ADVA™

Open edge networking

Annual report 2019

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ADVA overview

Welcome

Profile

ADVA is a company founded on innovation and driven to help our customers succeed.

Our technology is the foundation of a shared digital future and empowers networks across the globe. We're continually developing breakthrough hardware and software that leads the networking industry and creates new business opportunities.

It's these open connectivity solutions that enable our customers to deliver the cloud and mobile services that are vital to today's society and for imagining new tomorrows.

Together, we're building a truly connected and sustainable future.

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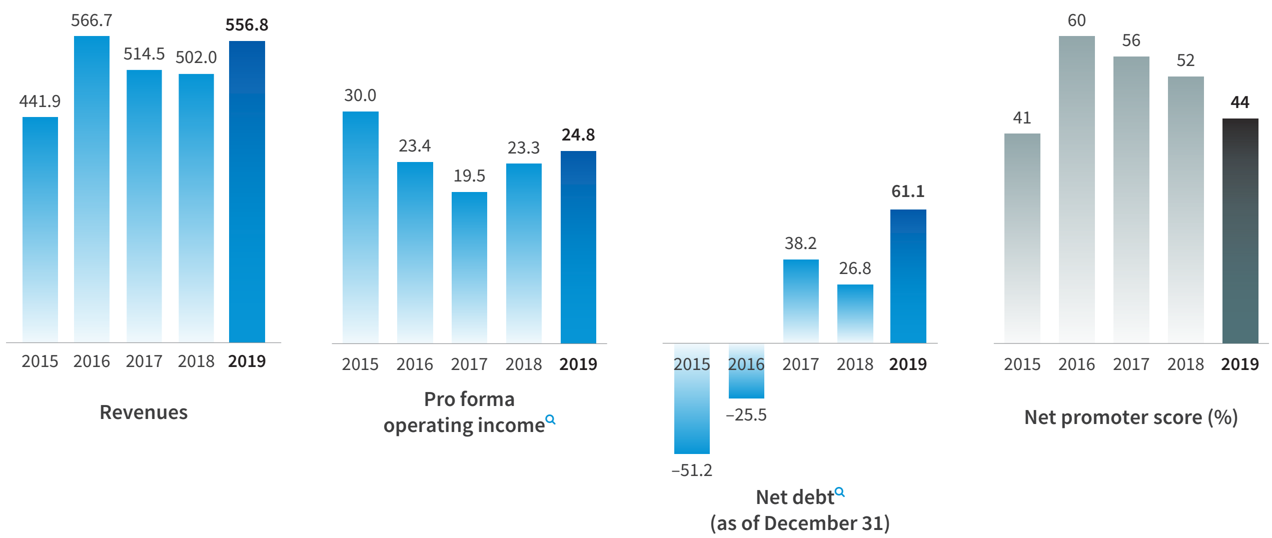
Mission

ADVA enables open next-generation networks. The group's mission is to be the trusted partner for connecting, extending and assuring the cloud.

2019 key performance indicators

(in millions of EUR, except net promoter score)



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ADVAntages

Focus on growth markets

- ADVA focuses on growth markets in the telecom space that have one thing in common: a strong and sustainable demand for innovative connectivity solutions.
- These markets are driven by the digitization of society and its ecosystems. The global megatrends "cloud" and "mobility" accelerate the demand for more bandwidth, demand faster and more flexible service creation and require ultra-precise network synchronization.
- The total addressable market for ADVA was estimated to be USD 15 billion in 2019 and will, according to industry analysts, grow to USD 18.5 billion by 2024*.

* Industry analyst estimates for access, metro and long-haul WDM equipment ("optical") and access switching & routing ("packet edge") relevant to ADVA. Sources: Ovum, "optical networks forecast 2019-2024" published September 2019 and "service provider switching and routing forecast 2019-2024", published June 2019

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Speed for customers

- ADVA has a strong track record of being first to market with new functionality that adds value for customers.
- A responsive team serves customers around the globe, with 53.7% of ADVA's 2019 revenues generated in EMEA (Europe, Middle East and Africa), 38.4% in the Americas and 7.9% in Asia-Pacific.
- ADVA's innovative networking solutions have been deployed by several hundred service providers and thousands of enterprises around the globe.

Innovation

- ADVA's industry-leading engineering force is focused on three key technologies that are strategically important for the modernization of networks. The company outperforms the engineering power of other vendors in relevant applications.
- Focus on innovation drives market success and has made ADVA the global leader for data center interconnect solutions for private enterprises with a market share of more than 30% globally and more than 50% in EMEA.
- The company is a technology leader in cloud access solutions (Carrier Ethernet with NFV) and in network synchronization, expanding its current market share*.

* Ovum, "market share data center interconnect 3Q19", published November 2019

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Trusted partner

- ADVA's unique combination of innovation, focus and speed has seen the group build close partnerships with customers, resulting in repeat purchases and strong cross-selling opportunities for its innovative networking solutions.
- As a trusted partner for two decades, ADVA provides high-quality solutions with lowest cost of ownership and best user experience.
- ADVA is led by a dynamic, international, experienced and highly motivated management team with many years of senior management background, making it a dependable partner when it comes to building long-term business relationships.

2019 business highlights

- Four solid quarters of growth and profitability
- Efficient cost management
- Technology investments delivering increasing returns

Customer achievements and awards

2019 was a year of major customer success. ADVA technology was deployed on every continent and across all industries, connecting people and businesses, enabling new efficiencies and creating revenue opportunities. CSPs around the globe leveraged the company's solutions to address booming data demand and support pioneering 5G mobile rollouts. As well as collecting several major awards, ADVA innovation was key to securing mission-critical cloud and enterprise networks, taking service assurance and timing accuracy to the next level and bringing speed and agility to the network edge. Here are some of 2019's highlights:

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ADVA FSP 150 deployed by major financial trading institution to safeguard data across Mexico

ConnectGuard™ Ethernet encryption technology protects mission-critical Ethernet services

ADVA wins BT sustainability innovation award with end-to-end optimized edge device

Carrier Ethernet solution designed for radical CO_2 reduction takes first place in Game Changing Challenge

BT uses ADVA synchronization solution in 5G strategy

Precise and resilient PRTC solution built on modular 10Gbit/s grandmaster clocks enables smooth mobile migration

HEP Telekomunikacije monitors nationwide fiber network with ADVA ALM

Compact low-power assurance solution enables cost savings and rapid repairs in Croatian utilities infrastructure

Openreach leverages ADVA demarcation technology for nationwide small cell rollout

MEF 3.0-certified compact cell site gateway device with full phase sync support key to 5G mobile services

SANReN selects ADVA FSP 3000 with ALM fiber monitoring solution

ROADM technology and Ensemble Controller network management enable rapid, efficient service delivery

Colt uses ADVA technology to deliver low-latency end-to-end Ethernet security service

Colt Ethernet Line Encryption leverages ADVA FSP 150 with Layer 2 ConnectGuard™ protection

POST Luxembourg harnesses Ensemble Activator for rapid service provisioning

Fully open FSP 150-Z4806 featuring carrier-grade disaggregated NOS delivers highly efficient 100G service aggregation

LU-CIX harnesses ADVA FSP 3000 for 400G backbone

Flexible, scalable solution tackles huge growth in data demand for major European internet exchange

Axians UK selects ADVA to deliver risk-free NFV solutions

Virtual hosting service built on carrier-class Ensemble suite enables rapid access to industry-leading ecosystem of VNFs

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POST Luxembourg deploys ADVA ALM for comprehensive fiber monitoring

Fiber assurance solution improves network performance and significantly reduces repair times

BOnline harnesses ADVA FSP 3000 for scalable nationwide network

High-capacity metro and backbone infrastructure provides international connectivity to Kuwait's government and financial institutions

Welcome Italia selects ADVA FSP 3000 for ultra-high-capacity enterprise services

Technology partnership delivers assured connectivity throughout Italy

TPx selects ADVA for edge device innovation

Ensemble software suite for uCPE brings additional simplicity, speed and agility to TPx's leading managed service offering

Russia's largest cloud service provider deploys ADVA FSP 3000 to answer fierce data growth

New solution boosts capacity, flexibility and efficiency of Inoventica's network

Sify selects ADVA as technology partner to deliver managed Ethernet services

FSP 150 enables highly scalable SLA-assured Layer 2 VPN connectivity services for business and cloud access

Netsam boosts metro network capacity with ADVA technology

FSP 3000 open line system drives simplicity and flexibility in Nordic network

Qualitynet deploys ADVA FSP 3000 for flexible 400G connectivity

ROADM technology and Ensemble Controller network management enable rapid, efficient service delivery

ADVA sync solution enables major Chilean telco to roll out 5G-ready network

Oscilloquartz timing technology delivers precise phase synchronization at the network edge

ADVA named Fierce Innovation Awards finalist

Upgraded Ensemble NFV solution with enhanced MANO capabilities shortlisted in Business Services category

conova deploys ADVA OLS solution for highly secure DCI connectivity

ADVA FSP 300 with ALM monitoring technology and Layer 1 encryption protects high-capacity Fibre Channel services

FUNET builds 400G-ready network on ADVA FSP 3000 open line system

ROADM technology and ALM fiber monitoring solution ensure reliable, high-capacity connectivity across FinlandEF19 PoC award

ADVA wins M19 PoC award

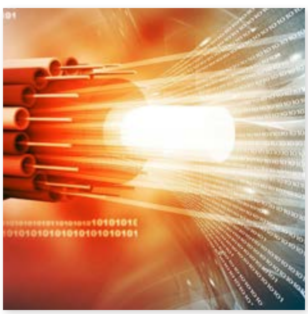
Judges recognize joint demo of orchestrated virtualized multi-vendor SD-WAN aligned with MEF 3.0 service automation

YTL Communications deploys ADVA timing solution in LTE-A network

OSA 5410 and OSA 5420 deliver precise phase and frequency sync for next-gen mobile services across Malaysia

ADVA timing technology synchronizes major US 5G network

OSA 5420 Series of PTP grandmaster clocks delivers ultra-precise phase synchronization at network edge



Citynet deploys ADVA ALM for comprehensive fiber monitoring

Assurance solution boosts performance and dramatically reduces opex in municipal utility network

Play harnesses ADVA timing solution for 5G-ready mobile network

ADVA technology delivers precise phase synchronization throughout Poland

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Innovation and corporate events

In 2019, ADVA continued its mission to identify and develop new solutions for the cloud, always focusing on increasing simplicity, flexibility and efficiency. The company celebrated Oscilloquartz's 70th anniversary, brought new levels of automation to DCI networks and led the way with cell site gateway and network slicing technologies for 5G connectivity. As well as playing a key role in projects enhancing spectrum utilization and electro-photonic integration, ADVA broke multiple industry records for reach and capacity with its FSP 3000 TeraFlex™ solution. The terminal was also showcased in the industry's first 1200Gbit/s optical channel transmission. These were some of the supporting announcements:

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ADVA celebrates 70 years of Oscilloquartz timing innovation

Anniversary highlights unrivalled experience, unique vision and industry's most comprehensive portfolio of synchronization technology

ADVA achieves MEF 3.0 CE certification with market's smallest cell site gateway device

FSP 150-GO102Pro Series among handful of available products to comply with new automation-ready standards

ADVA announces pioneering carrier-grade network operating system

Ensemble Activator disaggregates hardware from software to deliver agility, scale and freedom of choice

ADVA expands FSP 3000 open line system to deliver ultimate DCI solution

Extemely compact DCI OLS offers complete choice and new levels of automation

ADVA showcases world's first SDN-controlled 600G transmission at OFC

Demo features open FSP 3000 TeraFlex™ terminal with automated line rate adjustment for ultimate data throughput

ADVA plays key role in development of UK's quantum-secured transport network

FSP 3000 technology enables 120km link with classical and quantum channels on the same fiber

ADVA launches new FSP 3000 TeraFlex™ capabilities to dramatically boost network capacity

Ultra-flexible modulation technique enables existing networks to carry up to 30 times more data

ADVA launches industry-first AI-powered service for monitoring of satellite-based timing

SatAware™ delivers unique health check of GNSS-based synchronization without the need for on-site visits

ADVA FSP 3000 TeraFlex™ breaks multiple industry records in live network trial

Demo over long-haul terrestrial network achieves unprecedented wavelength efficiency

ADVA introduces multi-layer cell site gateway to maximize 5G efficiency

FSP 150-XG118Pro edge hosting device optimized for ultra-reliable low-latency communications

ADVA leads project to create market's most advanced optical transceiver chiplets

PEARLS consortium is using quantum dot technology to integrate lasers onto electro-photonic silicon chips

ADVA's science-based sustainability targets validated by SBTi

Measures include major reduction in product lifecycle carbon emissions

ADVA brings sub-microsecond synchronization to utility and broadcast networks

Upgraded PTP grandmaster clocks deliver precise, robust timing and industry's most compact form factor

ADVA introduces multi-band GNSS receiver for 5G timing accuracy

Unique pluggable line card enables easy transition to precise ePRTC and PRTC-B based synchronization

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ADVA unveils commercially ready disaggregated cell site gateway solution at TIP '19

Carrier-grade Ensemble Activator NOS running on Edgecore devices successful in 5G trials with major MNOs

ADVA takes network slicing to next level in MEF19 5G PoC

Extensive partner ecosystem interoperates in ultra-low-latency edge compute network

ADVA and PSNC showcase 1200G channel transmission at SC19

FSP 3000 TeraFlex™ terminal delivers unprecedented spectral efficiency and client port flexibility for ultra-high-speed transmission

ADVA first in the industry to achieve MEF 3.0 certification for 100G services

High-density aggregation and demarcation solution is market's only 100G technology to meet new industry standard

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Interoperability and alliance partnerships

ADVA is a strong believer in the importance of open architecture and the value of cross-industry collaboration. In 2019, the company played a central role in several joint innovation projects. ADVA also expanded the industry's largest NFV partner ecosystem, Ensemble Harmony, and its Ensemble Connector NFVI platform formed the basis of the market's most innovative new uCPE solutions. Here's a selection of relevant headlines:

ADVA's Ensemble Harmony Ecosystem reaches new heights

Industry-leading multi-vendor NFV program now includes 50 partners, 50 commercial VNFs and 25 white box servers

TIP uses ADVA's disaggregated cell site solution in MWC demo

Mobile network showcase features ADVA's unique carrier-grade NOS and Edgecore's open cell site solution

China Unicom trials ADVA's fully assured 5G sync solution

End-to-end timing network built on OSA 5410 key for next-generation mobile infrastructure

ADVA's Ensemble Activator selected for TIP DCSG lab and field trials

Carrier-grade NOS for bare-metal switches brings openness and disaggregation to cell site gateways

EANTC verifies IEEE 1588 PTP interoperability of ADVA's 5G sync and packet edge devices

Multi-vendor trials show interworking of synchronization from central grandmaster over 100G metro network to the cell site

ADVA delivers NFV platform for Intel® Select Solution for uCPE

Ensemble Connector brings carrier-class capabilities and open access to market-leading ecosystem of VNFs

Dell EMC deliver open uCPE solution

Collaboration enhances VNF management and accelerates customer deployments

Nokia and ADVA demo end-to-end 5G synchronization solution

Oscilloquartz timing technology distributes and assures precise phase and frequency with or without GNSS

ADVA recognized as a Leaders Board Partner in the Intel® Network Builders' Program

Ensemble Connector NFV platform as an Intel® Select Solution for uCPE achieves Leaders Board status

ADVA leads project to boost optical network capacity

OptiCON will leverage innovations in fiber transmission to build next generation of transport networks

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Management board

Members and their backgrounds

ADVA is led by a dynamic, international, experienced and highly motivated team. Leading, directing and managing the group's growth are four executive officers:

Brian Protiva, chief executive officer
Christoph Glingener, chief technology officer, chief operating officer
Ulrich Dopfer, chief financial officer
Scott St. John, chief marketing and sales officer

Chief executive officer (CEO)
Born in 1964

Bachelor of Science in electrical engineering,
Stanford University, USA

Brian Protiva co-founded ADVA in 1994. As the CEO, he is responsible for overall strategy, human resources and quality management. Under Brian's leadership, ADVA advanced to become a global market leader in Ethernet access devices and one of the top players in metro wavelength division multiplexing (WDM) worldwide. To date, ADVA's innovative networking solutions have been deployed in thousands of enterprises and hundreds of carrier networks around the world. Prior to leading ADVA, Brian was managing director at AMS Technologies (now the EGORA Group), which he joined in 1987 and where he focused on co-managing its subsidiaries.

Chief technology officer (CTO), chief operating officer (COO)
Born in 1968

Ph.D. in electrical engineering,
University of Dortmund, Germany

Dr. Christoph Glingener joined ADVA in April 2006, assuming responsibility for all global research and development activities and was appointed CTO in 2007. Since that time, he has also led ADVA's product management and advanced technology teams. Christoph has focused on streamlining ADVA's product portfolio, defining the product strategy and building the group's standing as a global innovator in optical networking. Strategic partnerships and mergers & acquisitions are an integral part of this strategy. Additionally, in January 2015, Christoph took on responsibility for global operations, enabling ADVA to integrate research and development, new product introduction and global operations into a unified development operations team. Christoph's activities at ADVA build on a long and successful industry career with experience gained in both academic and corporate roles. These include leading positions at Marconi Communications (now Ericsson) and Siemens Communications (now Infinera).

Chief financial officer (CFO)
Born in 1973

Graduate in business administration,
Verwaltungs- und Wirtschaftsakademie Munich, Germany

Ulrich Dopfer joined ADVA in March 2004 and led the group through some key financial initiatives taking on increasing responsibility over time. In 2006 Ulrich moved to Norcross, Georgia, where he is still based today. Prior to his appointment as CFO in January 2015, Ulrich served as vice president of financial planning & analysis and corporate services where he strategically optimized major processes, systems and support infrastructure, enabling ADVA to maintain the right balance between vision and execution. Combining his operational expertise with his vast financial skills and strong leadership style, Ulrich provides ADVA with the ability to flexibly steer the group in a volatile high-growth environment to ensure profitable growth. In addition to his CFO role, Ulrich was appointed president of the company's North American subsidiary in January 2015, assuming full legal responsibilities for the region. Ulrich's activities at ADVA build on more than 20 years' experience of designing and implementing financial reporting, performance measurements, policies and standards to maintain strong internal controls in corporate roles including positions at ESCADA AG and FJH AG.

Chief marketing and sales officer (CMSO)
Born in 1969

Bachelor of Arts, economics,
Syracuse University, USA

Scott St. John has spent over 25 years in the network technology industry. He has a proven track record of building high-performance teams in sales, marketing and customer service, as well as driving strategy to meet overall corporate goals. Scott joined ADVA in 2017, as part of the acquisition of MRV Communications, and was appointed CMSO and a member of the management board in October of 2017. As of late 2018 he is also responsible for the company's services group. Prior to his role at ADVA, Scott had been SVP of global sales and service at MRV Communications since 2014, restructuring the sales and service teams and driving adoption of new packet and optical platforms by over 175 customers globally. From 2004 to 2013, he served Overture Networks in senior sales and service leadership roles, delivering nine consecutive years of sales growth. Scott has also held sales leadership positions at Saisei, Larscom and VINA Technologies, as well as sales, marketing and finance roles at Lucent Technologies and AT&T.

Letter to shareholders

Dear shareholders and friends,

The year 2019 presented us with numerous challenges, particularly due to external geopolitical and economic factors. In addition, we are currently monitoring the spread of the coronavirus in China and taking precautionary measures to mitigate the possible effects on the global supply chain of critical components. Looking back on the obstacles we faced or continue to face, we can say that, thanks to the tireless efforts of our team, their creativity and technical know-how, we have risen to these challenges extremely well. We're proud of our people as well as our achievements and results.

Trade conflict and pressure on margins

In particular, the US trade dispute with China, which intensified towards the end of 2018, had a significant impact on ADVA's operating business in 2019. Due to increasing US import duties on Chinese goods and an expanding catalog of affected goods, we had to rearchitect and reorganize our supply and production chain that we had spent years perfecting. Together with our manufacturing partners, we began to move production lines from China to other countries. This led to one-off transfer costs and higher production costs. In addition, in the third quarter – prior to the extended list of affected goods becoming effective on October 1 – we moved goods from China to our distribution centers by air. While this did lead to higher transportation costs and inventory, these reorganization measures reduced the cost penalties of increased US import tariffs. It should also be noted that the US dollar, which is strengthening against the euro, has been weighing on our margins.

Adjusting our opex in times of strong revenue growth

In order to counter external pressures, we started cost-saving programs around the midpoint of last year. With a lot of courage and sensitivity, we optimized our sites and teams and selectively discontinued certain products. This particularly affected older product lines remaining from recent acquisitions, namely Overture (2016) and MRV (2017). Throughout the process, we paid particular attention to ensuring that neither important existing customers nor strategically relevant future projects were affected. At the same time, we enjoyed solid demand from our customers, and order intake developed positively. Thus, we were able to achieve strong revenue growth of over 10 percent on an annualized basis – an excellent result that even exceeded our self-imposed goals and was supported by satisfactory profitability.

Stability, continuity and continued growth

Numerous factors that caused market uncertainty and tension in the past year will continue to be relevant in 2020. However, we adjusted very well to the new boundary conditions and once again showed that the DNA of our company guarantees stable and reliable results even in difficult times. Despite the trade tensions, we held our course and developed our business with great discipline. In all four quarters, we were able to sequentially increase our revenues and gain market share in certain segments. ADVA is in an excellent position for the coming years. We have created a solid basis in all of our three technology areas and see interesting growth scenarios as a result of various changes that are disrupting our markets.

Optical transmission technology – bandwidth for a world going digital

The digitization of ecosystems worldwide is increasing the strategic importance of reliable, global and highly secure communication infrastructure. The most important raw material here is fiber. It's the only medium that can satisfy the rapidly increasing demand for more bandwidth. Fiber optic networks are extending their reach into new areas and are of crucial importance for 5G. Our transmission technology in turn ensures that this valuable medium is used optimally. Thanks to our FSP 3000, network operators can sustainably cope with the rapidly increasing amounts of data being transmitted and support new business models.

In 2019, we were able to further expand our market leadership in optical networks for data center interconnect (DCI) for private companies. In addition, our numerous major carrier customers worldwide began using our technology to expand their networks in preparation for 5G. The trend towards open solutions is disruptive here. Network operators are driven to decouple the individual building blocks in their networks in order to use innovation cycles more flexibly. In addition, in times of geopolitical tensions, they can reduce their dependency on individual large suppliers with open solutions. As a pioneer in the development of open and interoperable solutions for several years, ADVA is benefitting from this trend. Our FSP 3000 sets new standards in open, optical transmission technology. The platform delivers highly automated, scalable data transmission that further reduces the cost-per-bit of transport. The market introduction of the new TeraFlex™ terminal has been highly successful, and the flexibility of our open line system (OLS) has the potential to push market dynamics further in our favor.

Cloud access – innovation at the network edge

For many emerging applications in the digital world, it's important how and where the three critical functions of data processing, storage and transfer interact. For the internet of things (IoT) and also for the creation and use of artificial intelligence, the efficient collection, processing and provision of data is of crucial importance. In this context, edge computing solutions are emerging that require data transmission with low latency and high security. The network operators' investment focus is therefore moving closer to the network edge and towards our sweet spot. At the edge is where ADVA is best positioned.

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For many network operators, Carrier Ethernet access technology is a key part of the technology mix at the network edge. We have successfully consolidated this market segment in recent years through the acquisition of Overture and MRV and are now one of the two leading manufacturers in this technology space worldwide. Network operators are currently upgrading their Carrier Ethernet access networks and increasing data rates from 1Gbit/s to 10Gbit/s. For this, they need new demarcation and 100Gbit/s aggregation technology. Smaller manufacturers are finding it increasingly difficult to keep up with the high pace of innovation and are falling behind technologically. As a result, new opportunities are emerging to gain market share. In addition, the trend towards virtual provisioning of value-added services is accelerating. Our Ensemble Connector offers flexible and fast provisioning of NFV-based services at the network edge. Several leading network operators as well as system integrators have selected the solution as a key component for their universal customer premises equipment. Our win rate over the past year has been impressive, and commercial implementation of this software solution will continue to gain momentum in 2020.

Network synchronization – timing is everything

Finally, we want to briefly touch on our third technology pillar, synchronization technology. Network operators worldwide have embarked on a journey of implementing 5G and therefore need higher precision time and phase synchronization in their networks. Our Oscilloquartz portfolio is globally recognized as a technology leader. Its range of solutions offers unique features and achieves very high success rates in tenders around the globe. After an already very successful 2018, we were able to increase the revenue contribution of this technology pillar in 2019 with strong margins.

In addition to the increasing demand from network operators, the product portfolio now also addresses timing applications in other industries such as media and energy utilities. Our investments in synchronization technology are bearing more and more fruit and offer us additional opportunities for growth and profitability.

Open edge networking – investment focus is heading our way

Digitization is transforming networks and bringing the investment focus to us. Multi-cloud concepts for enterprises, edge computing solutions for network operators, IoT and 5G all require a robust and scalable telecommunications infrastructure – with more optical data transmission, new models for the provision of communication services and more precise network synchronization. Our investments in recent years address precisely these aspects. We are technologically well positioned for the new opportunities of this network transformation – a transformation based on openness, virtualization and security.

We also have a loyal, globally growing customer base that puts its trust in us and uses more and more aspects of our expanding solution portfolio. The number and variety of our customers has never been greater; the desire for open technology and trusting cooperation has never been stronger; and we currently see no critical dependencies on individual major customers. Consolidation in our industry over the past few years has reduced the number of competitors, so that our profile as an innovative telecommunications supplier with a unique mix of expertise and customer focus is becoming even more pronounced.

Our employees sharpen this profile every day. With their knowledge, creativity and dedication, they make ADVA a trusted partner for thousands of satisfied customers worldwide. I'd like to thank our dedicated team for their constant and valuable work. The interplay of their different knowledge and skills has made ADVA a unique company with bright future prospects.

In 2020, we'll continue to invest all our energy and creativity in innovative solutions for the benefit of our customers, shareholders and employees.

February 18, 2020

Brian Protiva
Chief executive officer

Supervisory board

Members

ADVA's supervisory board consists of a diverse and international group of seasoned experts in their respective fields:

Nikos Theodosopoulos – chairman

- Chairman since January 9, 2015
- Member since 2014
- Independent member
- Chairman of the compensation and nomination committee
- Member of the audit committee
- Founder and managing member of NT Advisors LLC, Manhasset, New York, USA

Johanna Hey – vice chairwoman

- Vice chairwoman since June 4, 2013
- Member since 2011
- Independent member
- Chairwoman of the audit committee
- Professor for tax law, University of Cologne, Cologne, Germany

Michael Aquino – member

- Member since June 13, 2018
- Independent member
- Member of the compensation and nomination committee
- Technology strategy consultant, Peachtree City, Georgia, USA

Report of the supervisory board

In 2019, the supervisory board once again performed its duties under the law and the company's articles. It carefully and continuously monitored the management board and supported it in all strategic matters. The supervisory board has been directly involved in the early stages of all important strategic decisions of the company. During a total of six ordinary meetings, in which all members of the supervisory board and the members of the management board regularly participated, the management board consistently, promptly and extensively informed the supervisory board about the business situation of the company and the group. In particular, the supervisory board was informed on matters regarding strategic orientation, market development and prospects for growth, as well as on the development of net assets, financial position and profitability, including budgeting, investments, personnel, compliance, internal audit and risk management. The supervisory board extensively discussed all important business issues on the basis of the management board's reports. Any deviations of the actual business development from the group's plans and objectives were thoroughly explained by the management board and reviewed by the supervisory board. The supervisory board gave its approvals to all important decisions, after thorough examination and consultation, where required by law or the company's articles and acting in the best interest of the company and the group. Furthermore, on urgent matters resolutions were passed outside of meetings during the year. Moreover, especially the chairman and the vice chairwoman of the supervisory board maintained regular contact with individual members of the management board outside of scheduled meetings and were kept up-to-date with respect to current business developments, important transactions and forthcoming decisions. No extraordinary meetings have been held in 2019.

Main management board activities covered and examined by the supervisory board

In 2019, as in the prior year, the supervisory board focused mainly on the business development and strategic direction of the company and the group, particularly its revenue, earnings and headcount development, and ADVA's financial situation. In this context, new opportunities for revenue growth and the development of margins were discussed.

The supervisory board closely monitored and supported the activities of the management board, including discussions on corporate governance. It discussed the group's organization and key business processes with the management board and assured itself of the efficiency of this organization and these processes. The management board submitted to the supervisory board all transactions and decisions requiring approval according to the company's articles. The supervisory board approved all such transactions and decisions.

Committees

In order to perform its tasks efficiently, the supervisory board continued to maintain two committees during 2019, the audit committee and the compensation and nomination committee. Members of the audit committee were Johanna Hey (chairwoman) and Nikos Theodosopoulos, members of the compensation and nomination committee were Nikos Theodosopoulos (chairman) and Michael Aquino.

The audit committee held five meetings during the reporting period, in which all members regularly participated. In addition to reviewing the consolidated annual and three quarterly financial statements and group management reports as well as the company's annual financial statements and management report, the audit committee discussed the financial position and performance of the group, the appointment of the external auditor, the audit scope for 2019, the development of tax positions and risks, internal audit activities, as well as the effectiveness of the internal controls related to financial reporting and of the risk management system.

The compensation and nomination committee sat three times during the past year. The committee's discussions focused in particular on the remuneration and the contract extensions of the chief officers.

Reports on the work of the supervisory board committees were regularly presented and discussed during the subsequent supervisory board plenary meeting.

Corporate Governance Code

The supervisory board welcomes the German Corporate Governance Code and supports its objectives. The supervisory board has agreed to comply with most of the recommendations and proposals of the Corporate Governance Code within the ADVA Optical Networking organization. In its meeting on November 12, 2019, the supervisory board discussed the deviations from the Code and jointly issued the regularly scheduled update on the declaration of compliance in accordance with section 161 of the German Stock Corporation Law (Aktiengesetz, AktG). The declaration is made permanently available to shareholders on the company's website.

Annual financial statements and management reports

ADVA Optical Networking's consolidated annual financial statements for the year ended December 31, 2019, and ADVA Optical Networking SE's annual financial statements for the year ended December 31, 2019, as well as the group management report and the management report of ADVA Optical Networking SE for the fiscal year 2019 were audited by the company's appointed auditor for 2019, PricewaterhouseCoopers GmbH Wirtschaftsprüfungsgesellschaft, Munich, who issued unqualified audit opinions. Pursuant to section 315e of the German Commercial Code (Handelsgesetzbuch, HGB), the consolidated annual financial statements have been prepared according to International Financial Reporting Standards (IFRS) as enacted in the EU. All management letter points issued by the auditor were taken up, discussed with the management board, and their consideration was ensured.

All relevant accounting documents, financial reports and audit reports were submitted to the supervisory board members prior to the meeting of the supervisory board dealing with the company's and group's 2019 financial statements. On February 17, 2020, these documents were discussed and examined in detail jointly by the audit committee and the auditor and in consideration of the auditor's long-form report. The audit committee reported its findings to the entire supervisory board in its meeting on February 18, 2020. Furthermore, the auditor, who was present in both meetings, reported on the material results of the audit, explained net assets, the financial position and the results of operations of the company and the group, and was available to answer additional questions from the members of the supervisory board.

In view and consideration of these audit reports and on the basis of the additional information provided by the auditor, the supervisory board discussed and examined in detail the financial statements and management reports in its meeting on February 18, 2020. It unanimously approved ADVA Optical Networking SE's annual financial statements and management report, as well as ADVA's consolidated annual financial statements and group management report. The annual financial statements of ADVA Optical Networking SE for the fiscal year 2019 are thereby adopted.

Changes within the management and supervisory boards

Within the fiscal year 2019, no personnel changes occurred in either the management or supervisory board.

In its meeting on February 19, 2019, the supervisory board extended the appointments of Brian Protiva, Christoph Glingener, Ulrich Dopfer and Scott St. John as members of the management board until December 31, 2020. In its meeting on February 18, 2020, the supervisory board approved the proposals of the compensation and nomination committee and resolved to extend the terms of appointment of Brian Protiva, Christoph Glingener, Ulrich Dopfer and Scott St. John as members of the management board until December 31, 2021. It was agreed that corresponding contractual provisions would be superimposed with the individual members of the management board in writing.

The supervisory board would like to express its appreciation for the personal dedication, performance and the ongoing commitment of the management board and all employees of the company and the group during 2019.

February 18, 2020

On behalf of the supervisory board:

Nikos Theodosopoulos

Chairman of the supervisory board

ADVA stock

The global capital markets in 2019 were impacted by the weak economic outlook and political uncertainties. In particular, these included the trade dispute between the US and China as well as the ongoing Brexit negotiations. Nevertheless, the stock market was surprisingly strong in 2019, with the SDAX gaining more than 30%. Especially, the interest rate policy of the US Federal Reserve and the ECB, which led to price gains. Also, the ADVA share was inspired by this market positivity and increased significantly in 2019. As a result, ADVA joined the SDAX in March 2019. In particular, the publication of the 2018 financials encouraged investors and increased their confidence in a successful return to solid business results. However, the share price dropped significantly after the publication of the Q1 financial report due to the weak Q2 outlook. As a result of market uncertainties, the share reacted erratically until the price dropped again after the publication of the results for the second quarter. With the publication of the Q3 results, ADVA announced an improvement program to respond to the impact of US trade policy. Following sequential growth of revenues and profitability for three quarters in a row and a favorable Q4 outlook, the ADVA share also reacted very positively. On December 31, 2019, the share was listed at a price of EUR 8.09. With an appreciation of +28.0%, ADVA ended 2019 quite successfully. It was able to close above 2018 levels, ending with performance close to the SDAX index (+ 30.8%).

