The ISA will be mandatory for all new cars from July 2024 on. In the USA, the Department of Transportation wants to improve traffic statistics and safety with a new "Safe Systems" strategy. Over the next two years, it plans to provide advice and 5 billion US dollars in funding to enable US states to introduce speed limits or launch pilot programs to increase the use of speed cameras.



See the "Control System" chapter for more information on the top control parameters



See the "Business Model and Markets" and the "Targets and Strategy" chapters for more information on the strategy and the division structure

Expected Development of the Business Situation

Planning assumptions for the Group and the divisions

The forecast for business development in 2022 was based on the [group planning](#).

The group planning was made in the fall of 2021 and thus before the Ukraine war and the associated sanctions. Therefore, these events and any potential risks arising from them have not been taken into account.

Since the first quarter of 2022, Jenoptik operates in the following reportable segments: Advanced Photonic Solutions, Smart Mobility Solutions, and Non-Photonic Portfolio Companies.

As part of its new organizational set-up, the Group is consolidating its core photonics business in two new division, Advanced Photonic Solutions and Smart Mobility Solutions. The former Light & Optics and Light & Production divisions will be merged into the new Advanced Photonic Solutions division, while non-photonics activities, particularly for the automotive market, will be separated. In future, these business activities will operate as independent brands within the Jenoptik Group's Non-Photonic Portfolio Companies. The former Light & Safety division will become the Smart Mobility Solutions division.

The starting point are the separate plans from the divisions and operational business units, which are harmonized and integrated in the group planning. Potential acquisitions, divestitures (excluding VINCORION), and exchange rate fluctuations are not included in the planning process.

The system of key performance indicators covers the revenue, EBITDA margin, order intake, cash conversion rate, and capital expenditure indicators. Other indicators will also be regularly compiled in the future and are used by top management for informational purposes.

With our strategic Agenda 2025, "More Value," we are targeting lasting profitable growth in the core photonic markets of semiconductor & electronics, life science & medical technology, and smart mobility. We continue to push on with our plans to become a pure, globally leading photonics group.

Overall, the Jenoptik Group anticipates consistently good business performance in the [Advanced Photonic Solutions division](#) in 2022. We will help to enable this by stepping up our activities as an active global supplier of solutions and products based on photonic technologies, by focusing on key sales markets, by growing our global reach, and with innovative products and a larger range of integrated system solutions. Jenoptik Medical (formerly BG Medical) and the SwissOptic Group, consolidated for the full year for the first time, will also make a significant contribution to growth. Market observers and key customers expect continued high demand in the semiconductor equipment market in the current year. In this regard, the division will benefit from its range of optical and micro-optical system solutions for semiconductor production. In the Biophotonics area (medical technology and life science), existing cooperation arrangements with key international customers are to be further expanded and new ones won in the current fiscal year. The above-mentioned acquisition will enable Jenoptik to roughly double the size of its medical technology business in this attractive market. The division expects stable business growth in the Industrial Solutions area, and appreciable growth is also anticipated in the Optical Test & Measurement area. Good performance in the Advanced Photonic Solutions division will be supported by both the range of optical solutions for information and communication technologies, and by applications in the field of virtual and augmented reality.

In the current fiscal year, the Advanced Photonic Solutions division will also continue to invest in its operational performance and sales to promote future growth and continue the process of internationalization.

For the fiscal year 2022, the Executive Board expects stable to slightly positive development in the [Smart Mobility Solutions division](#). This is to be supported by new products, investment in the expansion of the customer portfolio, and a promising project pipeline. In addition, local project management and service structures will be strengthened to further improve direct customer support.

Optimizations that have been made in sales and the partner network are showing positive results, also in view of the global pandemic. Supply chains and security procedures continue to

be closely monitored. The share of recurring revenue contributions in the division is to be increased by optimizing the product pipeline, also in form of new business models such as software as a service, and a broader range of products in the value chain. On a regional level, Jenoptik is primarily expecting growth momentum benefiting the Smart Mobility Solutions division to come from Europe and the Arab and Pacific region.

Business development in the [Non-Photonic Portfolio Companies](#) was still impacted in 2021 by the effects of the Covid-19 pandemic, but also by structural changes in the automotive industry. For 2022, we expect to see a positive development in the segment.

We expect growth, particularly in our Automation & Integration business in the current fiscal year. In our Metrology business, we expect the effects of the implemented restructuring measures to have a positive impact as planned in 2022.

2022 earnings position forecast

Based on the good order intake in the fourth quarter 2021 and the full year 2021, the high order backlog, and ongoing promising developments in the core photonics businesses, especially in the semiconductor sector, the Executive Board is confident of further profitable growth in the fiscal year 2022.

The forecast provided is for continuing operations.

In addition to the organic growth in the divisions, Jenoptik Medical and the SwissOptic Group, consolidated for the full year for the first time, will also make a contribution to positive business development. At the present time, uncertainties exist with regard to the development of the Covid-19 pandemic and associated supply bottlenecks, although we are confident of our ability to manage them. However, our scheduled growth also presupposes that political and economic conditions do not worsen. In particular, these include economic trends, regulations at European level, export restrictions, and further policy developments in our sales markets.

Major portfolio changes were not considered in the forecast.



See the Framework Conditions chapter for more information on the future development of the Jenoptik sectors

Jenoptik expects **revenue growth** of at least 20 percent for its continuing operations, including Jenoptik Medical and the SwissOptic Group, in 2022 (revenue 2021: 750.7 million euros).