On December 31, 2019, the company's nominal share capital totaled EUR 50,181,966, an increase of EUR 251,011 compared to December 31, 2018. The higher share capital is fully attributable to the issuance of ordinary shares from conditional capital following the exercise of employee options throughout 2019. ADVA's shareholder structure at the end of 2019 looked as follows: free float equaled 62.78%, including 0.8% of outstanding ADVA stock held directly by members of the management and supervisory board. In addition to the EGORA Group, which held 14.86% of the shares as of December 31, 2019, the other major shareholder Teleios Capital Partners increased its shares in ADVA and held a stake of more than 20.0% at the end of the year (voting rights announcement as of September 26, 2019: 22.36%). Compared to the end of 2018, the free float of 64.76% decreased to 62.78%*. During the year, the company did not utilize the share buyback authorized at the Annual Shareholders' Meetings in June 2010, May 2012 and May 2019.

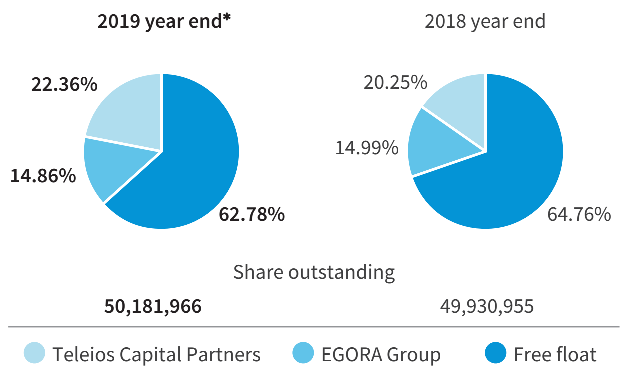
* Capital shares refer to the total number of voting rights at the respective notification date. A change in the total number of voting rights after the notification date was not taken into account.

Stock information*

Trade name	ISIN DE0005103006/WKN 510300
Symbol	ADV
Exchange	Prime Standard Segment Frankfurt Stock Exchange
Sector	Technology
Industry	Communications Technology
Number of shares outstanding at year-end 2019	50,181,966
2019 high/low price	EUR 9.73/EUR 5.70
2019 year-end price	EUR 8.09
2019 year-end market capitalization	EUR 406.0 million
2018 year-end price	EUR 6.26
2019 share price performance	+28.0%

* Price information is based on Xetra closing prices.

Shareholder structure



* Capital shares refer to the total number of voting rights at the respective notification date. A change in the total number of voting rights after the notification date was not taken into account.

Following the sell-off in the technology sector at the end of 2018, the ADVA share started the year 2019 at a price of EUR 6.26. Solid business development in 2018 convinced investors of a successful turnaround and the return to solid financial results. The share price increased significantly to over EUR 9 in the first quarter. Due to interim positive signals in the trade dispute and the expansionary steps taken by the US Federal Reserve and the ECB, global capital markets also reacted very positively during this time. ADVA joined in the SDAX index on March 18, 2019.

This positive trend continued until the publication of the Q1 results in April. ADVA increased its revenues by 6.3% compared to the same year-ago quarter and reported solid financial results within the guidance corridor. However, due to the sharpening trade dispute between the US and China and the strong US dollar, ADVA was confronted with a very challenging macro environment. Thus, the outlook for Q2 was not very optimistic, which led to a significant drop in the share price. The stock recovered slightly in July but was very volatile from then on. The ongoing trade dispute also led to a consolidation of the global capital markets during this time, particularly in August. Despite a sequential increase of revenues and profitability that were also in the guidance corridor, the share price dropped again substantially reaching the year's lowest value of EUR 5.70 in August.

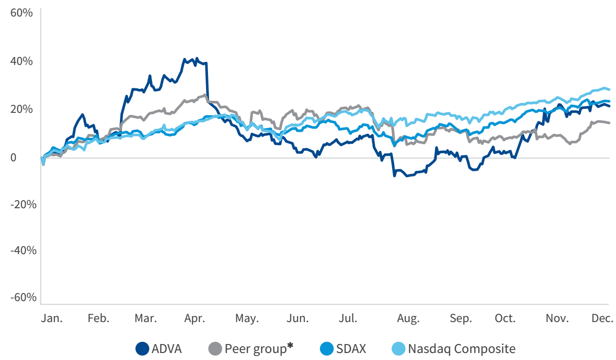
"ADVA's culture of innovation is at the heart of everything we do. It's how we keep discovering new ways to create a competitive edge for our customers."

During the third quarter, the ADVA share developed in line with the optimistic global capital markets, albeit with more volatility. In October, ADVA published the Q3 results. ADVA posted revenues at the upper end of the guidance corridor, a further improved profitability and an optimistic Q4 outlook. In addition, ADVA communicated an improvement program to counteract the challenges due to the US trade policy. At this point in time, two other financial institutions started covering ADVA with a clear buy recommendation. The macroeconomic factors were also intact. Most significantly, this includes the phase-one trade agreement between the US and China, the progress in the Brexit negotiation and the clear recovery of early economic indicators that drove global stocks to a new all-time high.

As a result, the share price increased to over EUR 8 and closed at EUR 8.09 which is a premium of +28.0% in 2019. With a market capitalization of EUR 406 million as of December 31, 2019, ADVA was significantly higher valued than in 2018 (EUR 312 million).

Price development 2019 comparison

(in %, indexed)



* Peer group data are calculated with the arithmetic average of Ciena, Cisco, and Infinera stock prices.

Investor relations review

Investor relations work was driven by the following priorities in 2019:

- Rebuilding confidence in the investor community based on the company's sequential growth and increasing profitability
- Intensive investor communications through conferences with focus on Europe and the US
- Industry consolidation and increasing relevance of all ADVA technologies

The digitization of ecosystems is progressing across the globe and requires a rapid and sustainable expansion of network infrastructure. The preparation for the fifth generation of mobile technology (5G), the internet of things (IoT) and the development and use of artificial intelligence (AI) are driving the modernization and expansion of networks. ADVA's solution portfolio based on optical transmission technology, network access solutions with virtualization and synchronization technology is exclusively based on technologies that are strategically important for the transformation of networks.

Despite the sustained increase in demand for modern network technology and its economic importance, the network equipment industry continues to face a challenging environment determined by high R&D expenditures, short innovation cycles, competitive pressure and fierce price negotiations. However, the industry is experiencing positive market growth in various segments and geographies.

In order to meet investors' demand for information on current market developments and their impact on ADVA, the company has continued its investor relations work at a very high level. A total of three roadshows (2018: two) were held in London, Paris and Munich, as well as over 210 one-on-one meetings (2018: 190). ADVA presented itself to institutional investors at a total of 10 investor conferences (2018: 11), including cross-industry conferences and technology-focused events. These conferences were organized by Berenberg / Goldman Sachs, Cowen, Commerzbank, Deutsche Boerse, Quirin, Jefferies, and Needham.

In addition, with a total of 59 press releases, three quarterly reports and regular conference calls, the financial community was kept informed about any significant developments within ADVA. Furthermore, throughout the year, the company continued to provide comprehensive and up-to-date information relevant to the financial community on the investor relations pages of its website at www.adva.com, including full transcripts of archived conference calls.

At the end of 2019, six financial analysts (end of 2018: five) provided research coverage of ADVA's stock.

Financial analyst coverage

(as of December 31, 2019)

Institution	Financial analyst name	Location
Commerzbank	Stephan Klepp	London, England
Deutsche Bank	Rob Sanders	London, England
First Berlin	Simon Scholes	Berlin, Germany
FMR Frankfurt Main Research	Felix Lutz	Frankfurt am Main, Germany
LBBW	Mirko Maier	Stuttgart, Germany
Northland Capital Markets	Tim Savageaux	Minneapolis, USA

Overall trading liquidity in ADVA's shares decreased substantially from 2018 levels. Investor interest in the network equipment industry, however, continues to be very high in light of the digitization of society and the dynamics of the internet economy (cloud). The average Xetra trading volume was at 143 thousand shares per day during 2019, following 203 thousand shares per day during the previous year. Due to the increasing position of the investment company Teleios Capital Partners in the ADVA stock, the free float decreased to levels of approximately 63%.

The Annual Shareholders' Meeting took place on May 22, 2019, in Meiningen, Germany. All items on the agenda were approved by a majority. Furthermore, the Annual Shareholders' Meeting appointed PricewaterhouseCoopers GmbH Wirtschaftsprüfungsgesellschaft as the auditor for the 2019 financial results.

Investor relations contact

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Business overview

ADVA develops open networking technology that is the foundation of a shared digital future and empowers networks across the globe.

Technology

ADVA develops, manufactures and sells networking solutions for a modern telecommunication infrastructure. Its products are based on three core areas of expertise: fiber-optic transmission technology, Ethernet-based packet networking with intelligent software for virtualization and network management, and solutions for precise timing and synchronization of networks.

Optical networking

Fiber is the optimum physical medium to transmit large amounts of data over long distances. The bandwidth-over-distance capabilities of fiber by far exceed those of any other physical medium such as copper or wireless technologies. Therefore, fiber-optic transport is the unchallenged foundation for all high-speed networks. ADVA's optical transmission solutions are based on wavelength division multiplexing (WDM) technology. With WDM, multiple data streams are transmitted simultaneously over a single optical fiber by assigning each stream to a different wavelength (i.e., color) of laser light. Every wavelength (more than 100 in total) can carry a different application such as voice, video, data or storage traffic. Combining (i.e., multiplexing) these wavelengths at one end of the fiber, transmitting them over distance and then separating (i.e., de-multiplexing) them at the far end multiplies the fiber capacity and makes transmission more efficient. WDM supports all data protocols and transmission speeds and is a natural foundation for all high-capacity networks.

Glossary: *Page 154*

Carrier Ethernet and virtualization

Ethernet is the dominant data-link protocol for today's networks supporting a multitude of communication applications. ADVA provides Ethernet-optimized transmission solutions for fiber-based networks. Carrier Ethernet is often used at the network edge supporting several important applications. Network operators use the technology to backhaul traffic from mobile base stations and to connect their enterprise customers. Over the years, Ethernet has evolved to be the key protocol used to carry applications in high-speed optical networks for data backhaul and the interconnection of routers.

The importance of software in networking technology is increasing rapidly. On the one hand, network operation is automated by means of intelligent software, which increases user friendliness and simplifies network control and maintenance. On the other hand, more and more network functions are virtualized (network function virtualization, NFV). With NFV, the tight coupling between hardware and software in network elements is dissolved, and individual network functions can be developed and provided independently of the underlying hardware. The Ensemble software solutions resulting from the acquisition of Overture in 2016 are now leading the way in NFV infrastructure applications.

Synchronization

Reference sources that deliver stable frequency and time-of-day information are crucial to the effective transmission of digital signals. Especially in mobile networks, the availability of highly accurate synchronization and timing information is crucial for best end-user experience. With a complete end-to-end solution portfolio sold under the Oscilloquartz brand, ADVA can offer a smooth evolution across multiple generations of synchronization technologies.

Technologies for a digital future

ADVA's three technology pillars are fundamental to the rapidly advancing digitalization of ecosystems around the world. Optical networking technology with WDM provides the scalable transmission capacity needed to handle bandwidth growth. Carrier Ethernet with NFV allows the flexible and fast deployment of new communication services, and the synchronization technology ensures maximum performance in the network.

ADVA creates innovative networking solutions from inception through manufacturing and into service. The following paragraphs describe important market dynamics that drive growth for the group's business.

Market, target customers and growth drivers

The rapid digitalization of society and ecosystems is putting a lot of pressure on communication networks worldwide. It is generating an ever-growing demand for more universally available bandwidth, faster provisioning of specialized communication services and high-precision time and frequency synchronization in distributed systems.

ADVA's technologies are strategically important to the necessary network transformation, and there is an ever-growing number of applications for optical transmission technology, physical and virtualized packet-edge access solutions and high-performance synchronization technologies.

The following briefly describes the key applications, target groups and growth drivers in ADVA's addressable market.

Data center interconnect for large enterprises

In a digitally networked world, enterprises depend more than ever on the integrity of their data and the availability of digital resources. There is a growing need to develop more reliable and efficient IT infrastructures, which not only protect against data loss, but also ensure that all processes run smoothly and at all locations. The loss of mission-critical information is a big threat to enterprises. System failures can result in idle staff, damage to reputation and, ultimately, lower revenues.

Due to the criticality of data and application availability, many large enterprises, research and educational institutions as well as health care providers have gone down the path of operating their own data centers connected via private fiber optic networks. Such private enterprise networks purely serve the business processes of an individual company or organization and offer a high degree of security and control. The network operation is either in the hands of the in-house IT department, or a specialized IT or communication service provider. The private IT infrastructure (private cloud) is often complemented by a partial outsourcing of less critical functions and data in external data centers, operated by a third party (public cloud). The combined use of private and public cloud solutions is called hybrid cloud, the simultaneous use of multiple clouds "multi-cloud." Cloud-based solutions have been gaining a lot of traction and will continue to spread rapidly in the corporate world.

ADVA has over 25 years of experience in the development and deployment of innovative transmission technology for data center interconnect. Many major companies from the so-called Fortune 500 league rely on ADVA's transmission technology for their business continuity and disaster recovery applications. ADVA offers a highly innovative product feature set in this market segment. The ADVA FSP 3000 supports native transmission for all data center protocols, guarantees low latency and provides additional security through the company's ConnectGuard™ encryption technology. Furthermore, ADVA has built a strong partner landscape supporting the go-to-market process.

Data center interconnect for internet content providers

Internet content providers (ICPs) are companies whose principal business is the creation and dissemination of digital content. The ICP community includes, for example, large internet companies such as Apple, Amazon, Facebook, Google, HP, IBM and Microsoft. These companies operate data centers of enormous proportions and are often referred to as a "hyper-scale" or "cloud-scale" operators. ICP data centers contain huge server farms. The main asset of an ICP is its digital content and the associated services.

Glossary: *Page 154*

The ICP community is focused on innovation, has much experience in developing software and a pronounced do-it-yourself mentality. ICPs' main objective is optimizing costs and strengthening the performance of their portfolios. For wide-area connections between their data center sites, they often still resort to leased lines from CSPs. However, there is a trend toward more and more scenarios where ICPs rent dark fiber and equip it with their own transmission technology. Because of their size and purchasing power, ICPs are not only a relatively new, but also interesting target group in the market for optical transmission equipment, promising high growth potential.

ADVA, thanks to its extensive experience in the field of data center interconnect for enterprise networks, offers many compelling product features and solutions for DCI applications (see previous section). Furthermore, the company developed a new generation of the FSP 3000 platform specialized for the ICP community. The ADVA FSP 3000 TeraFlex™ terminal further enhances fiber utilization and takes key performance parameters such as space and power efficiency to a new level. Thus, the terminal delivers a highly compelling feature set for interconnecting hyperscale data centers in the ICP. ADVA's highly agile and innovative corporate culture makes the company an attractive partner for the ICP target group.

Transforming carrier infrastructure

Carriers are companies that are in the business of building and operating large-scale networks that they use to offer communication services to end-users or other CSPs. Besides the demand from businesses and ICPs for data center interconnect capacity, it is foremost the increasing bandwidth demand of private households which is challenges carriers, increasing the pressure to expand their network infrastructure. Drivers of bandwidth growth are mainly mobile devices, as well as the increasing number of networked devices through the internet of things (IoT).

Industry analyst firm Gartner forecasts that the enterprise and automotive Internet of Things (IoT) market will grow to 5.8 billion endpoints in 2020, a 21% increase from 2019. This growth will drive a new set of requirements around network availability, latency and accessibility of computing resources. Carriers have a key role to play in building a suitable network infrastructure and digitizing ecosystems.

In addition to industrial use cases, it is the rapid growth of video-on-demand offerings from so-called "over-the-top" providers like Netflix or Amazon Prime that is creating huge traffic loads in carrier networks. In order to guarantee good signal quality, carriers need to deliver several Mbit/s of bandwidth per household. Building and operating a network that delivers such capacity is no trivial task. Moreover, due to the adoption of higher resolution video standards and 3D technology, bandwidth demand will continue to grow relentlessly for the foreseeable future. It is to be expected that the available bandwidth per household will reach data rates of 1Gbit/s in the near future. This is more than a factor of 20 higher than the bandwidth required for a traditional broadband service today.

Glossary: *Page 154*

There are several ways for service providers to deliver broadband connectivity to their customers. Traditional telecommunications companies still leverage digital subscriber line (DSL) technology to increase the capacity of their access lines (i.e., twisted pairs of copper wires), which are typically available to every household. Coaxial cables are a good alternative, typically owned by cable TV companies that are expanding their offerings to become multiple service operators (MSOs). New initiatives for fiber-to-the-home (FTTH) or fiber-to-the-building (FTTB) are rolling out, providing the ultimate bandwidth pipe. Finally, there are wireless technologies in the mix that are gaining momentum. In many developed countries, users already have access to the fourth generation (4G) of mobile network technology, based on the so-called Long Term Evolution (LTE) standards. The roll-out of the new 5G standard has begun and is being promoted aggressively in numerous countries. A complete, nationwide 5G build-out, however, will take several years. All these innovative new access technologies deliver significantly higher bandwidth per end user than legacy technology.

Glossary: *Page 154*

For carriers, the challenge is to provide market competitive connectivity to as many customers as possible at the lowest possible cost. That means making good use of existing infrastructure, especially in the access part of the network, and intelligent investment in new technology to support growth and emerging applications.

ADVA helps carriers to simplify and automate their networks and build a scalable network infrastructure that is future-proof. By deploying the group's networking solutions, carriers can combine various traffic streams from different access technologies onto a single transport platform. In addition, ADVA offers with the FSP 3000 one of the most scalable platforms on the market, allowing seamless data transport from the customer premises to the core of the network. Thus, carriers can bypass some of the small access nodes, eliminating the expense of operating these locations.

The ability to deliver more bandwidth to more customers from fewer sites located farther back in the network enables operators to streamline their networks while simultaneously improving the end-user experience. Energy-hungry devices, which are needed for data processing, can be concentrated in fewer network locations. This is important for so-called edge computing solutions and leads to a network architecture that is more energy-efficient and easier to operate.

Transforming the network edge

Serving residential customers is, in most regions around the world, a highly competitive business with low margins for service providers. The providers are therefore keen to offer telecommunications services to business customers and provide industrial multi-cloud solutions. Serving enterprise customers is typically more lucrative as this clientele has more stringent requirements for quality of service, network performance, network availability and security. The CSP can charge a premium for these quality attributes but needs to back the service offerings with service level agreements.

In a digital framework, what companies need above all is high data security and speed. It is secondary whether it is a transfer of data between two company locations, an application for the company's customers or an application in the cloud. As a result, companies will pay more attention to the location of their data and connections in the future.

Also, for the internet of things (IoT) it is important how and where the three critical functions of data processing, storage and transmission work together. The resulting edge computing solutions generate their added value as much as possible by optimizing two parameters: the amount of data to be processed, and the proximity to the place where the data is collected and needed.

CSPs are in a perfect position to capitalize on the trend towards more localized functions and use their geographic footprint to their competitive advantage by creating tailor-made solutions with low signal latency and high security. Thus, the investment focus for carriers is moving to the network edge.

At the network edge, many operators deploy packet-based Carrier Ethernet (CE) technology as a unified, data-optimized transmission solution in their infrastructure. Business customers appreciate the simplicity and efficiency of the CE technology, and already know the Ethernet protocol from their local area networks. For services that address functions in higher network layers, however, network operators often rely on so-called routers and switches.

Recently, the adoption of NFV has changed the market at the network edge, and the separation between the two technology segments is disappearing. Through the virtualization of network functions, the creation of new services becomes a software-centric process, and new value-added services in higher network layers can easily be deployed over CE connections. This allows network operators to reduce the complexity of application-specific hardware in their portfolio and to offer new business models through a universal, programmable infrastructure, thus generating additional revenues.

In addition to connecting business customers, CSPs also use fiber-based CE solutions to backhaul traffic from mobile base stations. The success of smart phones and the associated high-speed mobile services created a bandwidth explosion. Mobile operators are now challenged to provide significantly higher bandwidth via their mobile networks without compromise on geographic coverage. Operators consequently upgraded their mobile networks and introduced 4G (LTE) and LTE-Advanced (4.5G) technologies. The commercial introduction of the new fifth generation (5G) has started and will have a significant impact on carrier infrastructure investments. While the new mobile technologies allow the delivery of more bandwidth over the air interface to the mobile devices, operators also need to solve the backhaul challenge from base stations to their core networks. Higher-speed backhaul today is generally implemented via fiber and optimized for data transmission supporting all the different applications. In order to make the expansion financially viable, close collaboration between wireline operators and mobile network operators with shared infrastructure will be necessary in most markets.

In the context of newer 5G technologies, not only the bandwidth in the networks increases, but also the number of antennas multiplies. This densification of radio heads requires a significant investment in the fiber optic network and 5G antenna technology as well as much more precise time and frequency synchronization throughout the network. The build-out of mobile broadband networks drives the demand for a new generation of fiber-based CE solutions that deliver and assure high data throughput and accurate timing information.

In summary, the trend towards enterprise multi-cloud solutions, IoT and corresponding edge computing solutions, as well as the increase in antenna density in 5G mobile networks, are creating new market dynamics and opportunities at the network edge.

ADVA offers a highly competitive solution set in this space. The company's FSP 150 product portfolio empowers service providers to provide their customers with intelligent solutions quickly and efficiently in all relevant application scenarios. The portfolio allows the provision of virtual network functions and the definition of a universal network termination. In combination with ADVA's Ensemble software solutions, network functions can be reliably hosted and orchestrated. In mobile backhaul applications, the ADVA FSP 150 excels by delivering and assuring precise synchronization information in addition to powerful data plane performance.

Malgorzata Gluszko

"Customers seek us out for cutting-edge innovation. What keeps them with us is the close synergy and support of our people."

Products

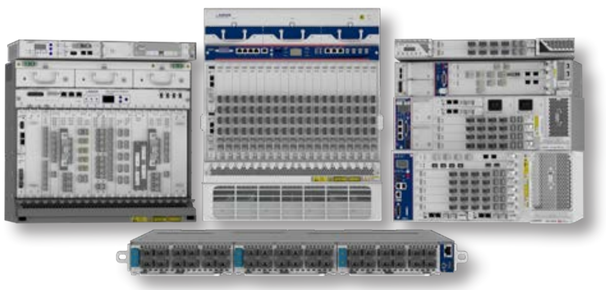
ADVA's portfolio strategy is built on a tripod of technologies:

- Optical networking technology
- Packet-edge solutions with NFV
- Network synchronization

Open optical transport

The ADVA FSP 3000 is a WDM-based optical networking system designed to maximize the bandwidth and service flexibility of access, metro and core networks. The modular design is highly scalable and enables high levels of network automation.

The platform impresses on the one hand with its high-performance terminals, which bundle data streams and generate transmission rates of up to 600Gbit/s per wavelength. On the other hand, through its open optical line system (OLS), which can be optimized for access, metro and long-haul applications. The combination of the platform's latest generation terminal and OLS supports transmission capacities of more than 50Tbit/s per fiber.



ADVA FSP 3000 – The open optical transport solution

Packet edge with NFV

The ADVA FSP 150 product family is a programmable, universal networking solution based on Carrier Ethernet technology for the so-called network edge. At the network edge, carriers worry less about the total amount of data to be transferred, but rather about a radical simplification of the logistical processes. Network operators strive to make delivery and protection of communications services faster and more flexible while implementing scalable and cost-efficient solutions to aggregate data streams.

With the introduction of NFV, more and more network functions will be realized as software applications, independent of application-centric hardware. These software applications can then be deployed centrally in a data center, or alternatively can be installed on a network termination device with integrated server functionality, such as the ADVA FSP 150 ProVM. With the Ensemble software framework, ADVA provides an NFV-optimized infrastructure (NFVi) that enables network operators to quickly and efficiently generate, deploy and administer value-added services, regardless of specific hardware. For the first time, functions from higher network levels can now also be mapped onto the ADVA portfolio. As a result, the addressable application space for the company is once again significantly expanded.

ADVA FSP 150 – The empowered network edge

Network synchronization

Under the Oscilloquartz brand, ADVA develops, manufactures and distributes a broad product portfolio for the synchronization of distributed systems and network elements. This portfolio covers all necessary functions and includes:

- Highly accurate, self-contained frequency sources (e.g., cesium clocks)
- Synchronization supply units (SSU)
- End-to-end solutions to synchronize 3G, 4G (LTE and LTE-Advanced) and 5G networks via a packet-based infrastructure
- Global navigation satellite system (GNSS) receivers
- Network timing protocol (NTP) solutions (standalone or integrated in SSUs)
- Network management solutions

Glossary: *Page 154*

In addition to the constantly increasing demands on the precision of time and frequency, there is also a trend towards miniaturization. Also in this area, Oscilloquartz has an industry-leading portfolio, including a unique plug-in reference device in the so-called SFP form factor.

Oscilloquartz – Precise network synchronization

Professional services

In addition to open and programmable networking technology, ADVA offers a variety of services that help the company's customers plan, operate and maintain their networks. This service portfolio includes a network operation center (NOC) from which experts handle network operations for customers.

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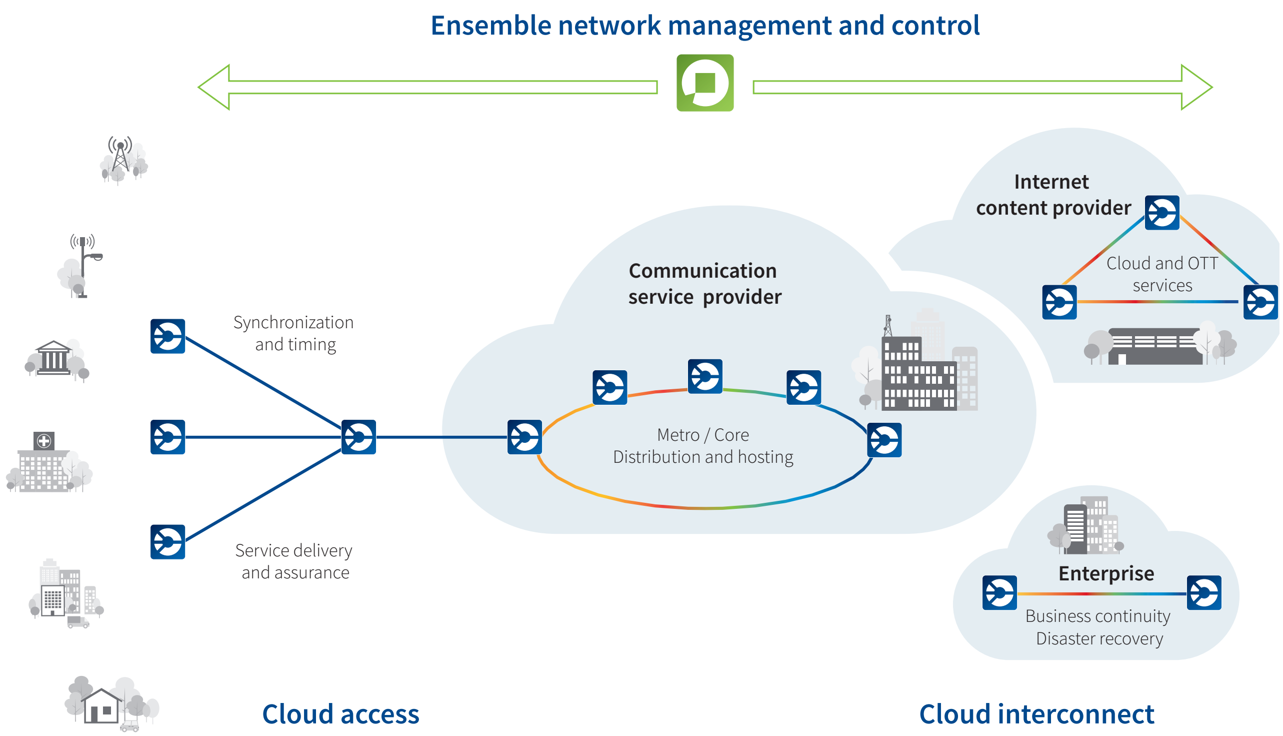


Regions, sales and marketing

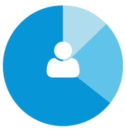
ADVA sells its products to a broad customer base worldwide, either through distribution partners or its own direct sales force. In 2019, the company successfully developed its worldwide customer base and won new customers in all regions.

Regions

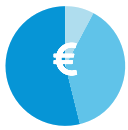
The EMEA region covers Europe, the Middle East and Africa. In this region, ADVA has a very balanced mix of customers of various sizes and can rely on a powerful network of value-added reseller partners to support the sales of the area. In 2019, EMEA was again the strongest region for the company. Year-over-year EMEA revenues increased significantly and contributed 53.7% to the group's total revenues.

The Americas region covers North America and Latin America. In 2019, America was the second strongest revenue-generating region behind EMEA, delivering 38.4% of total revenues. Many of the world's largest ICPs are US-based and represent additional revenue potential. ADVA is well positioned in this region.

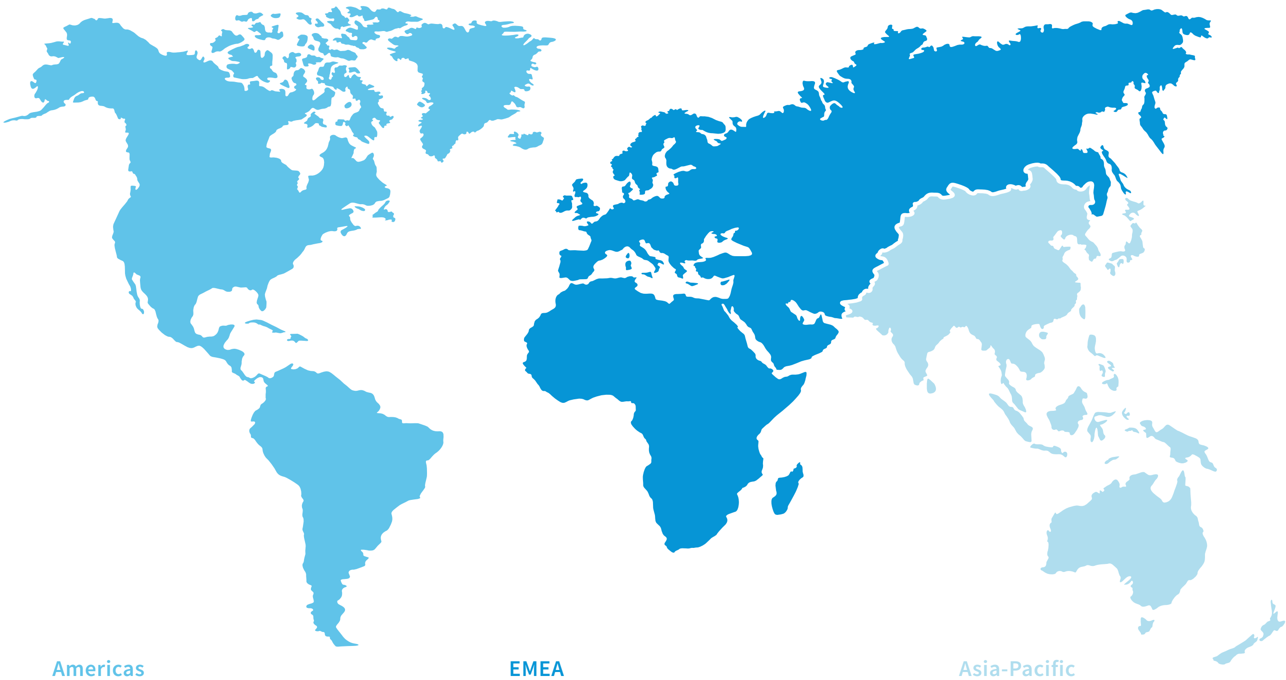
The Asia-Pacific region followed in third place. APAC includes Australia, New Zealand, China, India, Japan and Southeast Asia. ADVA is focused on select countries and applications in this region and only has a few larger accounts that guarantee sustainable and recurring revenues. The revenue contribution from the APAC region is therefore volatile and accounted for 7.9% of total sales in 2019.



Employees: **1,903** (1,886)*



Revenues: **EUR 556.8** (502.0) million



Americas

431 (451)

EUR 213.8 (192.1) million

EMEA

1,225 (1,179)

EUR 299.0 (249.2) million

Asia-Pacific

247 (256)

EUR 44.0 (60.7) million

* Total numbers at year-end 2019 (2018 in brackets)

Sales

ADVA continues to employ a well-balanced sales distribution strategy to maximize customer reach around the world:

DIRECT SALES

The group continues to focus on its direct-touch initiative as well as its direct sales force to win new customers. Establishing direct contact with enterprises and carriers enables ADVA to work more closely and better understand customers' specific requirements, which in turn helps to develop the right products and solutions. A direct sales approach is required in particular to address ICPs and strategically important communication service providers.

PARTNER SALES

Sales partners of ADVA include global system integrators such as IBM, Dell and NEC, OEM partners such as Fujitsu Network Communications (FNC) and so-called value-added resellers (VARs). Especially in the case of large enterprise networks and carriers, the company works closely with the sales partners during the planning and consulting phase and is intensively involved in the development of an optimal solution for the customer. Technical support after commissioning is generally performed by the partners. ADVA's Partner Ecosphere Program (PEP) ensures that sales partners have intensive training courses for their staff, quick and easy access to equipment engineering and high-quality support for projects.

Glossary: *Page 154*

Marketing

Direct-touch efforts are proactively supported by the marketing team to build the ADVA brand and to expand visibility of the entire product portfolio. Specific marketing activities include regular participation in tradeshows and conferences, tactical online advertising, news coverage and bylined articles in trade publications. ADVA supports co-marketing efforts with its partners and delivers regular e-newsletters to customers and partners. The group also maintains a dynamic and active online presence, including an influential, popular blog and social media outreach on multiple platforms.

In addition, ADVA has continued to engage in marketing alliances with various global network solution providers. Of particular importance are the numerous interoperability tests, especially in the field of NFV, which ADVA is conducting with its technology partners in order to demonstrate the seamless interaction of the different systems. In the area of NFV, the company has established a global network of technology partners around its Harmony program to ensure the seamless operation of virtualized network functions.

ADVA's brand promise can be summarized by three headlines: "Innovation," "Speed for customers" and "Trusted partner". The combination of these three elements makes ADVA a unique and differentiated player in the industry.

DevOps

Organizational setup

ADVA takes an advanced approach to development and operations. In order to further optimize product quality, manufacturability and time to market, these traditionally separate areas are tightly integrated with cross-functional teams working closely across the entire system. DevOps and the business lifecycle (BLC) organization form the two main units in the organizational setup.

The DevOps team covers products from the cradle to the grave. Its goal is to ensure consistently high quality and to routinely deliver the right product to the customer in the shortest possible time.

The BLC organization is ADVA's move into next-generation, automated manufacturing, supply chain management, sales and operations planning (S&OP), logistics and reverse logistics.

A third unit, the Advanced Technology Team, continues to identify new areas of innovation. It explores research possibilities and potential avenues for feasibility analysis and proofs of concept.

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DevOps

As the term suggest, DevOps refers to a combined approach to development and operations. DevOps is a model that has successfully been used in software development firms. ADVA has translated this model into a combined hardware plus software R&D environment. By adopting this model, ADVA is encouraging communication, collaboration and shared goals across cross-functional teams in all business areas. With a set of practices and policies being adopted by the whole team, the aim is to improve quality at all stages of the development lifecycle by enabling fast feedback loops and rapidly changing systems.

ADVA implemented a fully integrated, value-stream oriented DevOps model of organization involving product-line management, R&D and new product introduction – lifecycle engineering and quality management. It also developed a merged approach to system verification testing, network engineering and customer application testing. This setup allows a smooth and efficient integration of new products to existing portfolios.

To further foster agile, iterative DevOps processes, ADVA expanded its activities in the photonic integration area and launched development projects for highly integrated optical components/modules with the objective of reducing product cost and increasing product differentiation.

The company's market-leading product offering is the result of its DevOps set up. New innovation ensures ADVA's position as a global technology leader in important growth markets. The company continues to evolve its leading intellectual property rights portfolio, which currently (status December 31, 2019) includes more than 293 granted individual patents in 190 patent families.

As a member of all key industry standardization groups, ADVA makes a significant contribution to the development of standards. It also demonstrates technology leadership through multiple publications and presentations. Through new technology trials and the development of early prototypes, ADVA plays a significant role in validating innovative ideas and concepts. Strategies are developed in close cooperation with partners, including suppliers and colleagues in research centers and universities. Many collaborative projects are conducted in conjunction with partner organizations.

The DevOps teams innovate in the areas of optics, Ethernet, network management software, fiber assurance as well as network virtualization and network synchronization (under the Oscilloquartz brand). The development processes are completely agile and iterative, targeted to reinforce ADVA's position as a leader in the field of programmable networking on a secure, flexible infrastructure.

ADVA is also developing its own differentiated optical sub-modules which will enable it to tailor solutions more closely to individual customer needs for a more vertically integrated value chain. The commercially successful MicroMux™ module, for example, is a tangible result of these activities. The module significantly expands the capabilities of the FSP 3000 and can also be used in third-party devices.

The company continuously evolves its organization further by embracing DevOps strategies for both hardware and software, always with the customer as the central focus.

BLC organization

As technology and the demands of customers change over time, business approaches need to constantly evolve and adapt. ADVA's business lifecycle planning involves identifying the wishes and needs of actual and future customers. Requirements for product features, as well as delivery and service activities, are then determined. Challenges are reviewed prior to giving a final commitment to supply products and/or services. This approach ensures that requirements are clearly defined and understood, potential issues are resolved and ADVA is able to meet and exceed customer expectations. The BLC organization is clearly centered on the customer.

"Speed for customers" is a key promise of the ADVA brand. This promise is directly reflected in the way the company aligns its supply chain management and sales & operations teams. Intelligent IT tooling creates full transparency along the entire value chain, leading to better forecasting, material planning, shorter delivery times and higher inventory turnover.

In the areas of manufacturing, logistics and reverse logistics, ADVA has developed over the years a tightly integrated approach with two best-in-class, global Tier 1 EMS partners. The production system and degree of automation have been continuously optimized. The global EMS providers are now taking over the entire value chain from material purchasing, PCB assembly and final assembly, software loading and functional testing to storage and distribution logistics. Colocated ADVA experts monitor the results of the individual production and testing steps using remote shop floor control systems and ensure efficient communication between ADVA's development centers and the manufacturing partners. The fast and immediate feedback on manufacturability (design for manufacturing, DfM) leads to short time to market (TtM) and ensures a very high product quality at a competitive cost. Today ADVA can transfer the production of selected products between manufacturing partners' sister locations within eight weeks. The manufacturing system can thus react dynamically to intensifying global trade conflicts and minimize tariffs and penalties in the interest of customers. In 2019, manufacturing lines for products sold in the US were transferred from China to other countries to minimize the negative impact of the US government-imposed import duties.

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ADVA keeps increasing transactional efficiency through automation and robotics wherever possible, both in house and at the EMS sites.

ADVA's in-house experts focus on creating customer value in the areas of network staging, quality and the expansion of the award-winning portfolio of logistics services.

This portfolio is founded on a groundbreaking supply chain model with the following key components:

- dispatch of materials directly to installation sites precisely when needed
- refurbishment and recycling of materials returned by customers
- ADVA's radical approach to collaborating with customers on planning to maximize flexibility

The company's strategic procurement team has established rigorous processes for supplier onboarding, supplier performance and stringent component cost management. Procurement is closely integrated with the R&D teams to negotiate volume pricing in the product design phase and assure lowest product cost later in the product lifecycle.

It is important to note that requirement planning, supply chain management, forward and reverse logistics and ADVA's broad range of service offerings are all fully supported by one common and highly integrated business application infrastructure. Its main constituents are enterprise resource planning (ERP), product data management (PDM) and customer relationship management (CRM). This integrated transactional platform is the key to organizational efficiency and is constantly being enhanced by a team of application analysts using agile project management methods. ADVA's operating principle is to move any acquisition fully onto the company's process and organizational setup in less than six months. Fast and decisive integration are key to unleashing operational synergies and scale.

Quality management

ADVA strives to deliver world-class quality in all areas. From research and development, through production and supply chain management, all the way to post-sales technical support, quality management is crucial to maintaining the company's reputation as a trusted partner and its position as a quality leader in the marketplace. ADVA's quality management system is based on carefully controlled business processes and dynamic, continuous improvement. To ensure high-quality products, customer satisfaction and sustainability, it takes a top-down approach and its quality management team reports directly to the chief executive officer. To eliminate weaknesses in all areas, ADVA's quality management team also deals with cross-functional quality planning and monitoring.

In 2019, ADVA undertook its annual maintenance audit according to the international telecommunications quality management standards TL 9000 R6.1/R5.6 and ISO 9001:2015 as well as ISO 22301:2012 Business Continuity Management and ISO 14001:2015 for environmental management and ISO 50001:2011 for energy management. Once again, ADVA passed with outstanding results.

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Ulrich Kohn

"After 25 years of innovation, we're now on the edge of a new frontier. It's clear that the passion and expertise of our team will drive the next stage."

ADVA takes a holistic approach to quality assurance. This begins with a clear focus on optimizing product development, continues into excellence in operations through close collaboration with our suppliers and manufacturing partners, and continues into the shipping of products to customers and the provision of technical support. With regard to operation activities, supplier quality is a vitally important component of quality management. Compliance with stringent quality standards and continued improvement are ensured through thorough selection of suppliers, periodic evaluation through audits and systematic inspection of incoming goods. This is also supported by cross-functional commodity teams and the ever-increasing involvement of ADVA's suppliers in the development process.

Compliance with ADVA's quality management process is driven by the quality management team, which takes a proactive approach to problem solving as well as to advanced quality planning for new products in development and optimization of business processes across the entire value chain. ADVA's quality management process is underpinned by strong customer orientation and a clear focus on customer experience. This results in greater efficiency and very high customer satisfaction ratings. For 2018, ADVA's Net Promoter Score was +44% (a decrease compared to the very good scores of +52% in 2018 and +56% in 2017). This result still underlines the company's focus on customer satisfaction and its commitment to continuous improvement.

To identify weaknesses and opportunities to optimize cross-functional business processes, ADVA analyzes outcomes based on Lean Six Sigma methodologies. This ensures all aspects of the business can be measured and analyzed so that waste can be eliminated from every process. In order to strengthen its drive for continuous quality improvement, ADVA has taken a new approach to development and operations since 2016. Further optimized in 2017 and 2018, this approach is designed to enhance product quality, manufacturability and time to market.

In 2019, performance indicators for product-line quality such as early return indicators (ERIs), yearly return rate (YRR) and long-term return rate (LTR) were again below the industry average for the company's packet edge technologies and exceeded strict internal targets. Products based on WDM technology showed slightly elevated ERI figures. Intensive work is being done to improve these early failures. For the YRR and LTR return rates, the figures for WDM are industry average and meet internal targets.

TIA (formerly the QuEST Forum), the global organization dedicated to quality and sustainability in the ICT community, has praised ADVA for having "developed a culture of continuous improvement in many areas." Members of ADVA's quality management team continue to share best practices at TIA events around the world.

IT strategy

More than a decade ago, ADVA's IT team recognized that a traditional approach to IT tools and methodologies would no longer be sufficient. In order to meet growing demand for agility, speed and customer experience, a different strategy was necessary – one that could empower IT to deliver more business value by driving innovation and quickly adapting new technologies.

In recent years, the IT team has focused on the transition from a classic setup to a modern IT service architecture. Automation of routine tasks and automatic service delivery were major milestones, along with the transition of services into a hybrid cloud.

Today, important business processes and major changes, such as those resulting from acquisitions, must be quickly merged into the company's existing IT infrastructure and application framework, enabling the transition from an infrastructure-oriented, purely cost-driven organization to a business-service-oriented organization.

In the digital age, IT services are becoming a differentiator and an enabler of new business models. The growing need for agility to stay competitive and to be more efficient across organizational borders demands a paradigm shift and the adoption of new practices.

ADVA's IT team is well aware of the disruptive market changes caused by digitalization. Through its business-process and applications teams, ADVA has been taking targeted action since 2017 to successfully manage its digital transformation and move towards its goal of becoming a digital leader in the industry.

The data center has evolved a great deal in recent years due to the growth in cloud technology. The move to software-defined networking and storage architecture has enabled ADVA to quickly provision new IT services. The company is also changing its internal service structure to benchmark service costs with cloud services. This allows it to quickly decide where to move services in a hybrid cloud environment.

In addition to the excellent unified IT infrastructure, ADVA benefits from its highly integrated and standardized applications landscape, which enables it to integrate acquisitions within just a few months.

ADVA's vision of IT in the future is characterized by the following points:

- **Data analytics center of excellence (CoE)**
  Establishing this CoE enables the company to build up and bundle analytics capabilities under one common platform
- **Robotic process automation (RPA)**
  This involves the automation of routine business practices with "software robots" that perform recurring tasks automatically
- **IoT platform**
  Allows ADVA to connect with customer network management systems for the purpose of identifying, coordinating, prototyping, and implementing digital business models and services related to IoT topics as well as using AI/ML technology to support customers and internal business units with predictive maintenance and advanced data visualization
- **Collaboration platforms (Enterprise 2.0)**
  Collaboration between different departments as well as external partners, suppliers and customers is a key requirement. ADVA's IT team continues to evolve the company's collaboration platform, combining the newest on-premises and cloud solutions into one core platform
- **Unified communication**
  A state-of-the-art communication platform allows ADVA employees to quickly communicate and exchange information on any device, helping the company to drive team innovation across sites
- **Advanced security**
  Extended rights management and encryption protects critical business information and personal data. ADVA uses cloud-based machine learning and AI to identify threats to its environment; extended multifactor authentication simplifies access to ADVA data for employees
- **Hybrid cloud**
  ADVA extends its hybrid cloud to support all R&D software development processes with a cost-optimized solution

Going forward, ADVA's IT team will continue to analyze and quickly incorporate any new technology trends that can benefit the company's service offerings. Emerging trends like microservices have already been tested and will allow ADVA to become even more agile. This will also help the company to control and adjust service cost.

ADVA's IT team is committed to increasing the company's internal customer satisfaction score from 85% to 90%.

Compliance and sustainability

Corporate ethics and compliance

Integrity and ethical decision making are central requirements for the sustainable success of ADVA. The group recognizes its responsibility to comply with national and international laws and regulations, internal policies and ethical standards – otherwise known as compliance. Its commitment to compliance is continuously communicated and reinforced not only by the management board but also by the group's (line) managers. It is based on ADVA's core values, which translate into a holistic code of conduct and a range of group-wide policies that govern the group's business operations and are mandatory for all employees to follow.

ADVA's code of conduct and group-wide policies are embedded into a robust compliance management system, which is structured according to the legal requirements and best practices of the group's key countries of operation, as well as common international standards. The following elements are covered:

- Strong "tone from the top"
- Periodic risk assessments
- Proportionate risk-mitigating processes and controls
- Periodic compliance training and regular communication
- Means for in-person as well as anonymous reporting
- Proportionate responses to compliance violations
- Continuous improvement of all compliance procedures

The group's compliance management system is supported by a central compliance department and currently five regional compliance officers. Activities are coordinated by ADVA's chief compliance officer who reports to the chief executive officer and the supervisory board. Whenever employees have questions or suggestions related to compliance or suspect incidents of non-compliance, they are encouraged to speak up. In addition to clearly defined and actively communicated internal points of contact, an external ombudsman (this role is currently covered by Frank Fischer, tax lawyer and former member of ADVA's supervisory board) and an externally operated ethics and compliance helpline enable confidential and anonymous reporting.

Sustainability

ADVA's commitment to ethical decision making extends to the group's operations and products. Related activities are typically referred to as sustainability. The importance of sustainability for ADVA is best illustrated by the group's successful track record in the related areas. To continuously strengthen the group's sustainability record, a dedicated sustainability department with a direct reporting line to the group's chief technology officer is in place.

ADVA's sustainability program is based on a holistic model covering the range of all related aspects. It is shown in the following diagram:

The outlined model has been jointly developed by British Telecom and the QuEST Forum, the body which defines the TL 9000 as the telecommunication industry's version of the international quality standard ISO9001. It is meanwhile further maintained by the Telecommunications Industry Association. Therefore, it is used by several large network operators and system vendors worldwide for assessments or self-assessments of performance across the different sustainability segments. In 2019, the group achieved its third consecutive "Gold" ranking according to this model.

Furthermore, the group is regularly assessed regarding its sustainability performance by independent bodies like EcoVadis and the Carbon Disclosure Project (CDP). In 2019, the group also achieved its third consecutive "Gold" ranking in the EcoVadis assessment, putting ADVA in the top 5% of companies ranked by that platform.

In order to further strengthen the group's sustainability strategy and efforts, ADVA joined the Science-Based Targets Initiative (SBTi) in 2016 as one of the first 200 companies worldwide and one of the first 10 German companies. SBTi is a joint initiative by CDP, UN Global Compact, the World Resources Institute and the WWF. Its key aim is to support the restriction of global warming to within 2°C (3.6°F) compared to pre-industrial temperatures. In 2017, the group submitted its emissions-reduction targets. Following a sophisticated validation process, the group's three emissions-reduction targets were accepted in the first half of 2019, making ADVA the fourth German company with approved targets.

Finally, details regarding the group's sustainability program, performance and indicators are also summarized in ADVA's code of conduct and its annual sustainability report, which is compiled according to the German Commercial Code (HGB) and the Global Reporting Initiative's (GRI) standard. Both resources are publicly available on the group's website www.adva.com.

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Combined management report

Basis of preparation

This report combines the group management report of ADVA Optical Networking group ("the group", "ADVA Optical Networking" or "ADVA"), comprising ADVA Optical Networking SE (hereafter also referred to as "the company", "ADVA Optical Networking SE" or "ADVA SE") and its consolidated subsidiaries, and the management report of ADVA Optical Networking SE.

The combined management report of ADVA Optical Networking SE was prepared in accordance with sections 289, 315 and 315a of the German Commercial Code (Handelsgesetzbuch, HGB) and German Accounting Standards (Deutsche Rechnungslegungsstandards) No. 17 and 20 (DRS 17 and 20).

All information contained in this report relates to the status on December 31, 2019, or the financial year ending on that date, unless stated otherwise.

Forward-looking statements

The combined management report of ADVA Optical Networking SE contains forward-looking statements using words such as "believes", "anticipates" and "expects" to describe expected revenues, costs and earnings, anticipated demand for optical networking solutions and anticipated liquidity from which internal estimates may be inferred. These forward-looking statements are based on the beliefs of the Management Board and respective assumptions made, and involve a number of unknown risks, uncertainties and other factors, many of which are beyond ADVA Optical Networking's control. If one or more of these uncertainties or risks materializes, or if the underlying assumptions of the Management Board prove incorrect, actual results can differ materially from those described in or inferred from forward-looking statements and information. Unknown risks and uncertainties are discussed in the "risk and opportunity report" section further below.

Strategy and control design

ADVA's strategic goals are focused around growth & profitability, innovation, operational excellence and individual development of our employees. The strategic goals are reviewed by both the management board and the supervisory board on a yearly basis and amended where appropriate. Each of these goals are defined in detail and then broken down into specific departmental and individual targets. The strategic goals are traced to each individual employee so that each employee can focus and be evaluated on his/her individual performance and contribution to ADVA Optical Networking's overall performance.

ADVA measures the accomplishment of its strategic goals against revenues, pro forma operating income, net debt and as a non-financial criterion customer satisfaction as measured by the net promoter score. These metrics represent the group's key performance indicators. The management board sets target values for all four metrics for the coming year and measures actual values against the target values on a monthly basis for revenues and pro forma operating income, on a quarterly basis for net debt and on a yearly basis for the net promoter score. In case of deviations from plan, corrective action can be taken quickly. This information is summarized and communicated to the management board in monthly, quarterly and yearly reports.

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Sebastian Kissner

"Every day, we're pushing at the edges, improving speed, efficiency, agility, security, precision, reliability and value."

General economic and market conditions

The global economy at the beginning of 2020

In its January 2020 edition of the World Economic Outlook (WEO), the International Monetary Fund (IMF) provided the following view on the state of the global economy:

"Global growth is projected to rise from an estimated 2.9% in 2019 to 3.3% in 2020 and 3.4% for 2021 – a downward revision of 0.1 percentage point for 2019 and 2020 and of 0.2 percentage points for 2021 compared to those in the October WEO. The downward revision primarily reflects negative surprises to economic activity in a few emerging market economies, notably India, which led to a reassessment of growth prospects over the next two years. In a few cases, this reassessment also reflects the impact of increased social unrest."

According to Commerzbank economic experts, trade uncertainty is likely to decrease somewhat in 2020 due to the first agreement that is emerging between the United States and China but will remain high compared to previous years. In the world's largest economy, the United States, growth is currently primarily on the shoulders of consumers. By contrast, companies have continued to restrict their investments. This cautionary behavior is a result of significantly increased uncertainty, due to trade conflicts between the USA and China. Nevertheless, it cannot be assumed that the US economy will slide into recession. After all, consumption is unlikely to decrease significantly, and a restriction in government spending is not expected.

Industry appears to be stabilizing in the euro area, but an early, noticeable recovery in industrial production is unlikely. The lack of tailwind from the global economy prevents a stronger rebound. At the same time, the trade dispute between the USA and China continues to cause uncertainty here. Only the recent slight devaluation of the euro, which improves the price competitiveness of European companies, provides some relief. At the beginning of the year, the external value of the euro was around 2% below the level of the previous year. So far, the service sector has prevented the industrial downturn from plunging the euro zone economy into recession. The decoupling of the service sector from weakening industry since the beginning of 2019 is largely thanks to the ECB's ultra-expansionary monetary policy. Besides the construction industry, it is particularly the service sector that benefits from the domestic demand sparked by this.

While macroeconomic changes do not necessarily have a direct impact on the telecommunications equipment market, trade tariffs, barriers and exchange rate fluctuations do have an impact on ADVA's revenue generation and profitability. Furthermore it is important to acknowledge that ADVA generates the majority of its revenue in developed countries. The company's largest customer group is communications service providers, which in turn play a critical role in the process of digitization and the construction of economically relevant communications infrastructure. As a rule, these infrastructure investments are not subject to short-term economic fluctuations and are therefore less susceptible to macroeconomic turbulence.

Market environment for ADVA

The addressable market for ADVA is determined by the digitization of ecosystems and the resulting increase in demand for cloud-based solutions and the underlying communication networks. The rapid adoption of digital processes across all industries, the creation and use of artificial intelligence, and the ubiquitous use of high-definition video over mobile and fixed networks are important and sustainable growth drivers for the market.

ADVA's network technology enables the construction of a high-performance communications infrastructure that serves as the basis for the digital economy, the industrial internet of things (Industrial IoT) – often referred to as Industry 4.0 in Germany – and the digitization of ecosystems. The company addresses important applications in this growth market. Fiber optic transmission technology delivers scalable bandwidth for network operators' infrastructure and the data center interconnect (DCI) of large enterprises and internet content providers. At the edge of the network, the company's cloud access technology with virtualization enables fast and flexible provision of cloud services. In addition, the company's synchronization technology provides timing solutions required for the construction of mobile broadband networks and globally distributed data centers. Especially in Europe, there has been a backlog in the expansion of communications infrastructure since the 2008 financial crisis. The upcoming introduction of 5G mobile technology further intensifies the investment pressure.

ADVA is well positioned in several areas of the WDM market, the core segment of the overall optical networking hardware market. The adjacent market for Ethernet-based network access solutions is gaining new momentum with the introduction of virtualized network features. Here, the company's solutions can address more and more new growth applications and open up additional opportunities. Finally, ADVA provides differentiated network synchronization solutions for mobile networks and expands the feature set of the portfolio to address timing requirements for other industries. The total addressable market for ADVA is estimated to be USD 15 billion in 2019, growing to USD 18.5 billion* by 2024 (see also the chapter "Market, target customers and growth drivers").

* Industry analyst estimates for access, metro and long-haul WDM equipment ("optical") and access switching & routing ("packet edge") relevant to ADVA. Sources: Ovum, "optical networks forecast 2019-2024" published September 2019 and "service provider switching and routing forecast 2019-2024", published June 2019

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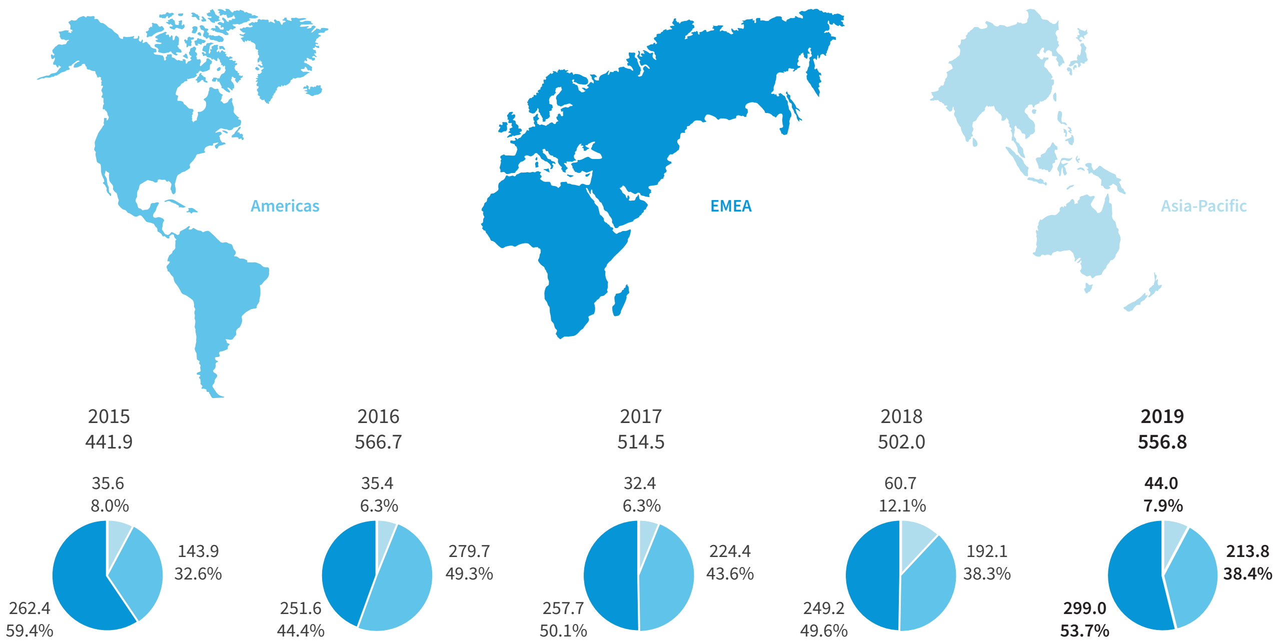
Business development and operational performance of the group

Revenues

Revenues represent one of the four key performance indicators for ADVA. In 2019, the group generated revenues of EUR 556.8 million, an increase of 10.9% on revenues of EUR 502.0 million in 2018. The positive development is due to solid demand from all customer groups in all technology areas. Except for Q1 2019, quarterly revenues increased sequentially in 2019 and reached EUR 151.1 million in Q4. This represents a growth of 4.7% when comparing to Q3 2019 and a year-on-year growth of 14.9%.

Revenues by region

(in millions of EUR and relative to total revenues)



In 2019, EMEA (Europe, Middle East and Africa) was reported as the most significant sales region, followed by the Americas and in third place Asia-Pacific.

Year-on-year, EMEA revenues of EUR 299.0 million in 2019 were strongly up from EUR 249.2 million in 2018. This is primarily due to very good demand from network operators. At the same time, business with private enterprise networks also developed very well. ADVA is traditionally strong in this region, using its mature partner strategy and achieving good results thanks to a broad and loyal customer base.

In the Americas region, revenues increased from EUR 192.1 million in 2018 to EUR 213.8 million in 2019. Similar to EMEA, demand from network operators in America was very strong and there were numerous successful projects with large companies.

In Asia-Pacific, revenues significantly decreased from EUR 60.7 million in 2018 to EUR 44.0 million in 2019. The region is predominated by project-based business, leading to greater fluctuations in individual quarters. In addition, there were regulatory uncertainties at one large customer, so that major revenue losses were also recorded over the year.

Results of operations

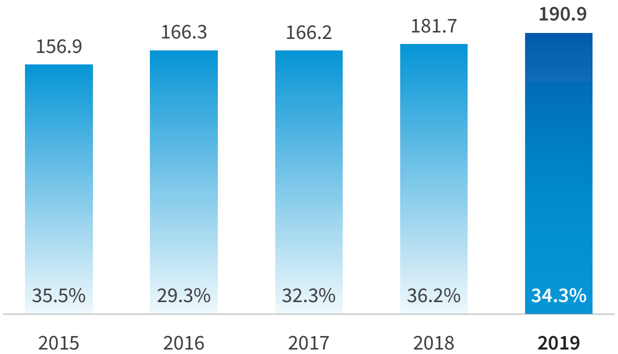
(in millions of EUR, except earnings per share)	2019	Portion of revenues	2018	Portion of revenues
Revenues	**556.8**	**100.0%**	**502.0**	**100.0%**
Cost of goods sold	-365.9	65.7%	-320.3	63.8%
Gross profit	**190.9**	**34.3%**	**181.7**	**36.2%**
Selling and marketing expenses	-72.8	13.1%	-63.5	12.7%
General and administrative expenses	-35.1	6.3%	-35.0	7.0%
Research and development expenses	-75.2	13.5%	-76.6	15.3%
Other operating income and expenses, net	4.2	0.8%	8.4	1.7%
Operating income	**12.0**	**2.2%**	**15.0**	**3.0%**
Interest income and expenses, net	-2.3	0.4%	-1.4	0.3%
Other financial gains and losses, net	-0.8	0.2%	-1.1	0.2%
Income before tax	**8.9**	**1.6%**	**12.5**	**2.5%**
Income tax expense (benefit), net	-1.9	0.3%	-2.8	0.6%
Net income	**7.0**	**1.3%**	**9.7**	**1.9%**
Earnings per share (in EUR)				
basic	0.14		0.19	
diluted	0.14		0.19	

Cost of goods sold and gross profit

Cost of goods sold increased from EUR 320.3 million in 2018 to EUR 365.9 million in 2019, primarily due to the higher revenues. Cost of goods sold includes amortization charges for capitalized development projects of EUR 33.5 million in 2019 after EUR 28.4 million in 2018.

Gross profit

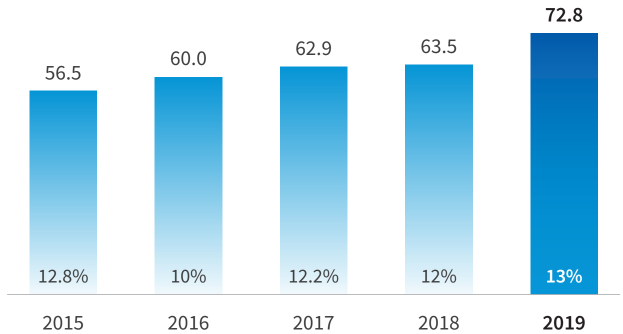
(in millions of EUR and relative to total revenues)



Gross profit improved to EUR 190.9 million in 2019 after EUR 181.7 million in 2018, comprising 34.3% and 36.2% of revenues, respectively. The development of the group's gross margin in general is impacted by variations in regional revenue distribution and in product and customer mix.

Selling and marketing expenses

(in millions of EUR and relative to total revenues)

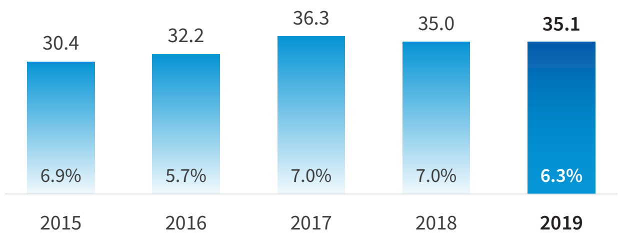


Selling and marketing expenses of EUR 72.8 million in 2019 were up from EUR 63.5 million in 2018 and comprised 13.1% and 12.7% of revenues, respectively. This increase is mainly attributable to increased personnel expense, predominantly due to growth of the team, increased variable remuneration and restructuring costs.

ADVA continues to invest in after-sales customer service and intensified direct-touch activities with those key customers served via indirect distribution channels. Establishing direct contact enables the group to work more closely with its end customers and better understand their specific requirements, which in turn helps in developing market-relevant products.

General and administrative expenses

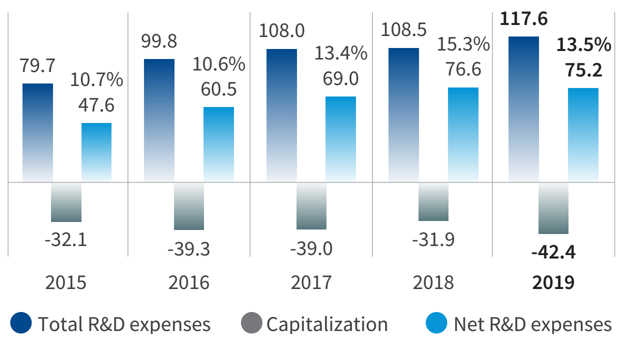
(in millions of EUR and relative to total revenues)



General and administrative expenses were at EUR 35.1 million in 2019 and slightly up from EUR 35.0 million recorded in 2018. The share of total revenues was at 6.3% in 2019 after 7.0% reported in 2018.

Research and development expenses

(in millions of EUR and relative to total revenues)



ADVA's research and development activities are driven by the distinct emphasis on differentiating its innovative connectivity solutions for cloud and mobile services and working with customers and partners to identify and meet their current and future needs. The resulting key technologies and products simplify complicated existing network structures and supplement existing solutions.

During 2019, research and development activities were focused on the following three technology areas:

- Enhancements to the open optical transport solution including the development of the new TeraFlex™ terminal and a new generation of open line system (OLS)
- A new generation of 100G products including network functions virtualization (NFV) software for the company's cloud access portfolio
- Ultra-precise synchronization technologies for 5G mobile networks and other industry verticals.

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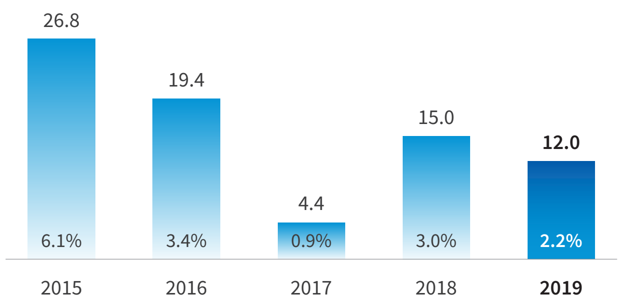
Net research and development expenses of EUR 75.2 million were slightly down from the EUR 76.6 million in 2018, thereby constituting 13.5% of revenues in 2019 after 15.3% in the prior year. Capitalization of development expenses of EUR 42.4 million in 2019 was significantly up from EUR 31.9 million seen in 2018. The capitalization rate in 2019 amounted to 36.1% (prior year: 29.4%) and the extraordinarily low capitalization rate for the previous year was influenced by the one-time decline in capitalization in the area of virtualization of network solutions. The slight decrease in net R&D expenses mainly relates to the significantly increased capitalization rate in 2019 compared to prior year which, however, was at an average level in a multi-year comparison.