At present, the Executive Board is expecting **EBITDA** (earnings before interest, taxes and depreciation, incl. impairment losses and reversals) to see significant growth in the current fiscal year compared with the prior year's EBITDA excluding one-off effects (2021: 125.2 million euros (excluding one-off effects) / 155.7 million euros (including one-off effects)). The **EBITDA margin** is due to be around 18 percent (2021: 16.7 percent (excluding one-off effects) / 20.7 percent (including one-off effects)). We will endeavor to clarify the forecast during the course of the year.

Order intake is influenced by major orders, especially in the Smart Mobility Solutions division, and increasingly also in the Non-Photonic Portfolio Companies. In the past fiscal year, the continuing operations received new orders worth 936.7 million euros and had thus built up a good order base at year-end 2021, particularly following a strong fourth quarter. Due to a very good order intake in 2021, which included pull-forward effects, the Executive Board assumes that the order intake in the 2022 fiscal year will not reach this very high level again, instead remaining slightly below the figure in 2021.

Also worthy of note is that the continuing operations had frame contracts worth 135.1 million euros at the end of 2021, which are not included in the order intake or backlog. 85.9 percent of the order backlog as of December 31, 2021 is expected to be converted to revenue in 2022.

In 2022, the **Advanced Photonic Solutions division** expects revenue, including the contributions from Jenoptik Medical and the SwissOptic Group, to grow in the mid-double-digit percentage range. EBITDA is expected to increase in line with revenue on a comparable prior-year basis, i.e., excluding one-off effects in connection with the acquisitions made in 2020.


The **Smart Mobility Solutions division** also expects growth in 2022, with a revenue increase in the mid-single-digit percentage range. EBITDA is expected to be slightly up on the prior year.

The **Non-Photonic Portfolio Companies** are expecting revenue to grow in the low double-digit percentage range. The EBITDA is expected to show a stronger rate of growth than revenue.

Group asset and financial position forecast

Jenoptik expects that its continuing operations' **capital expenditure** in the fiscal year 2022 will be up on the prior year's figure (2021: 49.9 million euros). Capital expenditure on property, plant, and equipment will focus on the growth areas within the divisions or take place within the scope of new customer projects. It aims to expand capacities, thereby ensuring future growth, e.g., through construction of the new cleanroom facility in Dresden.

We expect the **cash conversion rate** (ratio of free cash flow to EBITDA) to grow to 45 to 55 percent in 2022 (31/12/2021: 27.7 percent).

Notwithstanding the current extreme geopolitical uncertainties, and in addition to financing the continued growth of the company, the future aim of the Executive Board remains to ensure a [dividend policy](#) in line with corporate success. In the view of the Executive Board, a stable provision of equity for sustainable organic growth to increase the company value as well as the exploitation of further opportunities for acquisitions are also of crucial importance to the interests of the shareholders. 

Important note. The actual results may differ significantly from the forecasts of anticipated development made above and summarized below. This may arise, in particular, if one of the uncertainties mentioned in this report were to materialize or worsen, or if the assumptions upon which the statements are based prove to be inaccurate in relation to the economic development, especially in association with the spread of the coronavirus, risks arising from the markets as well as geopolitical risks, in particular in connection with the Ukraine war and the associated sanctions.



See the Report on Post-Balance Sheet Events for more information on the dividend

T63 Summary of targets for group (continuing operations) and divisions

	Actual 2021	Forecast for 2022 (without major portfolio changes)
Revenue	750.7	Growth of at least 20 percent
Advanced Photonic Solutions	525.6 ²	Growth in the mid-double-digit percentage range
Smart Mobility Solutions	110.1 ²	Growth in the mid-single-digit percentage range
Non-Photonic Portfolio Companies	111.3 ²	Growth in the lower double-digit percentage range
EBITDA/EBITDA margin	155.7/20.7%	
EBITDA/EBITDA margin (excluding one-off effects from the acquisitions of TRIOPTICS and INTEROB)	125.2/16.7%	Marked growth/approx. 18 percent
Advanced Photonic Solutions	117.9 ^{2,3}	Growth in line with revenue
Smart Mobility Solutions	19.2 ²	Slightly above prior year
Non-Photonic Portfolio Companies	1.5 ²	Growth stronger than revenue
Order intake	936.7	Slightly below prior year
Cash conversion rate	27.7%	Between 45 and 55 percent
Capital expenditure ¹	49.9	Markedly above prior year

¹ Excluding capital expenditure on financial assets

² Segment data is simulated

³ Without one-off effects in connection with the acquisitions made in 2020

General Statement by the Executive Board on Future Development

In the current fiscal year 2022, the Jenoptik Group will begin rolling out its strategic Agenda 2025, concentrating on core photonics markets. In terms of economic development, our key focus remains on profitable growth. We believe that revenue growth, resulting economies of scale, and more efficient and faster processes result in higher, sustainable earnings. It is the assessment of the Executive Board that what is still a good asset position and a viable financing structure give Jenoptik sufficient room for maneuver to finance both further organic and inorganic growth.

Achieving our targets is dependent on the development of the economic and political environment, especially in connection with the Ukraine war and associated sanctions.

On the basis of encouraging order intake growth in the fourth quarter of 2021, the current order backlog, and ongoing promising developments in the core photonics business, the Executive Board remains positive for the fiscal year 2022 and expects revenue growth of at least 20 percent. In addition to the organic growth in the divisions, Jenoptik Medical and the SwissOptic Group, consolidated for the full year for the first time, will also make a significant contribution to growth. The EBITDA margin of the Group (continuing operations) is due to come in at around 18 percent.

In 2022, we will again invest a significant portion of our funds in the expansion of the international sales network and the development of innovative products. As part of our active portfolio management, potential acquisitions are closely scrutinized; divestitures have not been ruled out.

Based on the information available at the time this report was created, the Executive Board expects the Jenoptik Group to see positive business development in 2022.

Jena, March 16, 2022

JENOPTIK AG
The Executive Board