Operating income

(in millions of EUR and relative to total revenues)



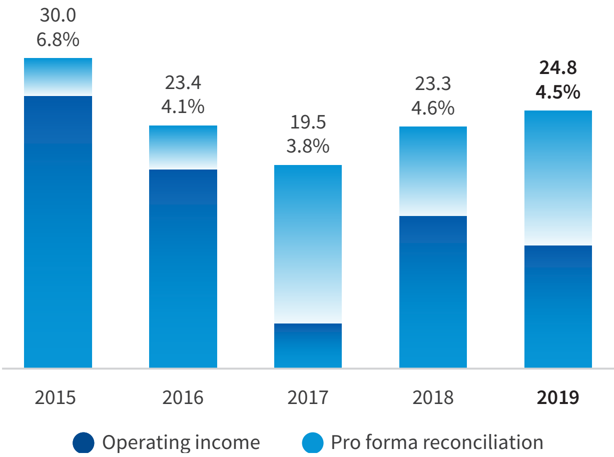
Net other operating income and expenses amounted to positive EUR 4.2 million in 2019, down from positive EUR 8.4 million in the prior year. This item is mainly impacted by subsidies received for specific research activities and release of provisions created in earlier periods.

Total operating expenses increased from EUR 166.7 million in 2018 to EUR 178.9 million in 2019, representing 32.1% of revenues in 2019 after 33.2% in the prior year.

Overall, ADVA reported a strongly decreased operating income of EUR 12.0 million in 2019 after an operating income of EUR 15.0 million in the prior year. The decline in operating result is largely due to a decrease in gross margin combined with increased operating cost due to restructuring measures.

Pro forma operating income

(in millions of EUR and relative to total revenues)

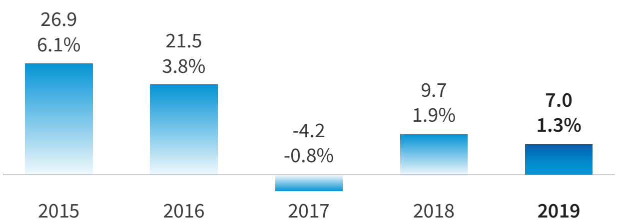


Pro forma operating income represents one of the four key performance indicators for the group. As pro forma operating income excludes non-cash charges related to stock compensation and business combinations as well as non-recurring expenses related to restructuring measures, ADVA's management board believes that pro forma operating income is a more appropriate measure than operating income when benchmarking the group's operational performance against other telecommunications equipment providers.

In contrast to the operating result, the pro forma operating result increased from EUR 23.3 million in 2018 to EUR 24.8 million in 2019, mainly due to higher restructuring expenses of EUR 5.7 million in 2019 (prior year: EUR 1.3 million), which had a negative impact on the operating result and were not taken into account for the calculation of the pro forma figure.

Net income (loss)

(in millions of EUR and relative to total revenues)



Given the decreased operating income, compared to 2018, ADVA reported net income of EUR 7.0 million for 2019, after a net income of EUR 9.7 million in 2018. Beyond operating income, the net result in 2019 included net interest expenses of EUR 2.3 million (prior year: EUR 1.4 million) and net other financial losses of EUR 0.8 million (prior year: net other financial loss of EUR 1.1 million). The increase in interest expenses is due to the inclusion of interest from the recognition of rental agreements in accordance with IFRS 16.

"In every corner of the world, our team is pushing the boundaries of innovation and going beyond the limits of customer expectations."

Other financial losses mainly related to the translation of foreign currency assets and liabilities and to gains and losses on hedging instruments. Moreover, 2019 includes expenses of EUR 1.4 million from the write-off of another investment. In 2018, an income of EUR 0.4 million from the write-up of an asset for sale was included.

In 2019, the group reported an income tax expense of EUR 1.9 million after an income tax expense of EUR 2.8 million in 2018, representing a tax rate of 21.09% (previous year: 22.49%). In 2019, the increased current income tax expense and deferred tax expense were offset by the release of provisions for tax risks.

Earnings per share

Basic and diluted earnings per share were EUR 0.14 each, in 2019 after EUR 0.19 each, in the prior year. Basic average shares outstanding increased by 0.2 million to 50.0 million in 2019, due to capital increases from the exercise of stock options. Diluted weighted average shares outstanding were at 50.5 million in 2019.

Summary: Business development and operational performance

Operating income as well as net income decreased strongly in 2019 compared to the previous year due to the decline in gross margin and the increase of operating expenses by EUR 12.2 million.

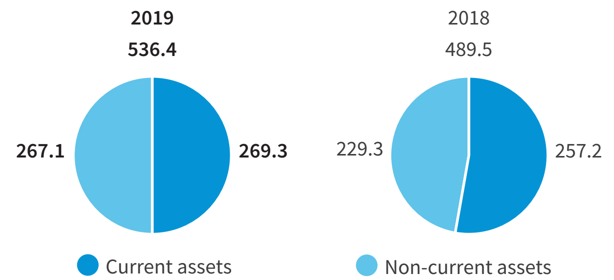
Net assets and financial position of the group

Balance sheet structure

ADVA's total assets increased by EUR 49.9 million or 10.2%, from EUR 486.5 million at year-end 2018 to EUR 536.4 million at the end of 2019.

Assets

(on December 31, in millions of EUR)



Current assets increased by EUR 12.1 million or 4.7% from EUR 257.2 million on December 31, 2018, to EUR 269.3 million on December 31, 2019, and comprised 50.2% of the balance sheet total after 52.9% at the end of the prior year. The increase in current assets was mainly driven by a significant rise in inventories by EUR 19.6 million to EUR 105.4 million, anticipating negative effects from the trade dispute between the US and China. Inventory turns remained stable at 4.0x in 2019 and 2018. Trade accounts receivable slightly decreased from EUR 97.9 million to EUR 96.2 million at the end of December 2019. Days sales outstanding improved from 68 days reported in 2018 to 66 days in 2019. At the same time, cash and cash equivalents at EUR 54.3 million were EUR 8.4 million down at year-end 2019, mainly due to increased cash outflows for net working capital and higher investments in capitalized development projects.

Non-current assets strongly increased by EUR 37.8 million from EUR 229.3 million at year-end 2018 to EUR 267.1 million on December 31, 2019. This increase is mainly due to the recognition of right-of-use assets in the amount of EUR 32.0 million in connection with the first-time adoption of IFRS 16 and the increase in capitalized development projects by EUR 8.2 million to EUR 96.2 million at the end of 2019, largely driven by developments of the future product platform for innovative connectivity solutions. At the same time, property, plant and equipment increased from EUR 29.1 million in 2018 to EUR 32.6 million at year-end 2019. On the other hand, other intangible assets from acquisitions and other intangibles decreased by EUR 7.0 million to EUR 24.6 million, mainly due to scheduled amortization of acquired technologies and customer relationships. Deferred tax assets decreased by EUR 1.0 million to EUR 6.3 million at the end of 2019. Deferred tax assets and liabilities are presented net in accordance with relevant netting requirements.

Meaningful additional assets belonging to ADVA are the broad and global customer base of several hundred service providers and thousands of enterprises, the ADVA, Oscilloquartz and Ensemble brands, the vendor and partner relationships and a highly motivated and skilled global team. These assets are not recognized in the balance sheet. Customer satisfaction as measured by the net promoter score represents one of the group's four key performance indicators.

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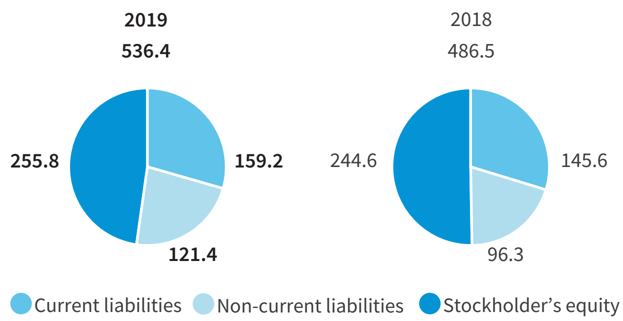
Liabilities

(on December 31, in millions of EUR)



With respect to equity and liabilities, current liabilities increased by EUR 13.6 million from EUR 145.6 million at year-end 2018 to EUR 159.2 million at the end of 2019, primarily due to first-time recognition of current lease liabilities amounting to EUR 6.1 million related to the first-time adoption of IFRS 16. At the same time, trade accounts payable increased strongly by EUR 10.2 million to EUR 73.4 million at year-end 2019, with days payable outstanding increased to 63 days in 2019 from 55 days in 2018. The increase in trade accounts payable is driven by the order-oriented timing of material purchases.

Non-current liabilities at EUR 121.4 million at year-end 2019 were significantly up from EUR 96.3 million reported at prior year-end. Within non-current liabilities, lease liabilities of EUR 28.3 million are reported for the first time in connection with the first-time adoption of IFRS 16. Non-current liabilities to banks decreased by EUR 8.3 million to EUR 61.8 million at the end of 2019 due to scheduled repayments. Financial liabilities are explained in more detail in a separate section below. At the same time, pensions provision increased by EUR 2.2 million to EUR 7.8 million and deferred taxes increased by EUR 1.5 million to EUR 12.3 million at the end of 2019. The increase in provisions for pension obligations is mainly due to lower interest rates considered in the valuation.

Stockholders' equity increased by EUR 11.2 million from EUR 244.6 million at year-end 2018 to EUR 255.8 million at the end of 2019, mainly due to net income as well as positive effects from currency translation in other comprehensive income. In 2019, capital increases totaling EUR 1.3 million from the exercise of stock options, and stock compensation expenses totaling EUR 1.5 million were reported.

Balance sheet ratios

The equity ratio declined to 47.7% at the end of 2019, after 50.3% at year-end 2018. The non-current assets ratio amounted to 95.8% on December 31, 2019, with stockholders' equity mainly covering the non-current assets. The decline is particularly due to the recognition of right-of-use assets in connection with the first-time adoption of IFRS 16.

(on December 31, in %)		**2019**	**2018**
Equity ratio	Stockholders' equity / Total assets	47.7	50.3
Non-current asset ratio	Stockholders' equity / Non-current assets	95.8	106.7
Liability structure	Current liabilities / Total liabilities	56.7	60.2

Capital expenditures

Capital expenditures for additions to property, plant and equipment in 2019 amounted to EUR 16.9 million, up from EUR 14.0 million in 2018, largely reflecting higher investments in technical equipment.

Capital expenditures for intangible assets of EUR 43.6 million in 2019 were significantly up from EUR 34.2 million in the prior year. This total consists of capitalized development projects of EUR 42.4 million in 2019 after EUR 31.9 million in 2018, and investments in concessions and software licenses and other intangible assets of EUR 1.1 million in 2019 after EUR 2.3 million in 2018. Investments in capitalized development projects are mainly driven by development activities for open optical transmission technology including the new TeraFlex™ terminal and the new generation of 100G products.

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Cash flow

(in millions of EUR)	2019	Portion of cash	2018	Portion of cash
Operating cash flow	66.9	123.3%	60.4	96.3%
Investing cash flow	-60.3	111.2%	-48.1	76.7%
Financing cash flow	-14.5	26.8%	-8.2	13.1%
Net effect of foreign currency translation on cash and cash equivalents	-0.5	0.8%	0.2	0.3%
Net change in cash and cash equivalents	**-8.4**	**15.5%**	**4.3**	**6.8%**
Cash and cash equivalents at the beginning of the period	62.7	115.5%	58.4	93.2%
Cash and cash equivalents at the end of the period	**54.3**	**100.0%**	**62.7**	**100.0%**

"We believe in going to the edge of what's possible and taking a leap. That's how our team continues to create ideas that add real value."

Cash flow from operating activities of EUR 66.9 million in 2019 was up EUR 6.5 million from EUR 60.4 million in 2018. This improvement was mainly due to the increase in non-cash depreciation and amortization, which was partially offset by the increased net working capital.

Cash flow from investing activities was negative EUR 60.3 million in 2019 after negative EUR 48.1 million in the prior year. In 2019, capital expenditures for property, plant and equipment and capitalized development projects increased compared to the previous year.

Finally, cash flow from financing activities at negative EUR 14.5 million in 2019 was significantly up compared to the 2018 level of negative EUR 8.2 million. Due to the first-time adoption of IFRS 16, reductions in lease liabilities are classified as financing activities from 2019. In addition, the net outflow results mainly from scheduled repayments and interest payments for existing liabilities to banks. In 2018, the cash outflows mainly included scheduled servicing of existing liabilities to banks

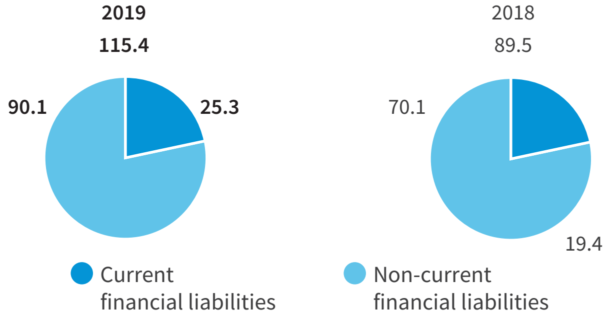
Overall, including the net effect of foreign currency translation on cash and cash equivalents of negative EUR 0.5 million (2018: positive EUR 0.2 million), cash and cash equivalents decreased by EUR 8.4 million in 2019, from EUR 62.7 million at year-end 2018 to EUR 54.3 million at the end of 2019, after an increase of EUR 4.3 million in the prior year.

Financing and liquidity

ADVA's financial management is performed centrally by ADVA Optical Networking SE. Its objective is to provide sufficient funds to ensure ongoing operations and to support the group's projected growth. Beyond the strong equity base appropriate for the business, ADVA finances its business by means of liabilities with maturities typically exceeding the life of the assets being financed. For any liability taken, ADVA is focused on minimizing related interest cost, as long as access to funds is not at risk. Excess funds are generally used to redeem liabilities.

FINANCIAL LIABILITIES

(on December 31, in millions of EUR)



Due to the first-time adoption of IFRS 16, current and non-current lease liabilities totaling EUR 34.4 million are included in financial liabilities in 2019. As a result, financial liabilities have increased significantly by EUR 25.9 million to EUR 115.4 million at the end of 2019. While current liabilities to banks remained largely stable at EUR 19.2 million, non-current liabilities to banks fell to EUR 61.8 million at the end of December 2019 due to scheduled repayments.

In 2019, a new bullet loan of EUR 10.0 million was taken out with Deutsche Bank. This loan is due for repayment in one amount in the third quarter of 2022.

All financial liabilities were exclusively denominated in euro at the end of 2018 and 2019.

On December 31, 2019, the group had available EUR 10.0 million (on December 31, 2018: EUR 10.0 million) of undrawn committed borrowing facilities.

Further details about the group's financial liabilities can be found in note (17) to the consolidated financial statements.

NET DEBT

Net debt represents one of the four key performance indicators for the group. As a result of the first-time inclusion of lease liabilities, ADVA's net debt deteriorated significantly by EUR 34.3 million to EUR 61.1 million at the end of 2019. Excluding the effects of IFRS 16, net debt would have amounted to EUR 26.7 million. Cash and cash equivalents of EUR 54.3 million on December 31, 2019, and of EUR 62.7 million on December 31, 2018, were invested mainly in EUR, USD and in GBP. At year-end 2019 and 2018, access to EUR 0.2 million and EUR 0.3 million of cash and cash equivalents was restricted, respectively.

Net debt as of December 31 is calculated as follows:

(in millions of EUR)	2019	2018
Liabilities to banks		
current	19.2	19.4
non-current	61.8	70.1
Lease liabilities		
current	6.1	n/a
non-current	28.3	n/a
Cash and cash equivalents	-54.3	-62.7
Net debt	**61.1**	**26.8**

As of December 31, ADVA reports liquidity ratios as follows:

		2019	2018
Cash ratio	Cash and cash equivalents / Current liabilities	0.34	0.43
Quick ratio	Monetary current assets* / Current liabilities	0.95	1.11
Current ratio	Current assets / Current liabilities	1.69	1.77

* Monetary current assets are defined as the sum of cash and cash equivalents, short-term investments and securities and trade accounts receivable.

Return on capital employed (ROCE)

Return on capital employed in 2019 was at 3.3%, down from 4.8% reported in 2018. The decrease is mainly due to the lower operating result as well as a EUR 57.1 million increase in capital employed in 2019.

(base data in millions of EUR)	2019	2018
Operating income	12.0	15.0
Average total assets*	517.6	472.7
Average current liabilities*	151.2	163.4
ROCE = Operating income / (Ø total assets – Ø current liabilities)	**3.3%**	**4.8%**

* Arithmetic average of five quarterly period-end values (Dec. 31 of the prior year and Mar. 31, Jun. 30, Sep. 30 and Dec. 31 of the year).

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Summary: Net assets and financial position

ADVA's net assets and financial position deteriorated in 2019, mainly due to the first-time adoption of IFRS 16 and the associated recognition of rights-of-use assets and lease liabilities as well as the decline in cash and cash equivalents.

Transactions with related parties

Transactions with related individuals and legal entities are discussed in notes (40) and (41) to the consolidated financial statements.

Performance of ADVA Optical Networking SE

In addition to reporting on the ADVA Optical Networking group, the following sections provide information on the performance of ADVA Optical Networking SE.

ADVA Optical Networking SE is the parent company of the group and performs the group's management and corporate functions. It takes on major group-wide responsibilities such as finance and accounting, corporate compliance and risk management, strategic and product-oriented R&D activities as well as corporate and marketing communications worldwide.

ADVA Optical Networking SE's individual financial statements are prepared in accordance with the German Commercial Code. The complete individual financial statements are published separately.

Branch offices and organization

The company maintains its registered office in Meiningen, Germany. This is also the location of the main production and development facility of the company (364 employees at year-end 2019). Branch offices are located in Berlin, focusing on software development of the company's products (44 employees) and in Martinsried/Munich, where the company maintains its headquarter with all central functions and the sales and marketing organization (135 employees). On December 31, 2019, further branch offices were located in Hanover, Germany (ten employees), Courtaboeuf/Paris, France (18 employees), Madrid, Spain (two employees), Helsinki, Finland (one employee), Grottaferrata/Rome, Italy (14 employees), Vienna, Austria (two employees), Zurich, Switzerland (two employees), Dubai, United Arab Emirates (one employee) and Centurion/Pretoria, South Africa (five employees). ADVA is organized according to functional areas across all international locations.

Operational performance

In 2019, ADVA Optical Networking SE generated revenues of EUR 359.3 million, an increase of 10.4% compared to prior year's revenues of EUR 325.5 million.

EMEA continued to be the most important sales region in 2019, followed by the Americas and Asia-Pacific. EMEA revenues increased by 14.4% from EUR 214.9 million in 2018 to EUR 245.9 million in 2019, representing 68.4% of total revenues after 66.0% in 2018. This is primarily due to very good demand from network operators. At the same time, business with residential customer networks also developed very well. ADVA is traditionally strong in this region, using its mature partner strategy and achieving good results thanks to a broad and loyal customer base. In the Americas, revenues increased by 16.6% from EUR 66.3 million in 2018 to EUR 77.3 million in 2019. Similar to EMEA, demand from network operators in America was very strong and there were numerous successful projects with large companies. The corresponding share of total annual revenues increased from 20.4 % to 21.5%. In the Asia-Pacific region, revenues decreased by 18.3% from EUR 44.3 million in 2018 to EUR 36.1 million in 2019. The region is predominated by project-based business, leading to greater fluctuations in individual quarters. In addition, there were regulatory uncertainties with one large customer, so that major revenue losses were also recorded over the year. The Asia-Pacific region comprised 10.1% of total revenues in 2019 after 13.6% in 2018.

Cost of goods sold increased from EUR 201.8 million in 2018 to EUR 222.0 million in 2019. The corresponding share in total revenue of 61.8% remained almost unchanged compared to 2018 (62.0%).

Gross profit increased from EUR 123.7 million or 38.0% of revenues in 2018 to EUR 137.3 million or 38.2% of revenues in 2019. The development of the gross margin is impacted by variations in regional revenue distribution and in product and customer mix.

Due to higher Intercompany recharges selling and marketing expenses increased from EUR 32.3 million in 2018 to EUR 38.6 million in 2019. General and administrative expenses increased to EUR 15.2 million from EUR 14.7 million in 2018. Considering the increase in capitalization of development expenses from EUR 31.9 million in 2018 to EUR 42.4 million in 2019, research and development expenses totaled EUR 91.8 million or 25.6% from revenues compared to EUR 91.6 million or 28.1% from revenues in the prior year. Other operating result (other operating income less other operating expenses) increased because of lower foreign currency translation losses, to EUR 1.6 million from EUR 0.6 million in 2018.

The company generated a net loss after tax of EUR 6.3 million in 2019, compared to a net loss after tax of EUR 14.5 million in 2018.

Summary: Business development and operational performance

Overall, the business development and operational performance developed positively, mainly driven by an increase in revenues.

Net assets and financial position

ADVA Optical Networking SE's balance sheet total decreased by EUR 20.3 million from EUR 335.5 million at year-end 2018 to EUR 315.2 million at year-end 2019. Non-current assets decreased from EUR 199.9 million to EUR 171.7 million on December 31, 2019, representing 54.5% of total assets after 59.6% at the end of the previous year. Current assets increased to EUR 141.6 million from EUR 134.5 million in 2018, representing 44.9% of total assets after 40.1% at the year-end 2018. Within current assets trade accounts receivable declined with EUR 6.8 million, which is mainly attributable to sale of receivables under a new supplier finance agreement. The decline in non-current assets was mainly driven by a decrease in financial assets of EUR 30.4 million to EUR 43.0 million due to loan repayments from affiliated companies.

Mainly due to the net loss reported in the current year, stockholders' equity decreased from EUR 135.0 million at year-end 2018 to EUR 129.9 million at year-end 2019 and represented 41.2% of the balance sheet total after 40.2% at the end of 2018. Liabilities decreased from EUR 168.5 million to EUR 155.1 million. The decrease in liabilities is primarily due to the decrease of liabilities to affiliated companies of EUR 8.5 million and the decrease of liabilities to banks of EUR 8.5 million. This effect was partially offset by an increase in trade accounts payables of EUR 4.2 million. Provisions decreased from EUR 15.2 million in 2018 to EUR 12.7 million in 2019.

Capital expenditures

Total capital expenditures amounted to EUR 51.4 million in 2019 (prior year: EUR 60.0 million). Thereof, EUR 5.7 million (prior year: EUR 4.3 million) were attributable to property, plant and equipment, EUR 43.4 million (prior year: EUR 50.5 million) to intangible assets and EUR 2.3 million to financial assets (prior year: EUR 5.2 million). Investments in property, plant and equipment mainly relate to expenses for measuring and test equipment. Investments in intangible assets mainly relate to the capitalization of development expenses. Financial assets primarily relate to shares in and loans to affiliated companies.

Liquidity

The development of cash and cash equivalents is analyzed as follows:

(in millions of EUR)	**2019**	**2018**
Operating cash flow	32.4	39.9
Investing cash flow	-20.0	-29.2
Financing cash flow	-8.8	-6.8
Net change in cash and cash equivalents	**3.6**	**3.9**
Cash at banks and in hand at the beginning of the year	11.3	7.4
Cash and cash equivalents at the end of the year	**14.9**	**11.3**

During 2019 and 2018, the company was able to meet all payment obligations.

Cash and cash equivalents of EUR 14.9 million on December 31, 2019, and of EUR 11.3 million on December 31, 2018, were denominated mainly in EUR and USD. Due to the increase in cash and cash equivalents and the decrease in liabilities to banks in 2019, ADVA Optical Networking SE's net debt decreased from EUR 78.7 million in 2018 to EUR 66.6 million in 2019.

Financing

Liabilities to banks decreased from EUR 90.0 million at year-end 2018 to EUR 81.5 million at the end of 2019. In 2019, the company took out a bullet loan of EUR 10.0 million with a 3-year term. All financial liabilities were exclusively denominated in EUR at the end of 2018 and 2019. Further details about the financial liabilities can be found in notes (17) and (35) of the consolidated financial statements.

On December 31, 2019, the company had available EUR 10.0 million (on December 31, 2018: EUR 10.0 million) of undrawn committed borrowing facilities in respect of which all conditions had been met.

The following table provides an overview of the maturity of each financial liability at year-end 2019:

		Maturity		
(in millions of EUR)		≤ 12 months	13 – 36 months	> 36 months
Loans of IKB Deutsche Industriebank	3.7	3.7	-	-
	6.3	6.3	-	-
	2.5	2.5	-	-
Loan of Deutsche Bank	10.0	-	10.0	-
Syndicated loan	59.0	6.7	29.3	23.0
Total financial liabilities	**81.5**	**19.2**	**39.3**	**23.0**

Dividend payments

In 2019 there were no dividend payments for 2018 (prior year: nil for 2017). ADVA Optical Networking SE does not plan to pay out a dividend for 2019.

Summary: Net assets and financial position

The net assets of ADVA Optical Networking SE developed negatively in 2019, whereas the net liquidity developed positively in the same period.

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Events after the balance sheet date

There were no events after the balance sheet date that materially impacted the net assets and financial position of the group and ADVA Optical Networking SE on December 31, 2019, or the groups and the company's financial performance for 2019. Similarly, there were no events considered material for disclosure.

Disclosures under takeover law in accordance with Section 289a (1) HGB and Section 315a (1) HGB

Share capital and shareholder structure

On December 31, 2019, ADVA Optical Networking SE had issued 50,181,966 no-par value bearer shares (December 31, 2018: 49,930,955). The common shares entitle the holder to vote at the Annual Shareholders' Meeting and to receive dividends in case of a distribution. No restrictions are attached to the common shares. No other class of shares had been issued during the reporting period.

At year-end 2019, EGORA Holding GmbH held a total of 7,456,749 shares or 14.86% of all ADVA Optical Networking SE shares outstanding (at year-end 2018: 7,456,749 shares or 14.93% of all shares outstanding). 5,930,902 of these shares or 11.82 % of all shares outstanding (at year-end 2018: 5,930,902 shares or 11.88% of all shares outstanding) were held by EGORA Ventures GmbH, a 100% subsidiary of EGORA Holding GmbH, and the remaining 1,525,847 shares or 3.04% of all shares outstanding (at year-end 2018: 1,525,847 shares or 3.05% of all shares outstanding) were held directly by EGORA Holding GmbH. Both EGORA companies have their registered offices in Fraunhoferstrasse 22, 82152 Martinsried/ Munich, Germany. Additionally, at year-end 2019, Teleios Capital Partners LLC, registered office Baarerstraße 12 in 6300 Zug, Switzerland, held 11,217,927 shares or 22.36% of all ADVA Optical Networking SE shares outstanding (at year-end 2018: 10,104,243 shares or 20.23%). No other shareholder has filed with the company to have held more than 10% of the company's shares outstanding on December 31, 2019. Further details on share capital and shareholder structure are disclosed in note (22) to the consolidated financial statements.

Restriction of voting rights and share transfers

At year-end 2019, the management board of ADVA Optical Networking SE had no knowledge of any restrictions related to voting rights or share transfers.

Appointment and dismissal of management board members

The appointment and dismissal of members of the management board of ADVA Optical Networking SE follows the direction of the German Stock Corporation Act (Aktiengesetz, AktG), the German SE Implementation Act (SE-Ausführungsgesetz, SEAG) as well as the provisions in section 6 of the company's current articles of association as of June 6, 2019. According to these articles, in principle the supervisory board appoints the members of the management board and does so for a maximum period of five years. However, it is the company's practice to appoint the members of the management board for two years only. Repeated appointment is possible. According to the company's statutes, the management board of ADVA Optical Networking SE shall regularly consist of two individuals and the supervisory board shall have the right to determine and appoint a higher number of individuals. If the management board consists of more than one individual, the supervisory board may appoint one member of the management board chief executive officer or speaker of the management board, and another member his or her deputy. The supervisory board may revoke an already effective appointment for important reasons. In 2019, no appointments or dismissals of management board members were affected. ADVA Optical Networking SE's management board consisted of Brian Protiva (chief executive officer), Christoph Glingener (chief technology officer), Ulrich Dopfer (chief financial officer) and Scott St. John (chief marketing & sales officer) throughout the year.

Changes to articles of association

Following article 9 SE Regulation in conjunction with section 50 SEAG, amendments to the articles of association of ADVA Optical Networking SE are made pursuant to section 179 AktG in conjunction with Section 133 AktG considering a 75% majority vote, as well as the provisions in section 4 para. 6 and section 13 para. 3 of the current articles of association of the company dated June 6, 2019. Accordingly, in principle any changes to the articles of association other than purely formal amendments need to be resolved by the shareholders' meeting. However, the shareholders' meeting has authorized the supervisory board to change the version of the articles of association in accordance with capital increases from authorized capital and conditional capital.

Issuance and buy-back of shares

The rights of the management board to issue new shares are regulated in section 4 paragraphs 4 and 5k of the articles of association as of June 6, 2019, of ADVA Optical Networking SE. According to ADVA Optical Networking SE's current articles of association, the management board is authorized with approval of the supervisory board to increase the capital stock by up to 24,965,477 new shares from authorized capital, amounting to a total of EUR 24,965,477 against cash or contribution in kind with possible exclusion of subscription rights (authorized capital 2019/I). As of December 31, 2019, the authorized capital amounted to EUR 24,965,477, so that at that time the management board was capable of issuing up to 24,965,477 shares, equating to 49.75% of total shares outstanding. In addition, as of December 31, 2019, a conditional capital of EUR 4,993,095 was recorded in the commercial register (conditional capital 2011/I). The conditional capital can only be used for granting stock option rights to members of the management board, to employees of the company and to management and employees of affiliated companies. The conditional capital increase is put into effect only if, when and insofar as the holders of the option rights exercise these rights. 251,011 new shares were already created in 2019 as a result of the exercise of stock options but will only be registered in the trade register after the balance sheet date. Thus, the number of shares that can be issued by the management board from the conditional capital is reduced to 4,742,084.

At year-end 2019, the management board was authorized to buy back up to a total of 10.0% of the existing share capital at the time of resolution by the Annual Shareholders' Meeting or – if this value is lower – at the time the authorization will be exercised. This right was granted to the management board until May 21, 2024, by a resolution of the shareholders' meeting on May 22, 2019. Shares bought back may be used for all legally permitted purposes, in particular as consideration for the acquisition of companies, parts of companies or investments in companies, for issuing stock to employees of the company or affiliated companies, for serving share subscription rights from the company's stock option plans, and for redeeming the shares pursuant to the legal provisions.

Takeover bid-driven change of control provisions

At year-end 2019, a bilateral loan with redemption value of nominally EUR 6.3 million (repayable in 16 equal quarterly installments since March 2017), a bilateral loan with redemption value of nominally EUR 2.5 million (repayable in 16 equal quarterly installments since March 2017), a bilateral loan with redemption value of nominally EUR 3.8 million (repayable in 12 equal quarterly installments since March 2019), a bilateral loan with redemption value of nominally EUR 10.0 million (repayable on the final due date), and a syndicated loan with a redemption value of nominally EUR 59.0 million (repayable in half-yearly installments as well as a final installment on the due date from June 2019), respectively, are part of ADVA Optical Networking SE's financial liabilities. In addition, the syndicated loan has an undrawn credit line of EUR 10.0 million at the reporting date. In the event of a potential takeover bid-driven change in control of ADVA Optical Networking SE, the creditors have the right to terminate these loans with immediate effect.

As of December 31, 2019, for the event of a takeover bid-driven change in control there have been no recourse agreements in place with any of the members of the management board or with any of the group's employees.

Declaration on corporate governance and corporate governance report

Compliance with the rules of proper corporate governance is of great importance to ADVA - it is the foundation for the group's success. According to section 289f and § 315d of the German Commercial Code (Handelsgesetzbuch, HGB), ADVA Optical Networking SE is obliged to publish a "declaration on corporate governance", and section 161 of the German Stock Corporation Act (Aktiengesetz, AktG) in connection with section 3.10 of the German Corporate Governance Code as amended on February 7, 2017, recommends that management board and supervisory board shall prepare a "corporate governance report". In order to facilitate public access to all respective data, ADVA integrates the "declaration on corporate governance" and the "corporate governance report" into one single publication on its website www.adva.com (About-us / Investors / Corporate-Governance).

Definition of aims and terms for the rise of the women portion in the supervisory board, the management board and in both leadership levels below the management board

Following the entry into force of the "Law on Equal Participation of Women and Men in Management Positions in the Private and Public Sector" (FüPoG), the supervisory board of ADVA Optical Networking SE had set a target of 33.33% for the company's supervisory board, and a target of 0% for the management board of the company, both to be achieved by June 30, 2017. As of June 30, 2017, the proportion of women on the supervisory board of ADVA Optical Networking SE has been 33.33% and on the management board 0%. So, both targets were achieved. For the following period, the supervisory board determined at its meeting on November 15, 2017, that a women's portion of 33.33% on the supervisory board shall be maintained until March 31, 2021, and a women's portion of 0% on the management board until December 31, 2021. As of December 31, 2019, these shares have already been realized.

Following the entry into force of the FüPoG, the management board of ADVA Optical Networking SE had set an 8% women's share for the first management level and a 30% women's share for the second management level below the management board; both to be achieved by June 30, 2017. As of June 30, 2017, the women's portion on the first management level has been 7%, and 32% on the second management level, exceeding the self-imposed target on the second management level, but slightly missing the self-imposed target of the first management level. This was due to an in-house change of a reporting line that lifted a male executive from the second to the first management level; besides that, the management structure and team remained unchanged at both management levels. For the following period, ADVA Optical Networking SE's management board has set a target of 7% for the women's share on the first level of management and of 30% on the second level of management below management board, both to be achieved until June 30, 2022. As of December 31, 2019, the women's portion on the first management level has been 13%, and 33% on the second management level; thus, these shares have already been realized.

Separate nonfinancial report

In order to facilitate public access to all respective data, ADVA decided to publish a separate nonfinancial report on its website www.adva.com (About-us / Sustainability) simultaneously with the publication of the annual report on February 20, 2020.

Remuneration of the management and the supervisory board

The compensation of ADVA's management board members consists of fixed and variable components. In addition to a fixed salary, the members of the management board receive two kinds of variable compensation which are assessed based either on short-term aspects or on long-term criteria focusing on the sustainable development of the group. As additional long-term variable compensation, the management board members receive stock options within the scope of ADVA's stock option program. The variable compensation for the members of the management board includes capped components (short-term variable compensation, long-term variable compensation, newly issued options), and provides upper and lower limits for the four targets of the short-term variable compensation.

In 2019, the fixed salaries of all members of the management board remained unchanged. The short-term variable compensation of all four members of the management board was based on the group's pro forma operating income (40%), the group's revenues (20%), and the group's net debt (20%) as well as individual goals agreed with each member of the management board at the beginning of the year (20%). The short-term variable compensation is determined annually as compensation for the current year at the discretion of the supervisory board. Furthermore, a long-term variable compensation focusing on the sustainable development of the group was agreed which will be paid to the members of the management board after three years, provided that a year-by-year increased minimum group pro forma operating income is met for each of the three years. All members of the management board additionally receive a company car or a car allowance. Moreover, ADVA bears the costs of the directors and officers liability insurance for the management board members, taking into account the statutory deductible amount. These benefits are partially taxable by the members of the management board as non-cash benefits. In addition, ADVA grants stock options to members of the management board. These option rights authorize the members of the management board to purchase a set number of shares in the company once a fixed vesting period has elapsed and the goal to increase the share price by at least 20% has been reached.

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Total management board compensation payable for 2019 and 2018 was EUR 1,695 thousand and EUR 2,099 thousand, respectively. During both years, there were no long-term service contracts in the sense of IAS 19 for any member of the management board. In 2019 and 2018, no loans were granted to the members of the management board. As of December 31, 2019 and 2018, no receivables outstanding from members of the management board have been reported.

Value of benefits granted for the reporting period

	Brian Protiva				Christoph Glingener				Ulrich Dopfer				Scott St. John			
	Chief executive officer				Chief technology officer and chief operations officer				Chief financial officer				Chief marketing and sales officer			
(in thousands of EUR)	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**
Fixed compensation	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253
Fringe benefits	9	11	9	9	14	14	14	14	15	20	15	15	15	20	15	15
Total	**262**	**264**	**262**	**262**	**267**	**267**	**267**	**267**	**268**	**273**	**268**	**268**	**268**	**273**	**268**	**268**
Short-term variable compensation (1 year)	206	221	-	536	146	150	-	380	131	142	-	340	147	142	-	360
Multi-year variable compensation:																
Long-term variable compensation (3 years)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stock option plans (7 years)	-	157	-	-	-	-	-	-	-	-	-	-	-	210	-	-
Total	**468**	**642**	**262**	**798**	**413**	**417**	**267**	**647**	**399**	**415**	**268**	**608**	**415**	**625**	**268**	**628**

Actual contribution for the reporting period

	Brian Protiva				Christoph Glingener				Ulrich Dopfer				Scott St. John			
	Chief executive officer				Chief technology officer and chief operations officer				Chief financial officer				Chief marketing and sales officer			
(in thousands of EUR)	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**	**2019**	**2018**	**2019 (Min)**	**2019 (Max)**
Fixed compensation	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253
Fringe benefits	9	11	9	9	14	14	14	14	15	20	15	15	15	20	15	15
Total	**262**	**264**	**262**	**262**	**267**	**267**	**267**	**267**	**268**	**273**	**268**	**268**	**268**	**273**	**268**	**268**
Short-term variable compensation (1 year)	206	221	206	206	146	150	146	146	131	142	131	131	147	142	147	147
Multi-year variable compensation:																
Long-term variable compensation (3 years)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stock option plans (7 years)	59	-	59	59	59	-	59	59	-	9	-	-	-	-	-	-
Total	**527**	**485**	**527**	**527**	**472**	**417**	**472**	**472**	**399**	**424**	**399**	**399**	**415**	**415**	**415**	**415**

The compensation of the members of ADVA's supervisory board, beyond the reimbursement of out of pocket expenses, only consists of fixed compensation paid out quarterly.

The total compensation payable to the members of ADVA's supervisory board for 2019 and 2018 amounted to EUR 235 thousand, each.

Furthermore, ADVA bears the cost of the directors and officers liability insurance for all members of the supervisory board. During 2019, no loans or advance payments were granted to members of the supervisory board.

Detailed information on the compensation structure of the individual members of the management and supervisory boards can be found in note (41) to the consolidated financial statements.

Employees

On December 31, 2019, ADVA had 1,903 employees worldwide, including 24 apprentices (prior year: 1,886 including 31 apprentices).

On average, ADVA had 1,909 employees during 2019, up from 1,857 in 2018. Furthermore, there were 35 and 24 temporary employees working for ADVA at year-end 2019 and 2018, respectively.

Personnel expenses in the group increased from EUR 173.0 million in 2018 to EUR 187.8 million in 2019, representing 34.5% and 33.7% of revenues, respectively.

On December 31, 2019, ADVA Optical Networking SE had 598 employees, thereof 23 apprentices (prior year: 575 employees, thereof 30 apprentices). This corresponds to an increase of 23 employees or 4.0% versus the end of the prior year.

The breakdown of employees of ADVA SE by functional area is as follows:

(on December 31)	2019	2018	Change
Purchasing and production	155	161	-6
Sales, marketing and service	141	116	+25
Management and administration	95	81	+14
Research and development	184	187	-3
Apprentices	23	30	-7
Total employees	**598**	**575**	**+23**

Personnel expenses in the ADVA SE increased from EUR 46.8 million in 2018 to EUR 50.0 million in 2019, representing 13.9% of revenues in 2019 compared to 14.4% in 2018. The employee compensation packages comprise fixed and variable elements and include stock options. These compensation packages enable employees to participate appropriately in the success of the group, and support employee retention, while at the same time rewarding individual efforts, teamwork, innovation and productivity. Furthermore, employees who perform exceptionally well, or who make suggestions for significant improvements are recognized through the group's spot award program. In addition, the group is committed to offering all employees comprehensive on-the-job training, as well as specific continuing education opportunities in order to advance their personal and professional development.

The group offers different types of continuing education programs through the ADVA university, based on employee development needs. These needs are identified, documented, and reviewed semi-annually, within an electronic performance appraisal and competency management system.

Within ADVA, all relevant local regulations for health and safety in the workplace are complied with, and in some countries are regularly monitored by independent engineering offices for safety in the workplace.

ADVA is committed to the creation of a workplace free of discrimination and harassment. The group recruits, hires, trains and promotes individuals on all job levels without regard to race, religion, ancestry, sexual orientation, marital status, national origin, age, gender and physical or mental disability. ADVA is committed to a fair and equitable workplace where everyone is a respected and valued member of the team. The group's core values (teamwork, excellence, accountability and motivation) and leadership principles (integrity & honesty, decisiveness and respect) guide employees and managers in all business activities.

An efficient employee representation without trade union ties is in place on a global basis, reflecting the international employee base and overall orientation of the group.

At its main production and development facility in Meiningen, Germany, ADVA currently provides 23 apprenticeship positions, whereof 15 lead to professions as electronic technician for devices and systems, office management assistant and as specialist for warehouse logistics. In Meiningen, Germany, the company is among the most recognized apprenticeship providers for industrial electronics professions in its region. In addition, ADVA offers a dual study program in Germany that provides on-the-job work experience to students pursuing degrees. Currently eight students are trained within this program.

Risk and opportunity report

ADVA's future development offers a broad variety of opportunities. It is however also subject to various risks, which in certain cases could endanger the group's continued existence. The management board has implemented a comprehensive risk management and internal control system that enables the detection of risks in a timely manner and allows the group to take corrective action and to benefit from identified opportunities. An integral aspect of the group's strategy is its ability to anticipate developments in the marketplace and future customer needs. Special emphasis is given to product development, the quality of the group's products and the validation, selection and oversight of key business partners.

"Our strategy is about opening up the edge of the network and delivering intelligence, security and timing accuracy precisely where customers need it."

Risk management system

Since ADVA was founded in 1994, its business has become more diversified. The group markets its products and solutions in part via a variety of distribution partners but has become less dependent over the years due to continued investment in a direct distribution model in core geographies. Beyond focusing on enhancing revenue predictability, a comprehensive risk management system has been established. The risk management system is subject to scheduled reviews by the group's internal audit function.

Being a globally operating company, ADVA implemented its risk management system on the basis of applicable laws and regulations such as Germany's BilMoG and KonTraG and by taking into account common international standards and best practices such as the COSO framework and the ISO 31000 auditing standard. It is closely integrated with supporting management systems such as the group's compliance management system. The management board nevertheless recognizes that a risk management system cannot in all cases prevent the occurrence of events that may cause material damage to the group.

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ADVA's strategic goals are the basis for its risk management system. These goals are organized into four areas, growth and profitability, innovation, operational excellence and people. The strategic goals are reviewed by the management board and the supervisory board on a yearly basis and amended where appropriate. They also constitute the basis for the group's three-year business plan, which is reviewed and updated annually. Each of these goals is defined in detail and then broken down into specific departmental and individual targets. The strategic goals are traced to each employee so that every individual can focus and be evaluated on his/her own performance and contribution to ADVA's overall success.

ADVA measures the accomplishment of its strategic goals against revenues, pro forma operating income and net debt as well as the non-financial criterion of customer satisfaction measured by the net promoter score3. These metrics represent the group's key performance indicators. The management board sets target values for all four metrics for the year to come and measures actual values against the target values: revenues and pro forma operating income on a monthly basis, net debt on a quarterly basis and the net promoter score on an annual basis. Corrective action is taken quickly should a deviation from the plan occur or be reasonably predicted to occur. This information is summarized and communicated to the management board in monthly, quarterly and yearly reports.

Moreover, budgets are reviewed on a monthly basis and adjustments are made if necessary. The group's accounting, controlling and treasury departments provide globally consolidated reports on available cash funds and the development of margins and current assets (e.g., inventories and receivables) on a monthly and quarterly basis. These reports also include budgeted, forecasted and actual revenues and expenditures. The structure and content of these reports is continuously adapted to the most current requirements.

ADVA regularly monitors the credit-worthiness of its customers and updates credit limits as needed. Material expenditures and investments must be approved in advance through an electronic purchase order system. In conjunction with continuously updated revenue and cash forecasts, a detailed monthly preview of the anticipated group development within the next three to twelve months is put together and communicated to the management board. Moreover, the group's accounting, controlling and legal departments review potential legal and litigation risks on a quarterly basis in order to obtain a reliable estimate of the potential loss, taking into account all relevant information and expectations. Finally, ADVA's management board discusses all significant business transactions with the supervisory board and obtains its approval if necessary.

In order to ensure observance of all applicable laws and regulations and to support the group's ongoing growth and internationalization, the management board implemented a combined risk management and compliance function. Key compliance measures include a code of conduct, a range of group-wide policies, the training of employees and the active encouragement to report suspected incidents of non-compliance and to seek support when having questions. All implemented measures and processes for risk management as well as compliance are continuously reviewed and improved. In 2019, the group completed the global implementation of its improved processes for risk identification and quantification as started in 2017 and, since then, continuously applied and further refined.

ADVA differentiates between two main categories of risks and opportunities – those considered major and those considered non-material. A risk or opportunity is considered major if its expected net impact on the group's pro forma operating income exceeds EUR 1 million in terms of ADVA's three-year business plan. If not attributable to the pro forma operating income, the group's net income is used as reference. The expected net impact is calculated by multiplying the potential net impact of a particular risk or opportunity with its net likelihood of occurrence.

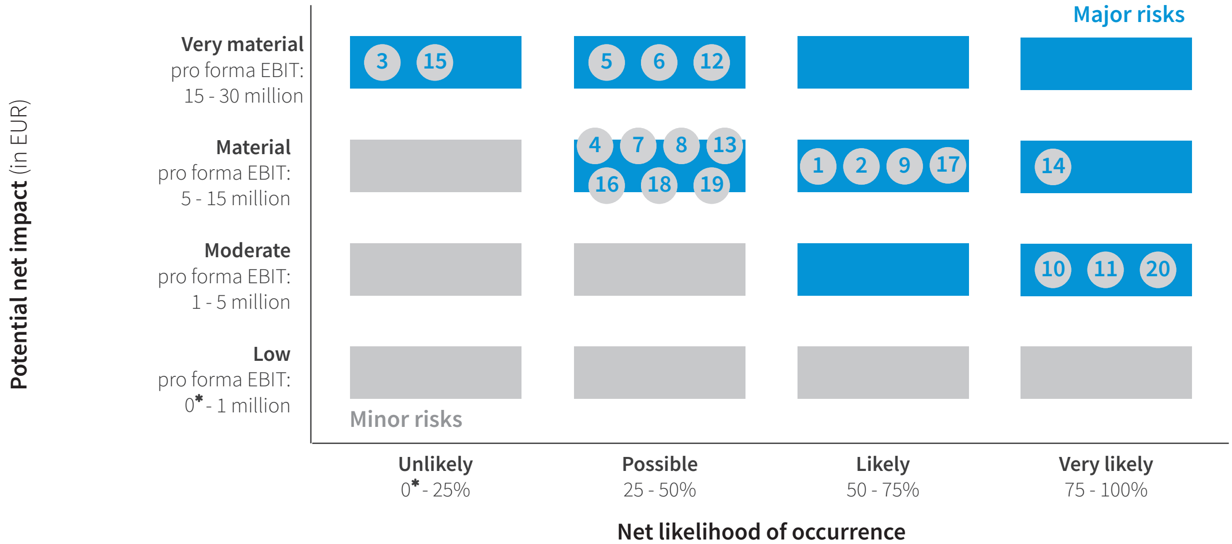
For each major risk, the group assigns a dedicated risk owner who is responsible for defining and implementing an adequate and effective response for risk mitigation. Adherence with this process is monitored by the group's compliance function which conducts structured reviews with each risk owner according to a defined schedule and at a minimum three times per year. Should any such major risk materialize, the assigned risk owner has the responsibility to immediately report this to the management board. Independent of specific risk ownership, all employees of ADVA are asked to escalate additional obvious risk items directly and informally to the group's compliance function and the chief financial officer. Risk identification and reporting is supported by monthly reports and regular webinars in which the management board informs the global management team about the current business development, outlook and goals.

Based on the outlined analytical tools and processes, ADVA ranked 20 risks as major risks at the end of 2019 (end of 2018: 17), which are discussed in detail below.

The risks and opportunities of ADVA Optical Networking SE essentially correspond to those of the group. In addition to the risks listed here, there is also a risk with regard to the recoverability of shares in affiliated companies. ADVA Optical Networking SE does not consider this risk to be material.

Major risks 2020-2022

1 Inadequate go-to-market support
2 Perceived lack of scale or innovation capability
3 Loss of key customers or channel partners
4 Market pricing pressure
5 Wrong product strategy
6 Uncompetitive product cost
7 Uncompetitive products due to delayed release
8 Product hardware design quality and regulatory compliance
9 Product software design quality
10 Alleged IP infringements by ADVA
11 Alleged IP infringements by supplier
12 Supplier and manufacturer quality
13 Supply shortages of critical product components
14 Global tariffs
15 Foreign currency fluctuations
16 Confidentiality of business-sensitive data
17 Compliance violations by intermediaries
18 Bribery
19 Loss of knowledge, skills, relationships and overall capacity
20 Harassment or discrimination claims or proceedings



*Defined minimum thresholds for risk reporting

Growth and profitability risks

INADEQUATE GO-TO-MARKET SUPPORT (LIKELY; MATERIAL)

ADVA operates in an industry characterized by rapid technological change. Examples include the ongoing convergence of Layer 2 and 3 at the network edge, the emergence of new disrupting technologies such as NFV and the growing importance of network synchronization. In order to benefit from such developments, ADVA has substantially increased its product portfolio during the last few years and continuously develops new products and features in order to meet customer requirements. Supporting the market introduction of new and enhanced products and technologies requires significant investments in resources, tools and procedures. Inadequate go-to-market support may result in delays in selling newly developed products and solutions, undermining ADVA's growth and profitability targets.

PERCEIVED LACK OF SCALE OR INNOVATION CAPABILITY (LIKELY; MATERIAL)

Industries and consumers increasingly rely on networks for their daily business operations. As the discussions around 5G illustrate, the strategic importance of networks for societies and nations is ever increasing. As a result, the group's customers are more intently seeking out vendors who offer leading innovation and engagement models, and who have the financial strength and sustainability to deliver on these over the long-term. With ADVA being one of the smaller companies in the network equipment industry, a certain risk arises that customers may have doubts about ADVA's ability to execute on its (product) strategy. Nevertheless, the group's proven track record in meeting this challenge does help to mitigate the risk.

LOSS OF KEY CUSTOMERS OR CHANNEL PARTNERS (UNLIKELY; VERY MATERIAL)

The loss of key customers or channel partners would have significant impact on ADVA's business and may arise from changes in customer demands and the group's ability to meet them, or mergers and acquisitions of existing customers that result in the decision to consolidate vendors and technology partners in a way that either reduces or eliminates ADVA's share of the consolidated entity's spend. However, for most key revenue customers, the group has deployed thousands of systems over a multi-year period which are integrated in operational workflows and processes and, as a result, there is a certain dependency on ADVA and its products. For key customers and channel partners, the group furthermore ensures continuous performance and satisfaction through a dedicated team of professionals.

MARKET PRICING PRESSURE (POSSIBLE; MATERIAL)

Procurement is a key focus area for customers and their cost-saving initiatives. Purchases, especially for multi-year projects, are often conditioned on gradual price decreases. In addition, several products are essentially being commoditized with many competing vendors. The group has many preventive action plans in place. Most important is its focus on innovation. In order to successfully defend higher prices, the group consistently pushes the limits of new technology in its products, improves its processes, and communicates the value, reliability, scalability, cost-effectiveness, performance and technological leadership of its solutions to all of its customers.

Innovation risks

WRONG PRODUCT STRATEGY (POSSIBLE; VERY MATERIAL)

The market for innovative connectivity solutions for cloud and mobile services is highly competitive and subject to rapid technological change. Competition in this market is characterized by various factors, such as price, functionality, service, scalability and the ability of systems to meet customers' immediate and future network requirements. Should ADVA be unable to quickly adapt to changing market conditions, customer requirements or industry standards, the group's development would be impacted negatively. Since some of the group's competitors operate in a broader market and have considerably more resources available due to their greater size, ADVA must continue to focus its efforts on those technologies and features that are expected to supersede the current ones. The likelihood of wrong development decisions is minimized by a series of preventive actions that include running advanced technology projects, running a team of navigators to decide on strategic direction, industry and competitor analysis, keeping the group's development roadmap up-to-date, testing product visions with customers, monitoring and influencing standardization and staying close to customers in order to identify differentiating technology opportunities. In addition, the group has implemented a highly flexible and adaptive development organization and processes to quickly adjust to changing requirements.

UNCOMPETITIVE PRODUCT COST (POSSIBLE; VERY MATERIAL)

ADVA achieves cost advantages through its ability to scale economically and through the optimization of product design. The loss of competitive product cost would drastically reduce the group's success in winning new business and would have a negative effect on gross and operating margins. The significant pricing pressure for innovative connectivity solutions must be met strategically by improving processes, controls and technology while maintaining adequate R&D budgets, as well as operationally by achieving cost leadership in sourcing product components. A dedicated team identifies competitive price and cost targets for new products, monitors product cost changes throughout the development process and negotiates, tracks and forecasts product and related component costs. Achievement of the group's annual cost reduction targets for sourcing components is supported by monthly and quarterly status reports to the group's management board.

UNCOMPETITIVE PRODUCTS DUE TO DELAYED RELEASE (POSSIBLE; MATERIAL)

High competition and rapid technological change are the decisive characteristics of the market for innovative connectivity solutions for cloud and mobile services. Continuous success not only requires the identification of innovative solutions for future network and customer requirements by maintaining cost leadership, but to also release such innovations at the projected time as delays may undermine their competitiveness. As a result, ADVA implemented a joint development and operations organization ("DevOps") clustered into technology value streams in order to maximize effectiveness and break up barriers. All value streams operate according to one common tool-supported development process.

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PRODUCT HARDWARE DESIGN QUALITY AND REGULATORY COMPLIANCE (POSSIBLE; MATERIAL)

Increasing pressure on product development timelines and growing product complexities that need to be supported by limited R&D resources present challenges for product hardware design quality and regulatory compliance. For risk mitigation, the group implemented a tool-supported development process that ensures "design for manufacturability" as well as the application of a meaningful development failure model and effective analysis conducted in alignment with ADVA's Quality Management Department. The aim is to identify and rectify potential flaws in hardware design as early as possible.

PRODUCT SOFTWARE DESIGN QUALITY (LIKELY; MATERIAL)

ADVA develops, manufactures and sells solutions for a modern telecommunication infrastructure. While mostly hardware based, it is increasingly software that drives the product performance and feature set. In order to support ADVA's growth targets by addressing a maximum number of customer needs, the group's limited R&D resources need to support a growing number of features. To enable this, the group applies a software development methodology commonly referred to as "Agile." It is embedded into a tool-assisted development and release process supported by continuous transparency and reporting on the achieved quality levels.

ALLEGED INTELLECTUAL PROPERTY INFRINGEMENTS BY ADVA (VERY LIKELY; MODERATE)

Third parties may assert that ADVA has violated their intellectual property rights and claim license fees, indemnities or a discontinuation of production and marketing of affected products. Related disputes could result in considerable cost to ADVA, while also diverting management and technical resources. For mitigation, the group has implemented adequate guidelines to avoid infringements in the first place. ADVA also uses and continuously extends its own patent portfolio as defense. A dedicated team is available to assess and appropriately act on any asserted intellectual property infringement.

ALLEGED INTELLECTUAL PROPERTY INFRINGEMENTS BY SUPPLIER (VERY LIKELY; MODERATE)

Besides ADVA itself, the group's suppliers may also be approached by third parties claiming intellectual property infringements. As a consequence, the group may be unable to source a particular component as required for its own solutions. To support risk mitigation, ADVA's contract templates include intellectual property provisions that aim to ensure authorized use of third-party intellectual property and to indemnify the group against the resulting damage of any infringement. In addition, multi-sourcing of components is pursued wherever technologically and economically feasible.

Operational excellence risks

SUPPLIER AND MANUFACTURER QUALITY RISKS (POSSIBLE; VERY MATERIAL)

ADVA's product quality is significantly influenced by its suppliers and contract manufacturers. Failure of a single part may cause the whole system to be dysfunctional. Early detection of component as well as production deficiencies is thus critical for the group's success. Deteriorating quality levels could not only lead to delays in installation, return of products or cancellation of orders, but also to penalties and lawsuits, contract terminations and liability claims. Preventive actions to avoid quality deterioration include close collaboration with key suppliers during the development of critical components, structured and tool-based processes for supplier and manufacturer identification and qualification, robust contracting including adequate indemnifications, and regular audits of key suppliers and all manufacturers.

SUPPLY SHORTAGES OF CRITICAL PRODUCT COMPONENTS (POSSIBLE; MATERIAL)

ADVA sources product components either based on forecasts or upon receipt of a customer purchase order. Any shortage in the required material can thus have a significant negative impact on the group's performance. This may be caused by natural disasters, pandemics, political conflicts or specific problems of a supplier. For mitigation, ADVA implemented tool-based processes for demand forecasting as well as the structured identification and consistent monitoring of suppliers, in particular suppliers of single source components. This includes the introduction of alternatives during the design phase of a new product.

GLOBAL TARIFFS (VERY LIKELY; MATERIAL)

During 2019, the US-China trade conflict evolved into more than a dispute over the existing bilateral trade imbalance. It also began to concern future technology leadership and national security questions. In addition, growing trade tensions emerged between the US and the European Union (EU) and these may result in higher tariffs and more non-tariff barriers that could slow down trade on both sides. Much uncertainty also exists with regard to the outcome and aftermath of Brexit and the short- and mid-term implications of the UK's economic growth and trade volume with the EU. With tariffs being increasingly used as a tool to enforce a political agenda, a flexible supply chain and manufacturing process that is less dependable on and can react swiftly in response to political decisions is key for risk mitigation. In 2019, ADVA substantially increased the flexibility of its operations but may nonetheless see a material impact from tariffs and non-tariff barriers in 2020 and beyond.

FOREIGN CURRENCY RISKS (UNLIKELY; VERY MATERIAL)

Due to a major portion of the group's revenues and costs being generated in foreign currencies, ADVA's profit is particularly subject to fluctuations in the EUR/USD, GBP/USD, EUR/ILS and EUR/PLN exchange rates. In 2019, on a net basis, the group realized significant GBP inflows and USD outflows. To combat fluctuations, the USD net cash flows are in part hedged against GBP using forward exchange agreements. The duration of such agreements follows ADVA's communication to the capital markets. Information on the sensitivity of the group's net income to fluctuations in foreign exchange rates is provided in note (34) to the consolidated financial statements.

CONFIDENTIALITY OF BUSINESS-SENSITIVE DATA (POSSIBLE; MATERIAL)

Stolen credit card information, personal data and business data from major companies have become the topic of frequent business headlines. Unauthorized access to the group's information systems and confidential data can not only cause material damage but also result in penalty payments for violating the EU GDPR. ADVA implemented technical and non-technical means to reduce its risk exposure, e.g., by investing in IT security resources and by implementing a variety of hardware, software and process-based risk-mitigating measures.

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People risks

COMPLIANCE VIOLATIONS BY INTERMEDIARIES (LIKELY; MATERIAL)

ADVA markets its products and solutions in part via a variety of distribution partners due to required economies of scale, local (legal) requirements and in order to benefit from existing contractual as well as personal relationships and post-sale support organizations and capabilities. While the group's ability to control the partners' activities are limited, compliance violations by intermediaries may, under specific circumstances, be attributed to ADVA. For mitigation, ADVA implemented robust risk-based due diligence procedures including upfront vetting of new intermediaries and periodic reviews and updates. Furthermore, resale contracts include robust compliance representations. Commission-based setups are tightly controlled and avoided where possible.

"The people in our team are an inspiration. Their passion for going beyond boundaries and exceeding expectation is clear to see."

BRIBERY (POSSIBLE; MATERIAL)

ADVA markets its products and services around the world. In recent years, its customer base and operational setup have become substantially more international. To ensure ethical behavior in all business situations, robust procedures and controls were implemented. If violated, the consequences for the group could be severe, including material fines, the breach of customer contracts and a general loss of reputation. ADVA has a dedicated anti-corruption program in place, which is based on a culture of Integrity and ethical decision making, strong tone from the top and supported by a central compliance department and dedicated regional compliance officers, means for (anonymous) reporting of concerns, tight controls on all financial transactions, continuous and risk-based monitoring of activities and the periodic auditing of all implemented measures through an independent function.

LOSS OF KNOWLEDGE, SKILLS, RELATIONSHIPS AND OVERALL CAPACITY (POSSIBLE; MATERIAL)

Slowing economic growth in the second half of 2019 is not yet having a material impact on global job markets. In addition, the digital transformation is continuing at a rapid pace and has led to a permanent shortage of skilled workers within the technology industry. While particularly intense in developed countries, competition for talent is fierce all over the globe. As a result, the group is continuously challenged to retain and nurture its employees in order not to lose their knowledge, skills and relationships required to develop, sell and maintain the group’s innovative products and solutions.

HARASSMENT OR DISCRIMINATION CLAIMS OR PROCEEDINGS (VERY LIKELY; MODERATE)

ADVA is committed to ensure equal employment opportunities without regard to race, religion, gender and any other protected factor and to prevent any related unwelcome behavior i.e., harassment. The group is proud about its international and diverse setup and employment base, and its open, transparent and respectful culture and management style. While multiple actions are taken to ensure ethical conduct of everyone working for the group globally, there is a high likelihood of alleged or actual violations, which may result in costly legal proceedings for the group, depending on the allegation’s nature, scope and location.

Minor and financial risks

Beyond the discussed 20 major risks, there is a broad range of minor risks that can also have a negative impact on ADVA. These uncertainties include financial risks such as the inability to secure financing, the risk of early maturity of loans due to the breach of material contractual obligations in connection with loan agreements totaling EUR 81.0 million and committed borrowing facilities totaling EUR 10.0 million, impairment of intangible assets and changes in interest rate levels, time risks related to carrier investment cycles and to distribution partnerships, legal risks pertaining to potential claims under product and warranty liabilities, as well as general macro-economic risks and risks related to acquisitions. However, the management board of ADVA does not consider any of these or other uncertainties to be likely and/or to have a major impact on the group.

Changes to the overall risk situation and classified major risks in 2019

During 2019, the number of ADVA’s major risks increased by three mainly due to the continuing adoption and evolution of its improved risk identification and quantification processes. In addition, the previously reported product design quality risk was split into a hardware and a software component in order to more clearly define responsibilities and to increase focus on the related risk mitigation. Finally, the US-China trade conflict evolved into the more general risk of global tariffs. In summary, 15 risks remained largely unchanged, one risk was split into two and three new major risks were added. In addition, the group’s Net Promoter Score decreased to 44% (2018: 52%). Overall, the risk situation remained largely the same as in 2018 as the group’s continued diversification and internationalization helped to balance the outlined changes.

Opportunity identification

The identification of opportunities is largely identical to the processes, tools and concepts as described in the "risk management system" section above. The annual definition of the group’s opportunities is supported by the management board, which has regular discussions with key customers and industry thought leaders in order to identify new opportunities and technological trends. Throughout the group, agile processes maximize the group’s ability to take advantage of newly identified trends. Current major opportunities are as follows:

MARKET SHARE GAIN IN OPTICAL NETWORKING (LIKELY; VERY MATERIAL)

With 25 years of expertise in interconnecting data centers, ADVA is a leading contender in the enterprise DCI space. In addition to broad success with private enterprise networks, the company has gained a lot of traction with communication service providers (CSPs) and internet content providers (ICPs). During 2019, the group successfully trialed and deployed its new TeraFlex™ open terminal in the networks of several customers. The product has a market-leading feature set, and an accelerating commercial ramp of the platform will likely result in an increased market share in optical networking.

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VERTICAL INTEGRATION FOR COMPONENT COST REDUCTIONS AND MARKET EXPANSION (POSSIBLE; MATERIAL)

During 2019, the group unveiled its component engineering efforts on the IC-TROSA and received interoperability approval from the Optical Internetworking Forum (OIF). The investment in component technology allows a higher level of vertical integration and independence from component suppliers, leading to an improved cost base for certain functions. In addition, ADVA benefits from an increase in its total addressable market (TAM) and expects a positive contribution to its consolidated revenues and margins in 2020 and beyond.

ADDITIONAL DEMAND FOR PACKET AND VIRTUAL EDGE CLOUD SOLUTIONS (LIKELY; MATERIAL)

With the rollout of 5G and the emergence of edge computing solutions, service providers are redefining their strategies at the network edge. ADVA invested heavily in expanding the company's cloud access portfolio to empower CSPs in their quest for new revenue streams. As a result, ADVA has the world's most comprehensive portfolio of fiber-based Ethernet access and aggregation solutions that empower industry-leading data connectivity services. In addition to the FSP 150 hardware, it is the company's Ensemble software portfolio with virtual networking solutions that enables CSPs to convert enterprise IT spend into new revenue streams for their managed services. Thanks to NFV, service providers can create and deliver new services quickly anywhere on the globe. Driven by close partnerships with some of the world's leading enterprise IT suppliers, the group sees potential for numerous new customer wins and a higher proportion of software sales in this area.

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STRATEGIC IMPORTANCE OF SYNCHRONIZATION TECHNOLOGY FOR 5G (VERY LIKELY; MATERIAL)

The ongoing expansion of mobile networks towards LTE-Advanced, as well as the accelerating rollout of 5G lead to more stringent requirements for time and frequency synchronization in mobile networks and an increasing demand for high-precision synchronization technology. Following a multi-year product portfolio refresh, ADVA's Oscilloquartz synchronization technology is industry-leading and continues to win competitive tenders. Many Network build-outs nevertheless are multi-year programs that depend on a variety of variables including end-user demand and their willingness to pay for new services. Due to the strategic nature of 5G, the group nevertheless considers it very likely that synchronization technology may provide a materially increased contribution to its revenues and profits in 2020 and beyond.

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NEW MARKETS FOR SYNCHRONIZATION SOLUTIONS (POSSIBLE; MATERIAL)

In addition to the increasing demands of mobile network operators for high-precision synchronization solutions, ADVA's Oscilloquartz technology is also gaining traction in other applications. The synchronization of global databases of internet content providers, time stamping accuracy for financial trading, the synchronization of power grids with decentralized power generation, timing distribution in digital infrastructure deployments and the synchronization of broadcast networks offer additional opportunities for this technology segment.

PORTFOLIO CROSS-SELLING SUPPORTED BY A COMMON NETWORK MANAGEMENT SOFTWARE (VERY LIKELY; MATERIAL)

ADVA operates in three different technology segments: Optical networking solutions, packet and virtual edge cloud solutions and network synchronization solutions. In addition to a wide range of opportunities within every one of these technology segments, the group sees a high likelihood for cross-selling between the technologies as supported by its common network management software. During 2019, ADVA consolidated its previously separate software platforms into one common architecture supporting all technology areas. As this platform is deployed at several hundred of the group's customers which typically have demand for all three technology areas but may only be an existing customer in one or two, material cross-selling opportunities do exist in 2020 and beyond.

INFORMATION SECURITY REQUIREMENTS AND REGIONALIZATION (VERY LIKELY; MATERIAL)

Large companies are concerned about the security of their data and business processes and are therefore building new data protection and storage solutions, which in turn require transmission technology to connect the geographically dispersed sites. In addition, the EU's GDPR, which came into effect in 2018, has led to increased data protection requirements for all companies operating in Europe. In the meantime, the signs of national demarcation are multiplying on the political world stage. In many places, demands for regional solutions are becoming louder. This inevitably affects the technical realization of the cloud as well as the selection of the corresponding equipment suppliers. ADVA is the remaining European specialist in optical transmission technology with a positive reputation amongst its customer base. ADVA's ConnectGuard™ security portfolio provides customers with comprehensive protection in different network scenarios and brings numerous competitive advantages. ADVA, a European company with strong visibility and presence in data center and network operators worldwide expects a positive market environment resulting in solid and profitable growth.

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ADDITIONAL SALES OPPORTUNITIES RESULTING FROM MARKET CONSOLIDATION (LIKELY; MATERIAL)

In 2019, vendor consolidation in the optical networking space continued, e.g., with one of the group's Israel-based competitors being acquired by an US technology company. The takeover further reduces the number of independent companies focusing on optical networking solutions. ADVA is the remaining European specialist for this technology and has established itself as a trusted partner. Through the acquisition of Overture in 2016 and the acquisition of MRV in 2017, the group has contributed to the ongoing industry consolidation and gained more strength and relevance. A consolidated competitive landscape is likely to result in slower market price erosion and new opportunities for ADVA to enter new accounts as a primary or secondary source.

Changes to the overall opportunity situation and the classified major opportunities in 2019

Compared to the previous year, the company believes that its opportunities have slightly increased in all aspects; number, likelihood as well as materiality. Not only the new TeraFlex™ terminal introduced in 2019 but also the group's technology leadership in packet and virtual edge cloud solutions as well as synchronization technology are resulting in a significant potential for further revenues and profitable growth. Coupled with increasing demands driven by information security requirements and regionalization, proven success in cross-selling supported by a common network management software and a consolidated competitive landscape, the group has every reason to look ahead with optimism.

Overall opportunity and risk assessment

Based on careful inspection of the group's opportunity and risk profile at the time of the preparation of the combined management report, the management board of ADVA believes that the group's opportunities in the market for innovative connectivity solutions for cloud and mobile services clearly outweigh the risks identified. The management board has not identified any risks that pose a danger to ADVA's survival or endanger the future of the group. ADVA's overall balance between opportunity and risk is at about the same level as it was at the time of the publication of the 2018 combined management report.

Internal controls related to financial reporting

The management board of ADVA is responsible for establishing and maintaining an adequate system of internal controls. It has implemented an internal control system that enables the management board to ensure completeness, accuracy and reliability of financial reporting at group and legal entity level. When designing its internal control system, ADVA used the COSO framework as a key reference and source of guidance. The internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting. No system of internal control over financial reporting, including one determined to be effective, may prevent or detect all misstatements.

CONTROL ENVIRONMENT

The control environment is the foundation of the internal control system in every organization. ADVA fosters an environment of openness and integrity with a clear commitment to excellence, competence and the development of its employees. The group's leadership principles of integrity/honesty, decisiveness and respect are based on this philosophy, and the culture is reflected in the overall tone set by the management board. ADVA has a clear organizational structure with well-defined authorities and responsibilities. The bodies charged with the governance and control of the group actively participate in the running and steering of the business. The business is managed on a global basis and run via functional areas. Financial steering of the group and financial stewardship for individual legal entities is handled by the chief financial officer, under the audit committee's control.

RISK ASSESSMENT

As part of the internal controls related to financial reporting, the risk assessment follows the process described in the "risk management system" section.

CONTROL ACTIVITIES

At an individual entity level, ADVA's larger and more complex business units use an integrated enterprise resource planning solution, which also serves as general ledger system. Information technology controls have been implemented to restrict user access, ensure proper authorization of changes to the system and efficient handling of user help desk requests. Specific processes are defined and applied for the following reporting cycles in these business units: cash reporting, revenue recognition, accounts payable, capitalization of development expenses and recognition of subsidies for research, inventory reporting, fixed assets, payroll and provisions. ADVA carries out monthly analytical reviews and quarterly balance sheet reviews based on a four-eye principle between the local accounting and the consolidation functions.

For the consolidated financial statements, the balance sheet and income statement positions requiring a significant degree of judgment and estimation when being valued are determined and analyzed with the involvement of management. This is the case for impairment testing reviews (annual or when a triggering event occurs), capitalization of development projects (when the industrialization stage is reached) and tax reporting, specifically deferred taxes (quarterly). ADVA additionally carries out monthly intercompany reconciliations as part of the consolidation process and analytical reviews of actual vs. expected results based on a four-eye principle between the financial planning and the consolidation functions.

All business units follow a set of global accounting policies and reporting guidelines applying to the whole group. The financial statements preparation process is monitored globally via a calendar that is communicated to all involved parties on a monthly basis. Checklists are completed both in the individual business units and at the consolidation level to ensure completeness of all closing steps. Periodic reviews by group management are conducted to detect errors and omissions.

INFORMATION AND COMMUNICATION TOOLS

The internal control system at ADVA is supported by tools to store and exchange information, enabling the management board to make informed business decisions about financial reports and disclosures. The following components ensure proper information and communication for financial reporting:

- Accounting systems for individual entities are matched to the degree of complexity of the business unit. For most entities, an integrated enterprise resource planning system, which also serves as general ledger system, is in place. All local accounts are mapped to the group chart of accounts, which is used group-wide.
- The group consolidation is supported by a database tool which is linked to the enterprise resource planning and financial planning systems via interfaces. The global financial planning system is used extensively in analyzing actual vs. expected results and thus monitoring the results of the consolidation.
- There are global accounting policies for the more complex financial statement positions of the group and a group chart of accounts for all other positions. Accounting policies are updated regularly and are implemented only after a thorough internal review and training.

INTERNAL MONITORING

As part of the ongoing monitoring, the chief financial officer is informed about all material misstatements and control breakdowns at group and business unit level on a quarterly basis in the executive summary to the financial statements. The reporting of deficiencies follows the principles of open and transparent communication. Follow-up is ensured through regular calls where corrective actions are presented.

Internal financial audit

ADVA maintains an internal audit function to regularly assess financial processes and systems.

Based on an annual risk assessment, the internal audit function develops an audit plan proposal for the upcoming year. The proposed plan is presented to, aligned with, and finally ratified by the audit committee. The internal audit function performs internal audit reviews throughout the year according to the audit plan. Audit results are discussed with responsible managers. In case of identified process or system weaknesses, the internal audit function makes recommendations and improvement actions are defined and agreed with the responsible manager(s). The progress of these and their success in removing the identified weaknesses is reviewed by the audit function. The state of internal auditing is reported quarterly to the audit committee and includes feedback about the progress of audits performed versus the audit plan, about the results of terminated audit reviews and about improvements resulting from actions taken.

Outlook

The year 2019 was overshadowed by much geopolitical and economic turmoil, which also had an impact on the network equipment industry. In particular, the trade conflicts between China and the USA influenced global supply and production chains, and the acceptance of the apparently overpowering technology group Huawei has deteriorated further in the western world. At the same time, the digitization of ecosystems continues and investments in a better and newer network infrastructure continue unabated. Industry analysts predict positive growth for several market segments in 2019. According to these estimates*, the addressable market for ADVA has grown by around 6.2%.

* Industry analyst estimates for access, metro and long-haul WDM equipment ("optical") and access switching & routing ("packet edge") relevant to ADVA. Sources: Ovum, "optical networks forecast 2019-2024" published September 2019 and "service provider switching and routing forecast 2019-2024", published June 2019

In 2019, the ADVA group successfully solidified its position in the market and from Q1 onward was able to grow revenues sequentially with increasing pro forma EBIT. The company's outlook for 2020 is positive.

The statements in this chapter apply to the ADVA group as well as to ADVA Optical Networking SE. Further details on the projected market environment up to the year 2024, as well as the resulting opportunities, can be found in the "General economic and market conditions" section and in the "Business overview" section.

In order to ensure sustainable corporate success, ADVA focuses on the following long-term strategic objectives:

- Grow global revenues and profitability through extensive sales and marketing activities, focusing on large customers, new customer acquisition and the service and software business.
- Expand the group's proven innovation leadership and increase market share by meeting strategic customers' demand for innovative connectivity solutions.
- Maintain operational excellence by further focusing on industry-leading processes and best-in-class execution, ensuring product and service quality leadership, improved efficiency and increased overall customer satisfaction.
- Recruit, retain, motivate, educate and nurture the group's employees to sustainably achieve high levels of performance, personal growth and job satisfaction, while keeping employee turnover low.

Looking back at 2019, ADVA made good progress in these strategic elements:

2019 revenues were 10.9% above the 2018 level and thus slightly above the expectations of the management board communicated in the group management report 2018. There, the board aimed for an increase in revenues in the high single-digit percentage range for 2019. In particular a strong Q4 lifted growth in the double-digit percentage range.

In terms of sales, the company was able to report numerous successes. New customers were acquired in all regions and business with existing customers – especially the important large customers – developed very positively. However, a clear margin pressure was felt in almost all areas. The US tariffs for imports of Chinese products mentioned earlier disrupted the group's production and supply chains and led to relocation of production sites, and consequently an increase of production and transport costs as well as higher inventory levels. In addition, the strength of the US dollar against the euro was negative for the group's profitability. In response to this pressure on margins, operating costs were reduced in the second half of the year by reducing staff and discontinuing product lines. Positive effects came, as they had begun to in previous year, from the success of Oscilloquartz synchronization technology. Significantly higher revenues combined with very good profitability increased the contribution to the overall result.

The group's pro forma operating result in 2019 of EUR 24.8 million, or 4.5% of sales, was EUR 1.5 million higher than the EUR 23.3 million reported in 2018. The management board's expectation in the 2018 annual report that the pro forma operating result would reach a mid-single digit level as a percentage of revenues was reached. At EUR 12.0 million, operating profit in 2019 was below the 15.0 million achieved in 2018. The decrease is attributable to extraordinary restructuring expense of EUR 5.7 million.

In terms of innovation leadership, ADVA scored well in all technology areas. The market for cloud access solutions is developing towards higher data rates and the new FSP 150-XG480 with its state-of-the-art 100Gbit/s aggregation technology offers an excellent feature set for the transition from 1Gbit/s to 10Gbit/s services. In addition, the number of customer wins in the area of network functions virtualization (NFV) increased significantly, so that after several years of high development expenditure, the starting signal for profitable sales contributions has now been given. In the market for optical transmission technology, the company successfully ramped the new FSP 3000 TeraFlex™ terminal. With data rates of up to 600Gbit/s per wavelength, the device has been commercially deployed in numerous customer networks. The Oscilloquartz product portfolio for high-precision network synchronization has been expanded in several areas to enable the smooth introduction of 5G, networks. For example, the company has launched the first modular multiband-capable Global Navigation Satellite System (GNSS) receiver for synchronization according to ePRTC and PRTC-B requirements. In connection with the mobile radio evolution, a disaggregated 5G network with edge computing and network slicing functions was also shown for the first time with industrial partners.

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All of the technologies in which the group invests are strategically significant and valuable for advancing global digitalization. ADVA is well-positioned to help customers build and grow their network, capitalizing on the megatrends cloud and mobility, as well as new technology such as edge computing, artificial intelligence, and the internet of things.

In the area of operational processes, ADVA has selectively evolved the very good quality of its processes. The company's innovative, globally standardized process landscape and efficient IT infrastructure had already proven themselves in the acquisitions of 2016 and 2017. In 2019, challenges had to be overcome in the company's supply and production chains. In order to minimize the negative impact of US import duties on Chinese goods, production facilities had to be relocated, transport routes changed and inventories increased. Thanks to these measures, ADVA was able to reduce the effects of the trade conflict, but not completely eliminate them.

Net debt stood at EUR 61.1 million at the end of 2019 and increased significantly year-over-year by EUR 34.3 million. This increase is due to the first-time adoption of IFRS 16 and includes EUR 34.4 million lease liabilities that were not recognized in the 2018 financials. Excluding the effects of IFRS 16, net debt would have amounted to EUR 26.7 million. The expectation of the management board communicated in the group management report 2018 to improve net debt excluding IFRS 16 effects was not met. That was already communicated in the company's nine-month quarterly statement. This is mainly due to the already mentioned effects of the trade conflicts and the associated restructuring expenses and higher R&D investment.

As for customer satisfaction, ADVA uses the net promoter score metric to track progress. The company remained below the value of 52% from the previous year. This is largely due to specific quality problems in 2018, which had caused dissatisfaction but have been resolved since. With 44%, however, the high positive level of at least 40% targeted by the management board was again exceeded. Customer.guru (https://customer.guru/net-promoter-score) - a net promoter score survey and benchmarking tool - provides estimates for ADVA's peer group. According to this portal, ADVA's net promoter score is more than 5% higher than the best score in this peer group.

As expected, the high employee turnover observed in 2018, particularly in North America, was a temporary phenomenon related to the measures following the MRV acquisition in 2017. Thanks to a constructive work environment, extensive further training measures and attractive remuneration models, the group was once again able to generate a high level of motivation among its employees in 2019 and return to the low fluctuation rate that has historically been the norm.

Following the significant increase in revenues in the past financial year, the company is aiming to grow again in 2020. Furthermore, the profitability of the group, measured in terms of the pro forma operating result as a percentage of sales, should continue to increase. The following factors, which are also described in the section "Risk and opportunity report" under "Opportunities," will play a decisive role in this regard:

- The megatrends cloud and mobility and the associated digitalization of ecosystem continue to drive the transformation of communication networks around the globe. The strategic importance of a reliable, global and highly available, secure communication infrastructure is growing, and the new build and expansion of fiber optic-based infrastructure will accelerate even further. Specialists in optical networking and transmission technology such as ADVA will benefit from this development.

"Our technology is transforming the network edge into the cornerstone of service innovation."

- In the access area of the network – especially driven by industrial use cases – new concepts for data processing, storage and transmission are emerging. Edge computing and the virtualization of network functions are changing the business models of network operators and enabling them to provide innovative and customer-optimized services globally. In addition to the FSP 150 product family, it is ADVA's Ensemble software solution that provides additional market differentiation. NFV is driving convergence in the markets for access solutions and expanding ADVA's addressable market. The group sees potential for numerous new customer wins and a higher proportion of software sales in this area.

- Security in information technology is becoming increasingly important and more stringent data protection requirements are impacting on the cloud. The company expects a trend towards regionalization in the technical implementation of data centers and in the selection of the corresponding suppliers. ADVA is the leading European specialist in transmission technology and a reliable partner for thousands of companies. Its ConnectGuard™ security portfolio provides customers with comprehensive protection in different network scenarios and brings numerous competitive advantages. ADVA, as a European company with strong visibility and presence with data center and network operators worldwide, is well positioned in this field.

- The strategic importance of synchronization technology continues to increase. The progressive expansion of mobile networks towards 5G create stricter requirements regarding time and frequency synchronization in networks. ADVA's Oscilloquartz product portfolio is industry-leading, winning numerous sync bid tenders in 2019. In addition, other industry verticals such es energy utilities and media companies are facing increasingly stringent requirements for precision timing and more accurate synchronization, opening new market opportunities for ADVA.

- Industry consolidation has reduced the number of competitors in recent years and the globally dominant network equipment supplier Huawei has started to see political headwinds also outside the United States. As a consequence of the consolidation, ADVA's position and visibility in the market will continue to improve, and the company's profile as a European specialist and reliable partner for innovative network technology is now even sharper.

ADVA is very well-positioned to capitalize on the current and future transformation of networks. The global digitalization of ecosystems, the development and use of artificial intelligence and the internet of things continue to fuel the demand for scalable, secure and ecologically sustainable communication infrastructure. Special investment pressure prevails at the so-called network edge. The edge of the network involves concepts such as edge computing, and it is here there that densification of infrastructure is necessary for the fifth generation of mobile technology (5G). All three of ADVA's technology legs are strategically important in this environment, and the company's product portfolio has many differentiating features.

In addition to the group’s technological competence, it is also increasingly the personality profile of the company that generates positive market resonance. ADVA's brand promise to be a reliable partner for open network solutions, true to the company’s slogan "connecting, extending and assuring the cloud" positions ADVA as an attractive network supplier in key growth markets. The combination of application-optimized innovation, short development and delivery times, a broad and growing customer base and a balanced distribution model differentiates ADVA from comparable companies and leads to a profitable, sustainable business model.

It is currently difficult for ADVA to assess what impact the COVID-19 crisis in China will have on the 2020 financial year. The city of Wuhan is an important center for photonic components and subsystems, and the Chinese government's efforts to contain the crisis will lead to production delays in the global supply chain. It is expected that despite the healthy order backlog, some of the order fulfilment and revenue recognition will shift from Q1 2020 to later quarters. However, with the positive order entry and strong macro-environment, the management board is very confident of further increasing annual revenues and profitability compared to 2019.

Against the background of the above-mentioned factors and taking into account planning parameters such as personnel and currency exchange rates, the management board of the company expects increasing revenues to reach more than EUR 580 million for the year 2020. In addition, the management board is committed to continuing its stringent cost-management discipline and expects above-average growth for products with higher margins. Based on these assumptions, the management board expects pro forma operating profit to increase further and exceed 5% of revenues in 2020. Net debt at the end of 2019 according to IFRS 16 accounting standards was EUR 61.1 million. The aim of the company is to ensure rapid debt relief and consistent compliance with the defined objectives of capital management, which are described in Note (35) to the consolidated financial statements. For the financial year 2020, the management board expects a reduction of the company’s net debt in a single-digit percentage range.

The group will continue to selectively invest in product development, technology and revenue-generating opportunities. In addition, the management board expects, due to the continued focus on innovation, quality and service, that customer satisfaction measured by 2020's net promoter score will once again be at high positive levels of at least 40%. Actual results may differ materially from expectations if risks materialize or the underlying assumptions prove unrealistic. The major risks facing ADVA are discussed in the "Risk and opportunity report" section.

Meiningen, February 18, 2020

Brian Protiva
Christoph Glingener

Ulrich Dopfer
Scott St. John

IFRS consolidated financial statements

Consolidated statement of financial position as of December 31, 2019

(in thousands of EUR)	Note	Dec. 31, 2019	Dec. 31, 2018
Assets			
Current assets			
Cash and cash equivalents	(10)	54,263	62,652
Trade accounts receivable	(11)	96,193	97,936
Contract assets	(13)	654	320
Inventories	(12)	105,355	85,734
Tax assets	(27)	1,857	1,675
Other current assets	(14)	10,918	8,899
Total current assets		**269,240**	**257,216**
Non-current assets			
Right-of-use assets	(15)	31,985	n/a
Property, plant and equipment	(15)	32,622	29,052
Goodwill	(15)	72,023	70,400
Capitalized development projects	(15)	96,169	87,926
Intangible assets acquired in business combinations	(15)	20,864	26,012
Other intangible assets	(15)	3,704	5,512
Deferred tax asset	(27)	6,336	7,315
Other non-current assets	(14)	3,419	3,105
Total non-current assets		**267,122**	**229,322**
Total assets		**536,362**	**486,538**

(in thousands of EUR)	Note	Dec. 31, 2019	Dec. 31, 2018
Equity and liabilities			
Current liabilities			
Lease liabilities	(16)	6,082	n/a
Liabilities to banks	(17)	19,221	19,400
Trade accounts payable	(18)	73,398	63,195
Other provisions	(20)	14,379	15,005
Tax liabilities	(27)	1,686	5,067
Contract liabilities	(21)	12,448	14,061
Refund liabilities	(21)	709	511
Other current liabilities	(18)	31,217	28,337
Total current liabilities		**159,140**	**145,576**
Non-current liabilities			
Lease liabilities	(16)	28,348	n/a
Liabilities to banks	(17)	61,758	70,084
Provisions for pensions and similar employee benefits	(19)	7,756	5,531
Other provisions	(20)	1,380	1,453
Deferred tax liabilities	(27)	12,307	10,828
Contract liabilities	(21)	7,070	6,469
Other non-current liabilities	(18)	2,811	1,956
Total non-current liabilities		**121,430**	**96,321**
Total liabilities		**280,570**	**241,897**
Stockholders' equity entitled to the owners of the parent company	(22)		
Share capital		50,182	49,931
(Conditional capital EUR 4,742 thousand; prior year EUR 4,778 thousand)			
Capital reserve		318,568	316,072
Accumulated deficit		-121,693	-131,371
Net income		7,045	9,678
Accumulated other comprehensive income		1,690	331
Total stockholders' equity		**255,792**	**244,641**
Total equity and liabilities		**536,362**	**486,538**

Consolidated income statement for the period January 1 to December 31, 2019

(in thousands of EUR, except earnings per share and number of shares)	Note	2019	2018
Revenues	(23)	**556,821**	**501,981**
Cost of goods sold		-365,908	-320,253
Gross profit		**190,913**	**181,728**
Selling and marketing expenses		-72,828	-63,569
Thereof net impairment results on financial assets	*(11)*	*-1,131*	*356*
General and administrative expenses		-35,126	-35,024
Research and development expenses		-75,186	-76,588
Other operating income	(24)	4,764	8,949
Other operating expenses	(24)	-534	-507
Operating income		**12,003**	**14,989**
Interest income	(25)	372	219
Interest expenses	(25)	-2,676	-1,627
Other financial gains and losses, net	(26)	-770	-1,096
Income before tax		**8,929**	**12,485**
Income tax benefit (expense), net	(27)	-1,884	-2,807
Net income entitled to the owners of the parent company		**7,045**	**9,678**
Earnings per share in EUR	(31)		
basic		0.14	0.19
diluted		0.14	0.19
Weighted average number of shares for calculation of earnings per share			
basic		50,031,396	49,810,321
diluted		50,520,571	50,234,216

Consolidated statement of comprehensive income

(in thousands of EUR)	Note	2019	2018
Net income entitled to the owners of the parent company		**7,045**	**9,678**
Items that possibly get reclassified to profit or loss in future periods			
Exchange differences on translation of foreign operations		4,483	7,860
Items that will not get reclassified to profit or loss in future periods			
Revaluation of defined benefit plans	(19)	-3,124	-1,993
Total comprehensive income entitled to the owners of the parent company	(22)	**8,404**	**15,545**

Items in the statement above are disclosed net of tax. The income tax relating to each component of other comprehensive income is disclosed in note (22).

In 2019 and 2018, no items were reclassified (recycled) from comprehensive income to profit or loss.

Consolidated cash flow statement

(in thousands of EUR)	Note	2019	2018
Cash flow from operating activities			
Income before tax		8,929	12,485
Adjustments to reconcile income before tax to net cash provided by operating activities			
Non-cash adjustments			
Amortization of non-current assets	(15)	62,191	49,367
Loss from disposal of property, plant and equipment and intangible assets	(15)	1,223	410
Stock compensation expenses	(39)	1,490	1,413
Other non-cash expenses		923	-37
Foreign currency exchange differences		-2,665	1,280
Changes in assets and liabilities			
Decrease (increase) in trade accounts receivable		1,409	-16,819
Decrease (increase) in inventories		-19,621	-4,040
Decrease (increase) in other assets		-2,502	1,334
Increase (decrease) in trade accounts payable		10,203	24,002
Increase (decrease) in provisions		1,423	-6,163
Increase (decrease) in other liabilities		5,572	-521
Income tax paid		-1,684	-2,351
Net cash provided by operating activities		**66,891**	**60,360**

(in thousands of EUR)	Note	2019	2018
Cash flow from investing activities			
Investments in property, plant and equipment	(15)	-16,888	-14,029
Investments in intangible assets	(15)	-43,584	-34,239
Interest received		169	207
Net cash used in investing activities		**-60,303**	**-48,061**
Cash flow from financing activities			
Proceeds from capital increase and exercise of stock options	(22)	1,257	810
Decrease of lease liabilities		-4,488	n/a
Payments received from liabilities to banks	(17)	10,000	75,730
Cash repayment of liabilities to banks	(17)	-18,500	-82,813
Interest paid		-2,801	-1,953
Net cash used in financing activities		**-14,532**	**-8,226**
Net effect of foreign currency translation on cash and cash equivalents		-445	203
Net change in cash and cash equivalents		**-8,389**	**4,276**
Cash and cash equivalents on January 1		62,652	58,376
Cash and cash equivalents on December 31		**54,263**	**62,652**

Details on the preparation of the consolidated cash flow statement are included in note (30).

Consolidated statement of changes in stockholders' equity

	Share capital		
(in thousands of EUR, except number of shares)	Number of shares	Par value	Capital reserve
Balance on January 1, 2018	**49,735,549**	**49,736**	**314,019**
Capital increase, including exercise of stock options	195,406	195	615
Stock options outstanding			1,438
Net income			
Exchange differences on translation of foreign operations			
Remeasurement of defined benefit plans			
Total comprehensive income			
Balance on December 31, 2018	**49,930,955**	**49,931**	**316,072**
Capital increase, including exercise of stock options	251,011	251	1,006
Stock options outstanding			1,490
Net income			
Exchange differences on translation of foreign operations			
Remeasurement of defined benefit plans			
Total comprehensive income			
Balance on December 31, 2019	**50,181,966**	**50,182**	**318,568**

Details on changes in stockholders' equity are presented in note (22).

	Net income (loss) and accumulated deficit	Accumulated other comprehensive income (loss)	Total stockholders' equity entitled to the owners of the parent company
	-131,371	**-5,536**	**226,848**
			810
			1,438
	9,678		9,678
		7,860	7,860
		-1,993	-1,993
	9,678	5,867	15,545
	-121,693	**331**	**244,641**
			1,257
			1,490
	7,045		7,045
		4,483	4,483
		-3,124	-3,124
	7,045	1,359	8,404
	-114,648	**1,690**	**255,792**

Notes to the consolidated financial statements

General information

(1) Information about the company and the group

ADVA Optical Networking SE (hereinafter also referred to as "the company" or "ADVA SE"), Märzenquelle 1-3, 98617 Meiningen, Germany is a Societas Europaea, registered as HRB 508155 at the commercial register in Jena. The management board authorized the consolidated financial statements for the year ended December 31, 2019 for issuance on February 18, 2020.

The ADVA Optical Networking group (hereinafter also referred to as "ADVA Optical Networking", "the group" or "ADVA") develops, manufactures and sells optical and Ethernet-based networking solutions to telecommunications carriers and enterprises to deliver data, storage, voice and video services.

Telecommunications service providers, private companies, universities and government agencies worldwide use the group's systems. ADVA sells its product portfolio both directly and through an international network of distribution partners.

Significant accounting policies

(2) Basic principles for the preparation of the consolidated annual financial statements

The group's consolidated annual financial statements for the financial years ended December 31, 2019, and December 31, 2018, are prepared in accordance with the International Financial Reporting Standards (IFRS) published by the International Accounting Standards Board (IASB), as applicable in the European Union (EU) in consideration of interpretations of the Financial Reporting Interpretations Committee (IFRIC) and the applicable additional German statutory regulations according to § 315e Abs. 1 HGB. The consolidated financial statements have been prepared under the historical cost convention, as modified by the valuation of certain derivative financial instruments and share-based compensation transactions at fair value through profit and loss.

The financial year correlates with the calendar year. The consolidated annual financial statements are presented in euro. Unless otherwise stated, all amounts quoted are in thousands of euro. The balance sheet is separated into current and non-current assets and liabilities. The classification of income and expenses in the income statement is based on their function within the entity. When items on the balance sheet and in the income statement are summarized in the interest of clarity, this is explained in the notes to the consolidated financial statements.

The annual financial statements of the individual subsidiaries of the holding company ADVA Optical Networking SE, as subsumed in the consolidated annual financial statements, are all prepared using the same accounting and valuation policies and the same balance sheet date.

(3) Effects of new standards and interpretations

The accounting policies followed are consistent with these of the prior financial year, except for the adoption of new and amended IFRSs and interpretations (IFRICs) during the year.

STANDARDS, AMENDMENTS AND INTERPRETATIONS APPLICABLE FOR THE FIRST TIME IN 2019

In 2019, following standards and interpretations have been adopted for the first time.

Standard	Topic	First-time adoption*	Expected impact on the financial position and performance
IFRS 16	Leases	Jan. 1, 2019	see note (4)
Amendments to IAS 19	Plan amendment, curtailment or settlement	Jan. 1, 2019	none
Amendments to IAS 28	Long term interest in associates and joint ventures	Jan. 1, 2019	none
Annual improvements 2017	The improvements include changes to: IFRS 3/IFRS 11 – Business combinations/ joint ventures IAS 12 – Income taxes IAS 23 – Borrowing costs	Jan. 1, 2019	none
IFRIC 23	Uncertainty over income tax	Jan. 1, 2019	see note (5)

* To be applied in the first reporting period of a financial year beginning on or after this date.

NEW ACCOUNTING REQUIREMENTS NOT YET APPLICABLE FOR FIRST-TIME ADOPTION

The IASB and the IFRIC have issued further Standards and Interpretations in 2019 and previous years that were not applicable for the financial year 2019. In addition, the first-time adoption is partly still subject to endorsement by the EU.

Standard	Topic	First-time adoption*	Expected impact on the financial position and performance
IFRS 17	Insurance contracts	Jan. 1, 2021	none
IFRS Framework	Revision of the IFRS Framework	Jan. 1, 2020	under review
Amendments to IFRS 3	Definition of a business	Jan. 1, 2020	under review
Amendments to IAS 1 and IAS 8	Definition of materiality	Jan. 1, 2020	under review
Amendments to IFRS 9, IAS 39 and IFRS 7	Reform of interest rate benchmarks (IBOR reform)	Jan. 1, 2020	under review

* To be applied in the first reporting period of a financial year beginning on or after this date.

(4) Changes due to first-time adoption of IFRS 16

On January 1, 2019, IFRS 16 Leases was applied for the first time. An analysis by the group showed that the leases to be accounted for in the future are mainly building and office leases as well as car leases. ADVA capitalized right-of-use assets for these leases using the modified retrospective method and recognized corresponding financial liabilities. Beyond this, there are no multi-component contracts or other contracts that would have to be accounted for in accordance with IFRS 16 and are not planned for the future either.

Upon first-time adoption, the simplification options were used to exclude current and low-value leases from capitalization as right-of-use assets.

Upon initial recognition, the right-of-use assets were adjusted for the lease payments made in advance and deferred in the consolidated balance sheet as of December 31, 2018.

Compared to the previous accounting treatment under IAS 17 the application of IFRS 16 resulted in a decline of EUR 1,209 thousand in net profit for 2019. At the same time, earnings before interest and taxes (EBIT) decreased by EUR 48 thousand and the financial result decreased by EUR 1,161 thousand.

In the consolidated cash flow statement for 2019, payments from IFRS 16 amounting to EUR 4,488 thousand were reported as cash outflows from financing activities, which would have been reported as cash outflows from operating activities previously in accordance with IAS 17.

A weighted average interest rate of 3.2% was applied for the valuation of lease liabilities.

The previous information on future lease obligations can be reconciled to the lease liabilities recognized as of January 1, 2019, as follows:

(in thousands of EUR)	
Commitments for operating leases reported on Dec. 31, 2018	**28,117**
Short-term and low-value leases recognized as expenses on a straight-line basis	-336
Changes due to the consideration of prolongation options of lease contracts	11,474
Interest share considering country-specific marginal interest rate	-2,204
Lease liabilities recognized as of Jan. 1, 2019	**37,051**
thereof: current	*5,366*
thereof: non-current	*31,685*

Further information regarding the corresponding balance sheet items and effects on the performance of the group are shown in notes (15) and (16).

(5) IFRIC 23

The interpretation IFRIC 23 Uncertainty over income tax treatments supplements the provisions of IAS 12 on accounting for effective and deferred taxes with regard to uncertainties over the treatment of particular circumstances and transactions by the tax authorities and courts pertaining to income tax. The interpretation is applicable for financial years beginning on or after January 1, 2019. In particular, IFRIC 23 addresses the question whether uncertain tax treatments should be considered independently or together as well as assumptions for taxation authorities' examinations. IFRIC 23 also provides rules for the determination of taxable profit (tax loss), tax bases, unused tax losses, unused tax credits, tax rates and treatment of changes in facts and circumstances. The tax risk shall be accounted for at the most likely value or expected value. According to IFRIC 23 the valuation method should be based on the approach which provides better predictions of the resolution of the uncertainty. The application of IFRIC 23 does not lead to any changes in the accounting of ADVA's tax risks, since in the past ADVA has been assessing tax risks at a most likely value. In 2019, no tax risks have been accounted for. Accruals for tax risks built in previous years were released due to a positive outcome of the recent examinations by the tax authorities.

(6) Recognition and measurement

INVENTORIES

Inventories are valued at the lower of cost or net realizable value. The cost of purchase is determined by the average method. Production costs include direct unit costs, an appropriate portion of necessary manufacturing overheads and production-related depreciation that can be directly assigned to the production process. Administrative and social insurance charges that can be assigned to production are also taken into account. Financing charges are not classified as part of the at-cost base. The net realizable value is the estimated selling price that could be realized on the closing date in the context of ordinary business activity, less estimated costs of completion and costs necessary to make the sale.

Inventory depreciation covers risks relating to slow-moving items or technical obsolescence. Where the reasons for previous write-downs no longer apply, these write-downs are reversed.

PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment is stated at historic cost less accumulated depreciation and accumulated impairment losses, if any. The present value of the expected cost for the decommissioning of the asset after its use is included in the cost of the respective asset if the recognition criteria for a provision are met.

Subsequent costs are included in the asset's carrying amount or recognized as separate asset only when it is probable that future economic benefits associated with this item will flow to the group and the cost can be measured reliably. All other repairs and maintenance costs are charged to the income statement during the financial period in which they are incurred.

Depreciation on property, plant and equipment is calculated on a straight-line basis over the estimated useful economic lives of the assets as follows:

• Buildings	20 to 25 years
• Technical equipment and machinery	3 to 4 years
• Factory and office equipment	3 to 10 years

No regular depreciation applies for land and similar rights.

Leasehold improvements are capitalized and depreciated over the expected useful life on a straight-line basis.

An item of property, plant and equipment is derecognized upon disposal or when no future economic benefits are expected from its use or disposal. Any gain or loss arising on derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the income statement when the asset is derecognized.

The assets' residual values, useful economic lives and methods of depreciation are reviewed at each financial year-end and adjusted prospectively, if appropriate.

INTANGIBLE ASSETS

Intangible assets acquired separately are measured on initial recognition at cost. The cost of intangible assets acquired in a business combination is their fair value on the date of acquisition. Following initial recognition, intangible assets are carried at cost less any accumulated amortization and any accumulated impairment losses. Internally generated intangible assets, excluding capitalized development costs, are not capitalized, and expenditure is reflected in profit or loss in the year in which the expenditure is incurred.

The useful economic lives of intangible assets are assessed to be either finite or indefinite.

Intangible assets with finite lives are amortized on a straight-line basis over the expected useful economic lives of the assets as follows:

• Capitalized development projects	3 to 5 years
• Intangible assets acquired in business combinations	4 to 9 years
• Software and other intangible assets	3 to 6 years

Intangible assets with finite useful economic lives are assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortization period and the amortization method for an intangible asset with a finite useful life is reviewed at each financial year-end. The amortization expense on intangible assets with finite lives is recognized in profit or loss in the expense category consistent with the function of the intangible asset.

Intangible assets with an indefinite useful life are not amortized. An impairment loss is recognized for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. The useful life of an intangible asset with an indefinite life is reviewed at least annually to determine whether the indefinite life assessment continues to be applicable. If not, the change in the useful life assessment from indefinite to finite is made on a prospective basis. There are no intangible assets with indefinite lives other than goodwill and development projects in progress.

Gains or losses arising from derecognition of an intangible asset are measured as the difference between the fair value less costs to sell and the carrying amount of the asset, and they are recognized in the income statement when the asset is derecognized.

Goodwill

An unlimited useful life is assumed for goodwill acquired in the context of business combinations. Impairment reviews are performed at the cash generating unit level on the balance sheet date or when there is an indication that the goodwill may be impaired in accordance with IAS 36. Impairment losses on goodwill recognized in prior periods are not reversed. See note (15).

Intangible assets acquired in business combinations

Intangible assets acquired in business combinations have a finite useful life. They are recognized at cost and amortized on a straight-line basis over estimated useful economic lives of five to nine years. They are tested for impairment if an indication exists that the recoverable amount of the asset may have decreased.

The breakdown of intangible assets into individual items is included in note (15).

Capitalized development projects
Development expenses for new products are capitalized as development projects if

- they can be unambiguously assigned to these products,
- the products under development are technically feasible and can be marketed,
- there is reasonable certainty that the development activity will result in future cash inflows,
- ADVA intends and is able to complete and use the development project and
- there is the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset.

Capitalized development projects include all costs that can be directly assigned to the development process. Financing charges are capitalized if the development project represents a qualifying asset in the sense of IAS 23.

After initial recognition of a development project as an asset, measurement is at historical cost, less accumulated amortization and impairment. The straight-line method of amortization is used from the start of production through the estimated selling periods for the products developed (generally between three and five years). Completed as well as ongoing development projects are tested for impairment on the balance sheet date or when there is an indication of potential impairment. Impairment losses are recognized if appropriate.

Research costs are expensed as incurred according to IAS 38.

Impairment of non-financial assets
Intangible assets with indefinite useful economic lives are tested for impairment annually and whenever there is an indication for potential impairment, either individually or at the cash generating unit level.

Intangible assets with finite useful economic lives are tested for impairment if an indication exists that the assets may have been impaired. An impairment loss is recognized for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. Prior impairments of non-financial assets (other than goodwill) are reviewed for possible reversal at each reporting date.

GOVERNMENT GRANTS

ADVA recognizes government grants for fixed assets as well as for grants related to research projects.

Government grants are recognized where there is reasonable assurance that the grant will be received, and all attached conditions will be met. When the grant relates to an expense item, it is recognized as income over the period necessary to match the grant on a systematic basis to the costs that it is intended to compensate. Where the grant relates to fixed assets, it is recognized as a reduction of purchase costs and released as a reduction of depreciation expense over the expected useful life of the related asset.

BORROWING COSTS

Borrowing costs directly attributable to the acquisition, construction or production of an asset that necessarily takes a substantial period to get ready for its intended use or sale (qualifying asset) are capitalized as part of the cost of the respective assets. If borrowing costs cannot be directly attributed to the acquisition, construction or production of an asset, an assessment is made on whether general borrowing costs should be recognized that would have been avoided if the asset was not acquired, constructed or produced. All other borrowing costs are expensed in the period they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing of funds.

LEASING

The group leases various properties and cars. Rental contracts are typically made for fixed periods of 3 to 5 years but may have extension options as described below. Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions. The lease agreements do not impose any covenants, but leased assets may not be used as security for borrowing purposes.

Leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the group. Each lease payment is allocated between the liability and finance cost. The finance cost is charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. If a purchase option is considered probable, the amortization period corresponds to the economic life.

Assets and liabilities arising from a lease are initially measured on a present value basis. Lease liabilities include the net present value of the following lease payments:

- fixed payments (including in-substance fixed payments), less any lease incentives receivable
- variable lease payment that are based on an index or a rate
- amounts expected to be payable by the lessee under residual value guarantees
- the exercise price of a purchase option if the lessee is reasonably certain to exercise that option, and
- payments of penalties for early termination of the lease if the exercise of a termination option is considered probable.

The lease payments are discounted using the interest rate implicit in the lease, if that rate can be determined, or the group’s incremental borrowing rate.

Right-of-use assets are measured at cost comprising the following:

- the amount of the initial measurement of lease liability
- any lease payments made at or before the commencement date less any lease incentives received
- any initial direct costs, and
- restoration costs.

Payments associated with short-term leases and leases of low-value assets are recognized on a straight-line basis as an expense in profit or loss. Short-term leases are leases with a lease term of 12 months or less. Low-value assets comprise IT-equipment and small items of office furniture.

Extension and termination options are included in a number of property and equipment leases across the group. These terms are used to maximize operational flexibility in terms of managing contracts. The majority of extension and termination options held are exercisable only by the group and not by the respective lessor.

To optimize lease costs during the contract period, the group sometimes provides residual value guarantees in relation to car leases. The group initially estimates and recognizes amounts expected to be payable under residual value guarantees as part of the lease liability. The amounts are reviewed, and adjusted if appropriate, at the end of each reporting period.

POST-EMPLOYMENT BENEFITS

ADVA maintains defined benefit plans in three countries based on the pensionable compensation of its employees and their length of service. Some of these pension plans are financed through external pension funds. Provisions for pensions are actuarially measured using the projected unit credit method for defined benefit pension plans, taking into account not only the pension obligations and vested pension rights known at the reporting date, but also expected future salary and benefit increases. The interest rate used to determine the present value of the obligations is generally set based on the yields on high-quality corporate bonds or government bonds in the respective currency area. The return on existing plan assets and expenses for interest added to obligations are reported in finance costs. Service cost is classified as operating expenses. Past service cost not recognized due to a change in the pension plan shall immediately be recognized in the period in which the change took effect. Gains and losses arising from adjustments and changes in actuarial assumptions are recognized immediately and in full in the period in which they occur within other comprehensive income. Further details on recognition and measurement of employee benefits is included in note (19).

In addition, ADVA grants defined contribution plans to employees of some group entities in accordance with statutory or contractual requirements. The payments are made to state or private pension insurance funds. Under defined contribution plans, the employer does not assume any other obligations beyond the payment of contributions to an external fund. The amount of the future pension payments will exclusively depend on the contribution made by the employer (and their employees, if applicable) to the external fund, including income from the investment of such contributions. The amounts payable are expensed when the obligation to pay the amounts is established and classified as operating expenses.

SHARE-BASED COMPENSATION TRANSACTIONS

Employees (including senior executives) of ADVA receive remuneration in the form of share-based compensation transactions, whereby employees render services as consideration for equity instruments (equity-settled transactions) or they are granted stock appreciation rights, which are settled in cash (cash-settled transactions). Share-based compensation transactions are reported and valued in accordance with IFRS 2.

Share-based compensation transactions between different entities of ADVA are considered as either equity-settled or cash-settled share-based compensation transactions in the individual financial statements of ADVA Optical Networking SE. The group entities employing the beneficiaries measure the received services as an equity-settled share-based compensation transaction. No repayment arrangements have been set up between the entities of the group.

Equity-settled transactions

The cost of equity-settled transactions with employees is measured by reference to the fair value on the grant date. The fair value is determined by an external expert using an appropriate pricing model. See note (39) for further details.

The cost of equity-settled transactions is recognized, together with the corresponding increase in equity, straight-line over the period in which the relevant employees become fully entitled to the award (vesting date). Vesting date ends with the first exercise possibility. From that day, the employee is entitled to benefit. No expense is recognized for awards that do not ultimately vest, except for awards where vesting is conditional upon market condition, which are treated as vesting irrespective of whether or not market condition is satisfied, if all other performance conditions are satisfied.

Where the terms of an equity-settled transaction award are modified, the minimum expense recognized is the expense as if the terms had not been modified, if the original terms of the award are met. An additional expense is recognized for any modification that increases the total fair value of the share-based compensation transaction or is otherwise beneficial to the employee as measured on the date of modification.

Where an equity-settled award is cancelled, it is treated as if it vested on the date of cancellation, and any expense not yet recognized for the award is recognized immediately. This includes any award where non-vesting conditions within the control of either the entity or the employee are not met. However, if a new award is substituted for the cancelled award and designated as a replacement award on the date that it is granted, the cancelled and new awards are treated as if they were a modification of the original award, as described in the previous paragraph. All cancellations of equity-settled transactions are treated equally.

The dilutive effect of outstanding options is reflected in the computation of earnings per share. See note (31).

Cash-Settled transactions

The cost of cash-settled transactions is measured initially at fair value on the grant date. The fair value is expensed straight-line over the vesting period with recognition of a corresponding provision. The provision is re-measured on each balance sheet date up to and including the settlement date, with changes in the fair value recognized in profit or loss.

PROVISIONS

Provisions are recognized when the group has a present obligation (legal or constructive) as a result of a past event, when it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation. The amount recognized as a provision represents the best estimate of the expenditure required to settle the present obligation.

Where the group expects some or all of a provision to be reimbursed, for example under an insurance contract, the reimbursement is recognized as a separate asset but only when the reimbursement is virtually certain. The expense related to any provision is presented in profit or loss, net of any reimbursement. If the effect of the time value of money is material, provisions are discounted using a current pre-tax rate that reflects, where appropriate, the risks specific to the liability. Where discounting is used, the increase in the provision over time is recognized in other financial gains and losses, net.

COMMON STOCK

Common stock is disclosed in stockholder’s equity.

Incremental costs directly attributable to the issuance of new ordinary shares or options are shown in equity as a deduction, net of tax, from the proceeds.

Where any group company purchases the company’s equity share capital (treasury shares), the consideration paid, including any directly attributable incremental costs, is deducted from equity until the shares are cancelled or reissued. Where such shares are subsequently reissued, any consideration received, net of any directly attributable incremental transaction costs, is included in equity.

FINANCIAL INSTRUMENTS

Financial instruments are contracts that give rise to a financial asset in one entity and a financial liability or equity instrument in another entity. ADVA recognizes financial assets and financial liabilities in the balance sheet when a company in the group becomes a contractual party to the financial instrument.

All customary purchases and sales of financial assets are recognized on the trading date, i.e. the date on which ADVA enters into the obligation to purchase the asset.

Financial assets and financial liabilities are generally reported at gross value. Netting only applies if the offsetting of the amounts is legally enforceable and it is intended to actually offset them. In general, ADVA does not intend to offset any amounts.

Financial assets
ADVA's financial assets include, in addition to trade receivables, cash and cash equivalents, other receivables, other investments and derivative financial instruments.

Classification
Financial assets are initially allocated to one of the following measurement categories in accordance with IFRS 9:

1. measured at amortized cost

2. measured at fair value through profit or loss

3. measured at fair value through other comprehensive income (debt instruments)

4. measured at fair value through other comprehensive income (equity instruments)

Financial assets that are debt instruments according to IAS 32 are classified based on the business model for managing the financial assets and the contractual agreed cash flows. Debt instruments are classified as amortized cost if the business model "hold to collect" applies and contractual cash flows solely consist of principal and interest on the outstanding redemption. If the business model is based on the collection of contractual cash flows as well as on the sale of the instruments, the financial assets are classified at fair value through other comprehensive income (FVOCI). Financial assets held for sale and derivative financial instruments that are not designated as hedges are classified as at fair value through profit or loss (FVTPL).

Debt instruments are reclassified if the business model for managing those assets changes.

Financial assets with embedded derivatives are considered at their entirety when determining whether their cash flows are solely repayment of the principal and interest.

In general, equity instruments are classified as instruments to be measured at fair value through profit or loss. For equity instruments not available for trading purposes, an irrevocable option applies to recognize changes in through other comprehensive income.

ADVA classifies receivables that are not subject to factoring, cash and cash equivalents, and rent deposits as financial assets, which are carried at amortized cost. Trade receivables for which a factoring agreement is in place are classified as financial assets at fair value through profit or loss.

The group has not made use of the option to classify financial assets at fair value through profit or loss upon initial recognition.

Initial measurement
At initial recognition, the group measures a financial asset at its fair value plus, in the case of a financial asset at fair value through other comprehensive income, transactions costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed immediately.

Subsequent measurement
The subsequent measurement of ADVA's financial assets is based on their classification:

1. at amortized cost: Interest income from these financial assets is reported in the financial income using the effective interest method. Gains and losses on derecognition are recorded in the income statement and, considering related foreign currency gains and losses, reported under other operating income and expenses,

2. at fair value through profit or loss: Gains or losses on debt instruments, which are subsequently measured at fair value through profit or loss, are included in the income statement as other operating income or expenses in the period in which they arise.

The group subsequently measures all equity instruments at fair value. Changes in fair value are recognized in other gains (losses) in the income statement as applicable.

For investments in equity instruments that are not held for trading, an irrevocable option to account for the equity investments at fair value through comprehensive income (FVOCI) at the time of initial recognition is available. ADVA has not made use of this option.

Impairment
The group assesses expected future credit losses associated with its debt instruments measured at amortized cost based on future expectations. A respective risk provision or, in case of an actual loss that already occurred, an impairment loss is recognized.

General approach
Generally, financial assets are considered as having a low default risk at initial recognition resulting in a 12-month expected credit loss provision. In case of a significant increase in credit risk, the lifetime expected credit losses are recognized. Amongst others debtor's payment delays of more than 30 days are considered an indicator for increase in default risk.

ADVA assesses expected credit losses using the general approach for cash and cash equivalents and other financial assets, except for trade receivables.

Simplified approach
For trade receivables and contract assets with no significant financing component the group applies the simplified approach, which requires lifetime expected credit losses to be recognized from initial recognition of the receivables.

In order to measure expected credit losses, trade receivables are summarized on the basis of common credit risk characteristics and overdue days. The expected credit losses are based on customers' historical payment behavior for a period of three years as well as on historical defaults. These are reviewed once a year and adjusted to take current and future information on macroeconomic elements (e.g. geopolitical events, currency fluctuations, inflation, trade wars, state subsidies) into account, that have an influence on customers' ability to meet their financial obligations.

Contract assets relate to work in progress that has not been invoiced and bears essentially the same risk characteristics as trade receivables. The group has therefore concluded that the expected loss rates for trade receivables are a reasonable approximation of the loss ratios for contract assets.

Financial assets are considered to be impacted by credit worthiness and are written off if there is objective evidence of impairment. An indication of impairment is, inter alia, if debtor payments are delayed more than two years. If, based on reasonable estimates, it is not expected to receive the respective payment, financial assets are derecognized. One indicator for this is the failure of the debtor to commit to a repayment plan.

Derecognition
ADVA derecognizes financial assets (or parts of their financial assets where applicable) when the rights to receive cash flows from the financial asset have expired or have been transferred and the group substantially transferred all opportunities and risks associated with the ownership. In the case of sales of trade receivables, essentially all opportunities and risks are transferred to the buyer of the receivables.

Financial liabilities
The financial liabilities of ADVA include trade payables, lease liabilities and other liabilities, bank overdrafts, loans and derivative financial instruments.

Classification
Financial liabilities are initially assigned to one of the following valuation categories in accordance with IFRS 9:

1. measured at amortized cost

2. measured at fair value through profit or loss.

The group has not used the option to designate financial liabilities as "at fair value through profit or loss" on initial recognition of financial assets.

Subsequent measurement
The measurement of financial liabilities of ADVA depends on their classification as follows:

1. Financial liabilities at fair value through profit or loss: This category includes derivative financial instruments that are not designated as hedging instruments in accordance with IFRS 9 hedge accounting rules. Gains and losses are recognized in the income statement.

2. Financial liabilities measured at amortized cost: This category includes trade payables and interest-bearing loans. After initial recognition, these are measured at amortized cost using the effective interest method. Gains and losses are recognized in profit or loss when the liabilities are derecognized as well as in case of amortization using the effective interest method. Amortization according to the effective interest method is included in interest expenses in the profit and loss account.

Derecognition
A financial liability is derecognized when the obligation under the liability is settled, cancelled or expired. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, this exchange or modification is treated as a derecognition of the original liability and the recognition of a new liability. In case of minor changes in conditions a change in the present value will be considered in profit or loss.

Derivative financial instruments and hedging activities

The group entered into forward rate agreements to hedge foreign currency exposure of expected future cash flows in foreign currency.

Derivatives are initially recognized at fair value on the date a derivative contract is entered into and are subsequently re-measured to their fair value at the end of each reporting period. The accounting for subsequent changes in the fair value depend on whether the derivative is designated as a hedging instrument.

The group did not apply hedge accounting rules according to IFRS 9 during the years ended December 31, 2019 and 2018. Thus, changes in fair value of the derivatives are recognized in profit or loss immediately.

CONTRACTS WITH CUSTOMERS

Revenue recognition

Revenue is recognized when a performance obligation is satisfied, i.e. when control of the goods or services is transferred to the customer. Control is passed either at a point in time or over time.

When hardware is sold control is transferred at a point in time depending on the delivery terms. Software licenses are either sold together with the hardware or sold separately. Control in case of software is transferred when the customer is able to use the software.

In case of service level agreements or maintenance contracts as well as period-related software licenses revenue is recognized over a period of time provided that further services are to be rendered during the term of the contract. The customer receives and uses all services at the same time as they are provided by the company.

Bill-and-hold arrangements or consignment stores are recognized when the performance obligation to transfer a product are met and the customer obtains control.

Transaction price

In general, the transaction price is the price from the order further considering the specific arrangements of the underlying contract. For contracts that contain multiple performance obligations, the transaction price is allocated to the individual performance obligations based on the relative individual selling price. A consideration to be paid to a customer is recorded as a reduction in the transaction price, hence reducing revenues, unless the payment relates to a specific delivery of goods by the customer or service provided by the customer.

The transaction price from a contract may contain fixed and/or variable components.

With regard to financial components, the practical remedy of not taking into account the effects of a financing component is applied if the maximum duration of the period between transfer of goods or services and payment by the customer does not exceed one year.

The group does not adjust any of the transaction prices for the time value of money.

Contract assets and liabilities

A contract asset is recognized when ADVA has transferred the goods or services. The contract asset is recognized as a receivable if an unconditional payment entitlement of the company exists.

A contract liability is recognized if the company receives the consideration before it has delivered the goods or services. This applies in particular to advance payments for service level agreements and maintenance contracts.

Contract assets and liabilities related to one contract are netted and shown as either contract assets or contract liability.

Volume discounts are incentive programs that offer the customer the option to receive free or discounted goods or services.

In addition, certain customers have the benefit of customer loyalty programs which result in the recognition of a contract liability and reduction of revenues based on the relative individual selling price.

Volume rebates can be identified as incentive programs where the company makes a payment to the customer once a specified sales volume has been achieved with the customer. Volume rebates are not related to separate performance obligations but are considered as a variable component of the transaction price.

Rights of return are considered in the transaction price on the basis of the historical selling price.

The company has made use of the option to recognize all costs in relation to conclude and extend a contract which would be amortized over a period of maximum one year upon activation, directly in profit and loss. This concerns all such costs.

Warranties

Exclusively all warranties are so-called "assurance type" warranties and therefore do not form separate performance obligations. For these essentially legal warranties, accruals according to IAS 37 are considered.

COST OF GOODS SOLD

The cost of goods sold comprises the costs incurred in the production and rendering of services. This item subsumes both the direct cost of materials and production directly assignable to a product and indirect (overhead) costs, including the depreciation of production equipment, amortization of production related intangible assets and write-downs on inventories. The cost of goods sold also includes appropriation to the warranty provision and amortization of purchased technologies. Income from the reversal of write-downs on inventories reduces the cost of goods sold.

INTEREST INCOME AND EXPENSES

For all financial instruments measured at amortized cost, interest income or expenses are recorded using the effective interest rate, which is the rate that exactly discounts the estimated future cash payments or receipts through the expected life of the financial instrument or a shorter period, where appropriate, to the net carrying amount of the financial asset or liability.

TAXES

Current income tax

Current income tax assets and liabilities for the current and prior periods are measured at the amount expected to be recovered from or paid to the taxation authorities. The tax rates and tax laws used to compute the amount are these that are enacted or substantively enacted on the respective balance sheet date.

Deferred income tax

Deferred tax is provided using the liability method on temporary differences at the balance sheet date between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes.

Deferred tax liabilities are recognized for all taxable temporary differences, except:

- where the deferred income tax liability arises from the initial recognition of goodwill or of an asset or liability in a transaction that is not a business combination and, at the time of the transaction, affects neither the accounting profit nor taxable profit or loss; and
- in respect to taxable temporary differences associated with investments in subsidiaries, where the timing of the reversal of the temporary differences can be controlled and it is probable that the temporary differences will not reverse in the near future.

Deferred tax assets are recognized for all deductible temporary differences, carry forward of unused tax credits and unused tax losses, to the extent that it is probable that taxable profit will be available against which the deductible temporary differences, and the carry forward of unused tax credits and unused tax losses can be utilized, except:

- where the deferred tax asset related to the deductible temporary difference arises from the initial recognition of an asset or liability in a transaction that is not a business combination and, at the time of the transaction, affects neither the accounting profit nor taxable profit or loss; and
- in respect of deductible temporary differences associated with investments in subsidiaries, deferred tax assets are recognized only to the extent that it is probable that the temporary differences will reverse in the foreseeable future and taxable profit will be available against which the temporary differences can be utilized.

The carrying amount of deferred tax assets is reviewed on each balance sheet date and reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow all or part of the deferred tax asset to be utilized. Unrecognized deferred tax assets are reassessed on each balance sheet date and are recognized to the extent that it has become probable that future taxable profit will allow the deferred tax asset to be utilized.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply to the year when the asset is realized or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted on the balance sheet date. Future changes in tax rates are recognized on the balance sheet date if their impact is materially certain as part of the tax legislation process.

According to IAS 12.74 deferred tax assets and liabilities have been set off in 2019 insofar as offsetting qualifications apply.

EARNINGS PER SHARE

The group calculates basic and diluted earnings per share in accordance with IAS 33. Basic earnings per share are calculated based on the weighted average number of no- par value shares outstanding during the reporting period. Diluted earnings per share are calculated based on the weighted average number of no-par value shares outstanding during the reporting period, but also including the number of no-par value shares that could come into existence if all stock options were exercised on the balance sheet date.

(7) Significant accounting judgments, estimates and assumptions

The preparation of the group's financial statements requires management to make judgments, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities and the disclosure of contingent liabilities on the reporting date. However, uncertainty about these assumptions and estimates could result in outcomes that could require a material adjustment to the carrying amount of the asset or liability affected in the future. Assumptions used to make estimates are regularly reviewed. Changes in estimates only affecting one accounting period are only taken into account in that accounting period. In the case of changes in estimates that affect the current and future accounting periods, these are taken into account appropriately in the current and subsequent accounting periods.

Discussed below are the key judgments and assumptions concerning the future and other key sources of estimation and uncertainty on the balance sheet date that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year.

DEVELOPMENT EXPENSES

Development expenses are capitalized in accordance with the accounting policy described in note (6). Initial capitalization of costs is based on management's judgment that technological and economic feasibility is confirmed, usually when a product development project has reached a defined milestone according to an established project management model. In determining the amounts to be capitalized, management makes assumptions regarding the expected future cash generation of the assets, discount rates to be applied and the expected period of benefits. See note (15) for the carrying amounts involved.

IMPAIRMENT OF NON-FINANCIAL ASSETS

The group assesses whether there are any indicators of impairment for all non-financial assets on each reporting date. Goodwill and other indefinite life intangibles are tested for impairment annually and at other times when such indicators exist. Other non-financial assets are tested for impairment when there are indicators that the carrying amounts may not be recoverable. When value-in-use calculations are undertaken, management must estimate the expected future cash flows from the asset or cash generating unit and choose a suitable discount rate in order to calculate the present value of these cash flows. See note (15) for the carrying amounts involved.

PENSION OBLIGATIONS

Pension and similar post-employment obligations as well as the related expenses are recognized based on actuarial calculations. The actuarial valuation of the present value of pension obligations depends on a number of assumptions regarding the discount rate, the expected salary increase rate, the expected pension trend, and life expectancy. In the event that changes in the assumptions regarding the valuation parameters are required, the future amounts of the pension obligations as well as the pension benefit costs may be affected materially. For further details on the valuation of pension obligations, see note (19).

SHARE-BASED COMPENSATION TRANSACTIONS

The group measures the cost of equity-settled and cash-settled transactions with employees by reference to the fair value of the equity instruments on the date at which they are granted or on the balance sheet date. Estimating fair value requires determining the most appropriate valuation model for a grant of equity instruments, which is dependent on the terms and conditions of the grant. This also requires determining the expected life of the option, volatility and dividend yield, as well as further assumptions. See note (39) for the carrying amounts involved.

PROVISIONS

Significant estimates are involved in the determination of provisions related to warranty costs and legal proceedings. The estimate of warranty claims is based on historic data and is extrapolated into the future. Legal proceedings often involve complex legal issues and are subject to substantial uncertainties. Accordingly, management exercises considerable judgment in determining whether there is a present obligation as a result of a past event at the end of the reporting period, whether it is more likely than not that such a proceeding will result in an outflow of resources and whether the amount of the obligation can be reliably estimated. Other provisions are described in note (20).

TRANSACTION PRICE FOR CUSTOMER LOYALTY PROGRAMS

Points accumulated for purchases provide a material right to customers that they would not receive without entering into a contract. The transaction price is allocated to the product and the points on a relative stand-alone selling price basis. Management estimates the selling price per point on the basis of the discount granted when the points are redeemed and on the basis of the likelihood of redemption, based on past experience.

LEASES

In determining the lease term, management considers all facts and circumstances that create an economic incentive to exercise an extension option, or not exercise a termination option. Extension options (or periods after termination options) are only included in the lease term if the lease is reasonably certain to be extended (or not terminated).

TAXES

Uncertainties exist with respect to the interpretation of complex tax regulations and the amount and timing of future taxable income. Given the wide range of international business relationships and the long-term nature and complexity of existing contractual agreements, differences arising between the actual results and the assumptions made, or future changes to such assumptions, could necessitate future adjustments to tax income and expenses already recorded. The group establishes provisions, based on reasonable estimates, for possible consequences of audits by the tax authorities of the respective countries in which it operates. The amount of such provisions is based on various factors, such as experience of previous tax audits and differing interpretations of tax regulations by the taxable entity and the responsible tax authority. Such differences of interpretation may arise on a wide variety of issues depending on the conditions prevailing in the respective group company's domicile.

Deferred tax assets are recognized for all unused tax losses to the extent that it is probable that taxable profit will be available to utilize these losses. Significant management judgment is required to determine the amount of deferred tax assets that can be recognized, based upon the likely timing and level of future taxable profits together with future tax planning strategies. See note (27) for the carrying amounts involved.

(8) Principles of consolidation, scope of consolidation and shareholdings

Subsidiaries are all entities over which ADVA Optical Networking SE directly or indirectly has control. Subsidiaries are fully consolidated from the date on which control is transferred to the group. ADVA Optical Networking SE controls an entity when it is exposed to or has the rights to variable returns from its involvement and has the ability to affect those returns through its power to direct the activities of the entity.

Intercompany revenues, expenses, income, receivables and payables within the group are netted.

Intercompany profits that arise from deliveries of products and services provided within the group are eliminated.

BUSINESS COMBINATIONS

Business combinations from January 1, 2010 are accounted for using the acquisition method. The cost of an acquisition is measured as the aggregate of the consideration transferred, measured at acquisition date fair value and the amount of any non-controlling interest in the acquiree. For each business combination, the acquirer measures the non-controlling interest in the acquiree either at fair value or at the proportionate share of the acquiree's identifiable net assets. Acquisition costs incurred are expensed.

When a group company acquires a business, it assesses the financial assets and liabilities acquired for appropriate classification and designation in accordance with the contractual terms, economic circumstances and relevant conditions on the acquisition date. This includes the separation of embedded derivatives in host contracts by the acquiree.

If the business combination is achieved in stages, the acquisition date fair value of the acquirer's previously held equity interest in the acquiree is re-measured to fair value on the acquisition date through profit and loss.

Any contingent consideration to be transferred by the acquirer will be recognized at fair value on the acquisition date. Subsequent changes to the fair value of the contingent consideration that is deemed an asset or liability will be recognized in accordance with IAS 39 either in profit or loss or as a change to other comprehensive income. Subsequent changes in the fair value of contingent considerations that represent an asset or liability are recognized in the income statement in accordance with IFRS 9.

Goodwill is initially measured at cost being the excess of the consideration transferred over the group's net identifiable assets acquired and liabilities assumed. If this consideration is lower than the fair value of the net assets of the company acquired, the difference is recognized in profit or loss after reassessment.

After initial recognition, goodwill is measured at cost less any accumulated impairment losses. For the purpose of impairment testing, goodwill acquired in a business combination is, from the acquisition date, allocated to each of the group's cash generating units that are expected to benefit from the combination, irrespective of whether other assets or liabilities of the acquiree are assigned to those units.

Where goodwill forms part of a cash-generating unit and where part of the operation within that unit is disposed of, the goodwill associated with the operation disposed of is included in the carrying amount of the operation when determining the gain or loss on disposal of the operation. Goodwill disposed of in this circumstance is measured based on the relative values of the operation disposed of and the portion of the cash-generating unit retained.

INVESTMENTS IN ASSOCIATES AND IN JOINT VENTURES

The equity method according to IAS 28 (Investments in Associates) is used to account for investments in entities in which ADVA Optical Networking SE holds 20% to 50% of the voting rights, either directly or indirectly, and over whose operating and financial policy decisions ADVA Optical Networking SE exercises significant influence (associated companies). The investment is initially recognized at cost, and the carrying amount is increased or decreased to recognize the investor's share of the profit or loss generated. The group share of the profit or loss of investments accounted for by the equity method is recognized in the consolidated income statement, whereas the share of changes in the equity of investments accounted for by the equity method that has not been recognized in profit or loss is shown in the reserves of the consolidated equity. In case the group share of losses exceeds the carrying amount of the investment accounted for by the equity method, no further losses are recognized at group level. Goodwill relating to an investment accounted for by the equity method is included in the carrying amount of the investment. Upon loss of significant influence over an associate, the group measures and recognizes any retaining investment at its fair value. Upon loss of significant influence, any difference between the carrying amount of the associate and the fair value of the retaining investment and proceeds from disposal are recognized in profit or loss.

As of December 31, 2019, ADVA Optical Networking has no interests in associates and joint ventures.

SCOPE OF CONSOLIDATION

The consolidated financial statements for the year ended December 31, 2019, include the financial statements of ADVA Optical Networking SE plus all of the 24 (prior year: 23) wholly-owned subsidiaries listed below (hereafter collectively referred to as "the group companies"):

(in thousands)			Equity	Net income/ (loss)	Share in equity owned directly	Share in equity owned indirectly
ADVA Optical Networking North America, Inc., Norcross/Atlanta (Georgia), USA (ADVA Optical Networking North America)	USD	*	133,832	12,624	-	100%
ADVA Optical Networking Ltd., York, United Kingdom (ADVA Optical Networking York)	GBP	**	13,487	-392	100%	-
Oscilloquartz SA, Saint-Blaise, Switzerland, (OSA Switzerland)	CHF	*	2,991	-8	100%	-
ADVA Optical Networking sp. z o.o., Gdynia, Poland (ADVA Optical Networking Poland)	PLN	**	30,425	2,754	100%	-
ADVA Optical Networking Israel Ltd., Ra'anana/Tel Aviv, Israel (ADVA Optical Networking Israel)	ILS	*	-92,265	643	100%	-
ADVA Optical Networking (Shenzhen) Ltd., Shenzhen, China (ADVA Optical Networking Shenzhen)	CNY	**	60,019	5,670	100%	-
Oscilloquartz Finland Oy, Espoo, Finland (OSA Finland)	EUR	*	104	24	100%	-
ADVA IT Solutions Pvt. Ltd., Bangalore, India (ADVA IT Solutions)	INR	*	66,805	-	-	100%
ADVA Optical Networking Trading (Shenzhen) Ltd., Shenzhen, China (ADVA Optical Networking Trading)	USD	*	1,272	116	-	100%
ADVA Optical Networking Singapore Pte. Ltd., Singapore (ADVA Optical Networking Singapore)	SGD	**	3,719	279	100%	-
ADVA Optical Networking Hong Kong Ltd., Hong Kong, China (ADVA Optical Networking Hong Kong)	HKD	**	5,204	813	-	100%
ADVA Optical Networking (India) Private Ltd., Gurgaon, India (ADVA Optical Networking India)	INR	*	136,694	37,260	1%	99%
ADVA Optical Networking Serviços Brazil Ltda., São Paulo, Brazil (ADVA Optical Networking São Paulo)	BRL	*	1,867	208	99%	1%
ADVA Optical Networking Corp., Tokyo, Japan (ADVA Optical Networking Tokyo)	JPY	*	86,881	2,896	100%	-
ADVA Optical Networking AB, Kista/Stockholm, Sweden (ADVA Optical Networking Stockholm)	SEK	**	2,066	164	100%	-
ADVA NA Holdings Inc., Norcross/Atlanta (Georgia), USA (ADVA NA Holdings)	USD	*	60,716	-1	100%	-
ADVA Optical Networking Pty Ltd., Sydney (New South Wales), Australia (ADVA Australia)	AUD	*	1,529	160	-	100%
ADVA Optical Networking B.V., LA Etten-Leur, Netherlands (ADVA Netherlands)	EUR	*	253	15	100%	-
MRV Communications GmbH i. l., Darmstadt, Deutschland (MRV Germany)	EUR	****	-	-3	-	100%
Charlotte's Web Ltd. i. l., Israel	USD	*	-	-	-	100%
NBase Communications Ltd. i. l., Israel	USD	*	10,254	-6,666	-	100%
Jolt Ltd. i. l., Israel	USD	*	-	0	-	100%
NBase Fibronics Ltd. i. l., Israel	USD	*	-1,134	2,612	-	100%
ADVA Canada Inc., Ottawa, Canada (ADVA Canada)	CAD	***	0	n/a	-	100%

* Prepared in accordance with the International Financial Reporting Standards (IFRS) for the financial year ended December 31, 2019.

** Prepared in accordance with local commercial law for the financial year ended December 31, 2018.

*** The entity was legally incorporated in 2019 and will start its operating activities in 2020. The paid-up share capital amounts to CAD 1.

**** Liquidation balance sheet as of September 18, 2019.

CHANGES IN THE SCOPE OF CONSOLIDATION

In November 2019, ADVA Canada Inc. in Ottawa, Canada has been incorporated. There was no operating activity in this entity in 2019.

In 2019, there were no other changes in scope of consolidation.

(9) Foreign currency translation

The functional currency of each group company is the currency of the main economic environment in which the company operates. The reporting currency of ADVA Optical Networking's consolidated financial statements is the functional currency of the parent company, ADVA Optical Networking SE (euro).

Transactions in foreign currencies are initially recorded by the group entities at their respective functional currency rates prevailing on the date of the transaction. Monetary assets and liabilities denominated in foreign currencies are retranslated at the functional currency spot rate of exchange ruling on the reporting date. Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rates on the dates of the initial transactions. Non-monetary items measured at fair value in a foreign currency are translated using the exchange rates on the date when the fair value is determined. The exchange differences arising from the translation are recognized in profit of loss in financial income/expense.

The assets and liabilities of foreign operations are translated into euro at the rate of exchange prevailing on the reporting date, and their income statements are translated at the average rate for the reporting period. The exchange differences arising from the translation are recognized in accumulated other comprehensive income. On disposal of a foreign operation, the component of accumulated other comprehensive income related to that particular foreign operation is recognized in the income statement.

Any goodwill arising on the acquisition of a foreign operation and any fair value adjustments to the carrying amount of assets and liabilities arising on acquisition are treated as assets and liabilities of the foreign operation and translated at the closing rate.

The relevant currency translation rates to euro are listed below:

	Closing rate Dec. 31, 2019	Closing rate Dec. 31, 2018	Average rate Jan. 1 to Dec. 31, 2019	Average rate Jan. 1 to Dec. 31, 2018
AUD	1.5992	1.6215	1.6104	1.5798
BRL	4.5128	4.4427	4.4147	4.3068
CAD	1.4621	n/a	1.4860	n/a
CHF	1.0871	1.1227	1.1127	1.1551
CNY	7.8175	7.8778	7.7329	7.8063
GBP	0.8521	0.9027	0.8775	0.8848
HKD	8.7133	8.9716	8.7717	9.2574
ILS	3.8749	4.3128	3.9913	4.2425
INR	79.8120	80.2255	78.8157	80.6685
JPY	122.1900	126.4000	122.0648	130.3944
PLN	4.2567	4.3028	4.2970	4.2609
SEK	10.4400	10.2773	10.5851	10.2603
SGD	1.5088	1.5642	1.5272	1.5925
USD	1.1189	1.1454	1.1196	1.1812

Notes to the consolidated statement of financial position

(10) Cash and cash equivalents

Cash and cash equivalents include current funds as well as current financial assets with an original remaining maturity that does not exceed three months.

On December 31, 2019 and 2018, cash and cash equivalents include EUR 175 thousand and EUR 334 thousand, respectively, to which ADVA has only limited access.

Moreover, on December 31, 2019, cash of EUR 1,763 thousand (December 31, 2018: EUR 2,759 thousand) is held in China and is subject to local exchange control regulations. These local exchange control regulations provide for restrictions on exporting capital from the country, other than through normal dividends.

Cash at banks earns interest at floating rates based on daily bank deposit rates.

Cash equivalents are invested for varying periods of between one day and three months, depending on the immediate cash requirements of the group, and earn interest at the respective short-term deposit rates.

(11) Trade accounts receivable

Trade accounts receivable are non-interest-bearing and are due within 30 to 120 days in general. For specific projects, other payment terms may be agreed.

Gross and net trade accounts receivable are as follows:

(in thousands of EUR)	2019	2018
Gross trade accounts receivable	**97,884**	**98,574**
Depreciation	-1,691	-638
Net trade accounts receivable	**96,193**	**97,936**

A reconciliation of the risk provision for trade accounts receivable carried at amortized cost is included in the table below:

(in thousands of EUR)	2019	2018
Jan. 1	**638**	**961**
Release of risk provision according to IFRS 9	-204	-356
Addition of specific allowances	1,335	-
Usage	-89	10
Foreign currency translation effects	11	23
Dec. 31	**1,691**	**638**

Further information on default risk from trade accounts receivable is included in note (34) on financial risk management.

The group entered into a supplier finance agreement, whereby it can finance receivables from a specific customer. Credit risks and settlement risks are transferred to the financing institution. The group paid an annual fee amounting to LIBOR plus 0.75% on the volume of receivables transferred. In 2019, the group incurred interest expenses of EUR 303 thousand pertaining to this arrangement (prior year: EUR 119 thousand).

The group entered, into a supplier finance agreement on December 18, 2019, whereby it can finance receivables from a customer. The group paid an annual interest amounting to EURIBOR plus 1.75% on the volume of receivables transferred. In 2019, the group incurred interest expenses amounting to EUR 2 thousand.

On December 31, 2019, trade accounts receivable amounting to EUR 10,321 thousand are included, for which an agreement for the sale of trade accounts receivable exists (December 31, 2018: EUR 4,251 thousand).

(12) Inventories

The table below summarizes the composition of inventories on December 31:

(in thousands of EUR)	2019	2018
Raw materials and supplies	20,547	13,877
Work in progress	3,385	3,271
Finished goods	81,423	68,586
	105,355	**85,734**

In 2019, depreciation of inventories amounting to EUR 5,761 thousand (prior year: EUR 4,751 thousand) was recognized as an expense within cost of goods sold. This amount includes reversals of earlier write-downs amounting to EUR 541 thousand (prior year: EUR 300 thousand) due to higher selling and input prices.

In 2019 and 2018, material costs of EUR 262,633 thousand and EUR 231,385 thousand, respectively, have been recognized.

(13) Contract assets

The contract assets amounting to EUR 654 thousand (prior year: EUR 320 thousand) relate to claims from return deliveries and corrective billing with customers and claims from a service contract with a customer in the USA. In the previous year, this position included only a service contract with one customer in the USA. Contract assets are subject to the impairment requirements of IFRS 9, but the identified impairment losses were insignificant.

(14) Other current and non-current assets

On December 31, other current assets analyze as follows:

(in thousands of EUR)	2019	2018
Non-financial assets		
Prepaid expenses	3,578	2,798
Receivables due from tax authorities	2,231	2,054
Other	2,203	771
Total current non-financial assets	**8,012**	**5,623**
Financial assets		
Government grant allowances for research projects	1,920	2,097
Positive fair values of derivative financial instruments	0	108
Investments for sale	-	393
Other	986	678
Total current financial assets	**2,906**	**3,276**
	10,918	**8,899**

Other current assets are non-interest-bearing and are generally due within 0 to 60 days.

Further disclosures on derivative financial instruments are given in note (33).

On December 31, other non-current assets analyze as follows:

(in thousands of EUR)	2019	2018
Financial assets		
Investments	-	1,374
Government grant allowances for research projects	1,882	275
Other	1,537	1,456
Total non-current assets	**3,419**	**3,105**

In 2019, the investment of 7.1% (prior year: 7.1%) in the shares of Saguna Networks Ltd. Nesher, Israel, held by ADVA Optical Networking SE has been fully impaired as ADVA does not expect the investment to be recoverable.

On December 31, 2019, government grants for seventeen research projects are recognized (December 31, 2018: thirteen research projects). These public grants relate to programs promoted by the EU and national governments.

On December 31, 2019 and 2018, no non-financial non-current assets have been reported.

The classification of financial instruments according to IFRS 9 is included in note (33).

(15) Fixed assets

The following changes in fixed assets were recorded in 2019 and 2018:

	Historical cost						
(in thousands of EUR)	Jan. 1, 2019	Additions	Disposals/ retirements	Reclassifications	Currency translation adjustments	Change in scope of consolidation	Dec. 31, 2019
Finance leases (prior to IFRS 16)	**2,342**	**-**	**-659**	**-**	**0**	**-**	**1,683**
Right-of-use assets							
Leased cars	1,057	1,798	-43	-	26	-	2,838
Leased premises	35,070	695	-1,344	-	1,013	-	35,434
	36,127	**2,493**	**-1,387**	**-**	**1,039**	**-**	**38,272**
Property, plant and equipment							
Land and buildings	16,065	1,637	-37	352	156	-	18,173
Technical equipment and machinery	88,710	12,578	-5,924	267	1,433	-	97,064
Factory and office equipment	15,622	1,861	-1,487	20	353	-	16,369
Assets under construction	683	812	-2	-833	2	-	662
	121,080	**16,888**	**-7,450**	**-194**	**1,944**	**-**	**132,268**
Intangible assets							
Goodwill	116,362	-	-	-	3,160	-	119,522
Capitalized development projects	292,720	42,443	-115,247	-	874	-	220,790
Intangible assets acquired in business combinations	75,097	-	-	-	1,350	-	76,447
Other intangible assets	62,681	1,141	-51	194	150	-	64,115
	546,860	**43,584**	**-115,298**	**-**	**5,534**	**-**	**480,874**
	706,409	**62,965**	**-124,794**	**-**	**8,517**	**-**	**653,097**

Accumulated depreciation								Net book values	
Jan. 1, 2019	Deprecia-tion of the period	Im-pairment of the period	Deprecia-tion on disposals/ retirements	Reclassifications	Currency translation adjustments	Change in scope of consolidation	Dec. 31, 2019	Dec. 31, 2019	Dec. 31, 2018
2,342	-	-	-659	-	0	-	1,683	-	-
-	963	-	-10	-	11	-	964	1,874	n/a
-	5,558	-	-270	-	35	-	5,323	30,111	n/a
-	6,521	-	-280	-	46	-	6,287	31,985	n/a
9,869	1,229	-	-12	-	114	-	11,200	6,973	6,196
69,094	10,502	-	-5,712	-	1,076	-	74,960	22,104	19,616
13,065	1,590	-	-1,467	-	298	-	13,486	2,883	2,557
-	-	-	-	-	-	-	-	662	683
92,028	13,321	-	-7,191	-	1,488	-	99,646	32,622	29,052
45,962	-	-	-	-	1,537	-	47,499	72,023	70,400
204,794	33,484	-	-114,531	-	874	-	124,621	96,169	87,926
49,085	5,663	-	-	-	835	-	55,583	20,864	26,012
57,169	3,202	-	-51	-	91	-	60,411	3,704	5,512
357,010	42,349	-	-114,582	-	3,337	-	288,114	192,760	189,850
451,380	62,191	-	-122,712	-	4,871	-	395,730	257,367	218,902

(in thousands of EUR)	Historical cost Jan. 1, 2018	Additions	Disposals/ retirements	Reclassifications	Currency translation adjustments	Change in scope of consolidation	Dec. 31, 2018
Finance leases (prior to IFRS 16)	**2,460**	**-**	**-118**	**-**	**0**	**-**	**2.342**
Property, plant and equipment							
Land and buildings	15,876	526	-417	3	77	-	16.065
Technical equipment and machinery	79,943	11,248	-3,512	212	819	-	88,710
Factory and office equipment	14,487	1,560	-435	-1	11	-	15,622
Assets under construction	240	695	-	-260	8	-	683
	110,546	**14,029**	**-4,364**	**-46**	**915**	**-**	**121,080**
Intangible assets							
Goodwill	114,310	-	-	-	2,052	-	116,362
Capitalized development projects	261,104	31,872	-	-	-256	-	292,720
Intangible assets acquired in business combinations	72,673	-	-	-	2,424	-	75,097
Other intangible assets	60,150	2,367	-	46	118	-	62,681
	508,237	**34,239**	**-**	**46**	**4,338**	**-**	**546,860**
	621,243	**48,268**	**-4,482**	**-**	**5,253**	**-**	**670,282**

Accumulated depreciation								Net book values	
Jan. 1, 2018	Deprecia-tion of the period	Im-pairment of the period	Deprecia-tion on disposals/ retirements	Reclassifications	Currency translation adjustments	Change in scope of consolidation	Dec. 31, 2018	Dec. 31, 2018	Dec. 31, 2017
2,460	**-**	**-**	**-118**	**-**	**0**	**-**	**2.342**	**-**	**-**
8,935	1,173	-	-338	-	99	-	9,869	6,196	6,941
62,841	8,724	-	-3,187	-	716	-	69,094	19,616	17,102
11,872	1,604	-	-429	-	18	-	13,065	2,557	2,615
-	-	-	-	-	-	-	-	683	240
83,648	**11,501**	**-**	**-3,954**	**-**	**833**	**-**	**92,028**	**29,052**	**26,898**
46,274	-	-	-	-	-312	-	45,962	70,400	68,036
175,929	29,124	-	-	-	-259	-	204,794	87,926	85,175
42,168	5,526	-	-	-	1,391	-	49,085	26,012	30,505
53,870	3,216	-	-	-	83	-	57,169	5,512	6,280
318,241	**37,866**	**-**	**-**	**-**	**903**	**-**	**357,010**	**189,850**	**189,996**
404,349	**49,367**	**-**	**-4,072**	**-**	**1,736**	**-**	**451,380**	**218,902**	**216,894**

Right-of-use assets
From January 1, 2019, lease terms of between 36 and 120 months were applied taking into account the minimum rental periods and contractual extension options. In 2019, depreciation of EUR 963 thousand for vehicles and EUR 5,558 thousand for office and building rentals are included in operating profit.

An amount of EUR 728 thousand, which mainly relates to short-term leases continues to be recognized in operating result. In addition, variable lease payments of EUR 2,560 thousand were not included in the measurement of lease liabilities and are also recognized in operating result. There are no major lease payments related to low value contracts. In the cash flow statement, the cash outflows resulting from these items are included in the cash flow from operating activities.

Further information on the corresponding lease liabilities is provided in note (16).

Property, plant and equipment
The classification and changes in property, plant and equipment are shown in the analysis of changes in fixed assets.

In 2019 and 2018, there were neither impairments nor write-backs of property, plant and equipment impaired in prior years.

Goodwill
The table below shows the composition of goodwill allocated to cash-generating units on December 31:

(in thousands of EUR)	2019	2018
ADVA Optical Networking SE plus	37,991	37,991
ADVA Optical Networking York	6,841	6,841
ADVA Optical Networking North America	24,579	24,579
OSA Switzerland	2,801	2,801
Effect of foreign currency translation	-189	-1,812
	72,023	70,400

Impairment of goodwill
In 2019 and 2018, no impairment of goodwill was recognized.

Key assumptions used in impairment testing
All entities, which are largely capable to generate revenues independently based on own customer relationships and own distribution channels are considered as separate cash-generating units. All dependent development service providing and sales service providing entities are considered together with the ADVA Optical Networking SE in one combined cash-generating unit (ADVA Optical Networking SE plus) as ADVA Optical Networking SE as owner of all technologies is responsible for future developments and utilization. For impairment test purposes goodwill is generally allocated to the cash-generating unit in which the subsidiary is included, on which acquisition the goodwill has been recognized. 61% of the goodwill recognized in the course of the acquisition of Overture Networks Inc. has been allocated to ADVA Optical Networking SE plus and 39% has been allocated to ADVA Optical Networking North America based on fair value of technology and customer relationship at the date of the acquisition. 50% of technologies and 40% of customer relationships recognized in the purchase price allocation as well as 45% of goodwill related to the acquisition of MRV group have been allocated to ADVA Optical Networking North America. Unchanged from prior years, the cash-generating units, to which the corporate assets are allocated, are ADVA Optical Networking SE plus, ADVA Optical Networking York, ADVA Optical Networking North America and OSA Switzerland.

On December 31, 2019 and 2018, the value in use of the goodwill was calculated based on future cash flows (discounted-cash-flow-method). The calculation is most sensitive to the following assumptions:

- Gross margins
- Discount rates
- Raw material prices
- Market share expected

Cash flows include the projected cash flows for the four subsequent years as per the approved budget and four-year planning for gross margins, market share and raw material prices. For further periods, a perpetual income is estimated based on nil growth with inflation offset. The discount rate used for the calculation is a pre-tax rate. It considers the specific risk of each group company and is calculated according to the Capital Asset Pricing Model (CAPM). The cost of equity is composed of a risk-free interest rate and a specific risk mark-up calculated as the difference of the average market rate of return and the risk-free interest rate multiplied with the specific risk related to the company (beta coefficient). The beta coefficient is calculated on a peer group basis. The calculation uses pre-tax discount rates depending on the different cash generating units.

Following pre-tax discount rates have been assumed:

(in %)	2019	2018
ADVA Optical Networking SE plus	10.88	13.70
ADVA Optical Networking York	11.81	14.54
ADVA Optical Networking North America	12.85	19.50
OSA Switzerland	9.71	11.11

Sensitivity analysis
No disclosures on sensitivities are provided, as an impairment is unlikely to occur as of the balance sheet date. Even an increase in the discount rates by 1.5 percentage points does not result in a need for impairment.

Capitalized development projects, intangible assets acquired in business combinations and other intangible assets
The table below summarizes the carrying amounts:

(in thousands of EUR)	Dec. 31, 2019	Dec. 31, 2018
Capitalized development projects	96,169	87,926
Intangible assets acquired in business combinations	20,864	26,012
Other intangible assets	3,704	5,512
	120,737	119,450

In 2019, borrowing costs of EUR 437 thousand (2018: EUR 359 thousand) were capitalized related to development projects with an expected duration of more than 12 months. Borrowing costs were capitalized at the weighted average rate of the financial liabilities of 1.7%.

Other intangibles assets mainly include licenses and software.

Intangible assets acquired in business combinations analyze as follows:

(in thousands of EUR)	Dec. 31, 2019	Dec. 31, 2018
Purchased technology FiSEC	121	412
Purchased hardware technology Overture	88	1,145
Purchased software technology Overture	1,841	2,534
Purchased technology MRV	5,670	7,084
Brand Ensemble	43	86
Purchased customer relationships OSA	-	17
Purchased customer relationships Overture	2,808	3,422
Purchased customer relationship MRV	10,293	11,312
	20,864	26,012

The acquired customer relationships OSA were fully amortized in 2019.

Amortization of intangible assets with a finite useful life comprises:

(in thousands of EUR)	2019	2018
Capitalized development projects	33,484	29,124
Intangible assets acquired in business combinations	5,663	5,526
Other intangible assets	3,202	3,216
	42,349	37,866

Amortization of intangible assets acquired in business combinations analyze as follows:

(in thousands of EUR)	2019	2018
Purchased technology FiSEC	291	290
Purchased hardware technology Overture	1,057	1,057
Purchased software technology Overture	693	693
Purchased technology MRV	1,581	1,496
Brand Ensemble	43	43
Purchased customer relationships OSA	18	69
Purchased customer relationships Overture	694	658
Purchased customer relationship MRV	1,286	1,220
	5,663	5,526

In 2019 and 2018, no impairment for capitalized development projects as well as purchased technology was recognized.

In the consolidated income statement, amortization and impairment of capitalized development projects and amortization of purchased technology is included in cost of goods sold. Amortization of purchased customer relationship assets is included in selling and marketing expenses.

The methodology for calculating impairment is the same as the one used for goodwill impairment testing. The key assumptions and key sensitivities are also the same.

(16) Lease liabilities

Variable lease payments of EUR 2,560 thousand have not been included in the measurement of lease liabilities and were recognized in the operating result. In the cash flow statement, the cash outflows resulting from these items are included in the cash flow from operating activities.

A weighted average marginal borrowing rate of 3.2% was used for accounting purposes. The interest expense of EUR 1,161 thousand is included in the financial result.

The maturity of lease liabilities is as follows:

(in thousands of EUR)	Dec. 31, 2019	Jan. 1, 2019
Up to 1 year	6,082	5,366
One to three years	16,772	23,977
More than three years	11,576	7,708
	34,430	**37,051**

(17) Financial liabilities

The tables below shows details on liabilities to banks and their maturity:

(in thousands of EUR)	Dec. 31, 2019	Maturity ≤ 12 months	Maturity 13 to 36 months	Maturity > 36 months
IKB Deutsche Industriebank loans	6,250	6,250	-	-
	2,500	2,500	-	-
	3,750	3,750	-	-
Syndicated loan	58,479	6,721	30,019	21,739
Deutsche Bank bullet loan	10,000	-	10,000	-
Total liabilities to banks	**80,979**	**19,221**	**40,019**	**21,739**

(in thousands of EUR)	Dec. 31, 2018	Maturity ≤ 12 months	Maturity 13 to 36 months	Maturity > 36 months
IKB Deutsche Industriebank loans	12,500	6,250	6,250	-
	5,000	2,500	2,500	-
	7,500	3,750	3,750	-
Syndicated loan	64,484	6,900	21,705	35,879
Total liabilities to banks	**89,484**	**19,400**	**34,205**	**35,879**

All IKB loans are repaid in quarterly instalments. A fixed interest rate of 1.4% p.a. applies for all IKB loans.

In September 2018, ADVA contracted a syndicated loan amounting to EUR 75,000 thousand with a banking syndicate. The new syndicated loan consists of two tranches with a total maturity of five years including a redeemable loan amounting to EUR 65,000 thousand as well as a revolving credit line of EUR 10,000 thousand. The interest rate for the redeemable loan amounts currently to EURIBOR plus 1.4% p.a., linked to the leverage of the group. Repayment in bi-annual instalments started from June 2019. The redeemable loan has been accounted for applying the effective interest method.

In October 2019, ADVA entered into a EUR 10,000 thousand bullet loan with Deutsche Bank. The loan is due for repayment in one amount in Q3 2022 and bears interest at EURIBOR plus 1.1% p.a.

In 2019, the interest on liabilities to banks recognized at year-end was 1.1% and 1.4% p.a., respectively.

On December 31, 2019, the group had EUR 10,000 thousand of unused borrowing facilities (December 31, 2018: EUR 10,000 thousand).

The fair value of the liabilities to banks is stated in note (33).

(18) Trade accounts payable and other current and non-current liabilities

The trade accounts payable are non-interest-bearing and generally due within 30 to 90 days. The increase in trade accounts payable mainly results from demand-oriented purchases of materials.

Other current liabilities on December 31 analyze as follows:

(in thousands of EUR)	2019	2018
Non-financial liabilities		
Liabilities to employees for vacation	2,459	3,362
Liabilities due to withheld wage income tax and social security contribution	2,954	2,493
Liabilities due to tax authorities	2,630	1,985
Obligations from subsidized research projects	2,211	2,128
Other	-	271
Total current non-financial liabilities	**10,254**	**10,239**
Financial liabilities		
Liabilities to employees for variable compensation and payroll	18,290	16,125
Negative fair value of derivatives	336	-
Other	2,337	1,973
Total current financial liabilities	**20,963**	**18,098**
	31,217	**28,337**

On December 31, other non-current liabilities include:

(in thousands of EUR)	2019	2018
Non-financial liabilities		
Obligations from subsidized research projects	2,289	571
Other	17	1,323
Total non-current non-financial liabilities	**2,306**	**1,894**
Financial liabilities		
Other	505	62
Total non-current financial liabilities	**505**	**62**
	2,811	**1,956**

On December 31, 2018, other non-current non-financial liabilities primarily included accrued rental expenses of EUR 1,303 thousand, which were offset upon initial recognition of the right-of-use assets due to the first-time adoption of IFRS 16 in 2019.

The classification of financial instruments according to IFRS 9 is included in note (33).

(19) Provisions for pensions and similar employee benefits

Post-employment benefit plans are classified as either defined contribution or defined benefit plans.

Plan assets related to defined contribution plans are managed separately from the assets of the relevant company by a trustee. For such plans, the company pays fixed contributions into a separate entity or a fund and does not assume any other obligations. Payment obligations to defined contribution plans are recognized in profit or loss when they occur. Payment to government managed pension plans with fixed contributions are considered as defined contribution plans. ADVA group maintains defined contribution plans in different group companies. In 2019, total expenses related to defined contribution plans amount to EUR 8,197 thousand (prior year: EUR 7,377 thousand).

Under defined benefit plans the company is required to pay agreed benefits granted to present and past employees. Defined benefit plans may be funded or unfunded. The group maintains defined benefit plans in Switzerland, Italy, India and Israel.

The defined benefit plans in Switzerland and Israel are final salary related plans which in the case of Switzerland include a guaranteed minimum rate of return additionally. Benefits paid in conjunction with these plans comprise old-age retirement pensions as well as invalidity and surviving dependents' benefits. Trustees according to local statutory regulations administer the assets of these pension plans. The Italian and Indian defined benefit plans are unfunded and consider final salary assumptions. In Switzerland, in addition to the regular case pension payments on reaching retirement age, vested benefits and payments in connection with the use of home ownership incentives may also be paid out from the pension fund. In Italy, Israel and India, a one-time lump-sum payment is usually made upon retirement.

On December 31, 2019, ADVA reports provisions for pensions amounting to EUR 7,756 thousand (December 31, 2018: EUR 5,531 thousand).

At year-end, the carrying amount analyzes as follows:

(in thousands of EUR)	**2019**	**2018**
Present value of defined benefit obligations	24,448	19,515
Fair value of plan assets	-16,692	-13,984
Provisions for pensions and similar employee benefits	**7,756**	**5,531**

The change in the net defined benefit liability for pension plans derives as follows:

(in thousands of EUR)	Defined benefit obligations	Fair value of plan assets	Total
Jan. 1, 2018	**19,903**	**-14,081**	**5,822**
Expenses and income			
Current service cost	880	-	880
Interest expense (+)/income (-)	271	-187	84
Past service cost	-255	-	-255
Remeasurements			
Gains (-)/losses (+) arising from changes in financial assumptions	-894	-	-894
Gains (-)/losses (+) arising from experience	407	-	407
Gains (-)/losses (+) on plan assets, excluding amounts included in interest income	-	161	161
Employee contributions	264	-264	-
Transfers to funds	-	-626	-626
Assets distributed on settlements	-	32	32
Benefits paid through plan assets	-1,270	1,270	-
Disbursements of ADVA	-165	-	-165
Exchange rate differences and other changes	374	-289	85
Dec. 31, 2018	**19,515**	**-13,984**	**5,531**
Expenses and income			
Current service cost	834	-	834
Interest expense (+)/income (-)	356	-243	113
Past service cost	-	-	-
Remeasurements			
Gains (-)/losses (+) arising from changes in financial assumptions	2,646	-	2,646
Gains (-)/losses (+) arising from experience	-272	-	-272
Gains (-)/losses (+) on plan assets, excluding amounts included in interest income		-618	-618
Employee contributions	272	-272	-
Transfers to funds	-	-643	-643
Assets distributed on settlements	-	47	47
Benefits paid through plan assets	-647	647	-
Payments made to plan assets	849	-849	-
Disbursements of ADVA	-207	-	-207
Exchange rate differences and other changes	1,102	-777	325
Dec. 31, 2019	**24,448**	**-16,692**	**7,756**

The past service cost in 2018 mainly resulted from the reduction of the conversion rates for the old-age capital achieved in Switzerland.

The payments made to plan assets result in particular from vested benefits brought in by joining the company as well as from other payments and repayments of benefits drawn in advance to top up the pension fund.

On December 31, 2019, EUR 23,069 thousand of the defined benefit obligations relate to active employees and EUR 1,379 thousand relate to pensioners (prior year: EUR 18,248 thousand and EUR 1,268 thousand, respectively).

The average remaining period of service for employees and the weighted average duration of the obligations as of December 31, 2019 are as follows:

(in years)	Switzer-land	Italy	India	Israel
Average remaining period of service	10.3	15.4	n/a	n/a
Weighted average duration	18.4	10.6	6.8	12.2

At December 31, 2018 the average remaining period of service and the weighted average duration are as follows:

(in years)	Switzer-land	Italy	India	Israel
Average remaining period of service	10.6	15.5	9.1	n/a
Weighted average duration	17.7	12.7	6.6	12.2

In general, the monthly payment of pensions starts if an employee in Switzerland or Israel reaches the retirement age, while in Italy and India a lump sum payment of the relevant accrued amount applies with retirement or resignation of an employee.

Employer contributions in 2020 are expected to amount to EUR 671 thousand (2018 expected for 2019: EUR 679 thousand). The expected pension payments for 2020 amount to EUR 841 thousand. In 2018 the prior year pension payments of EUR 527 thousand had been expected for 2019.

In 2019, the projected units credit method is used to calculate the defined benefit obligations considering the following material assumptions for valuation parameters:

	Switzer-land	Italy	India	Israel
Discount rate	0.30%	0.60%	6.75%	2.00%
Inflation rate	1.00%	1.75%	n/a	1.40%
Salary level trend	1.00%	2.00%	7.00%	2.00%

In 2018, the following valuation parameters have been assumed:

	Switzer-land	Italy	India	Israel
Discount rate	1.00%	1.75%	7.40%	3.60%
Inflation rate	1.00%	1.75%	n/a	1.50%
Salary level trend	1.00%	2.00%	7.00%	2.00%

Discount rates have been determined considering the weighted average duration of the obligations. The evaluation for Switzerland, Italy and Israel is based on high-quality corporate bonds with AA-rating. For India, the discount rate is based on government bond rates.

ADVA is exposed to risks arising from defined benefit plans. Changes in actuarial parameters, especially in discount rates, may have significant influence on the pension obligations.

The sensitivity analysis provided below shows the extent to which the defined benefit obligation would have been affected by changes in the relevant assumptions in 2019:

(in thousands of EUR)		Change in defined benefit obligation
Discount rate	Increase by 0.25%	-885
	Decrease by 0.25%	942
Salary level trend	Increase by 0.25%	167
	Decrease by 0.25%	-168

The sensitivity analysis in prior year were as follows:

(in thousands of EUR)		Change in defined benefit obligation
Discount rate	Increase by 0.25%	-659
	Decrease by 0.25%	702
Salary level trend	Increase by 0.25%	147
	Decrease by 0.25%	-149

Sensitivities for discount rate and salary level trend have been considered in turn disregarding any potential dependencies between these assumptions. Separate actuarial computations have been performed for increase and decrease of the assumptions.

ADVA assumes inflation rate and pension entitlement trend to have minor impact on the amount of defined benefit obligations.

On December 31, 2019, plan assets split to major asset categories as follows:

	Quoted market prices	Other than quoted market prices
Equity instruments	20.68%	-
Bonds	22.26%	-
Real estate	20.34%	-
Alternative investments	6.97%	-
Qualified insurance policies	-	17.75%
Cash and cash equivalents	-	3.24%
Other	-	8.76%

On December 31, 2018, plan assets split to major asset categories as follows:

	Quoted market prices	Other than quoted market prices
Equity instruments	18.49%	-
Bonds	19.81%	-
Real estate	18.48%	-
Alternative investments	7.26%	-
Qualified insurance policies	-	24.86%
Cash and cash equivalents	-	2.28%
Other	-	8.82%

Pension fund assets are monitored continuously and managed from a risk-and-yield perspective by the external trustees.

(20) Other provisions

The table below lists changes in the composition of the group's other provisions in the reporting period:

(in thousands of EUR)	Jan. 1, 2019	Usage	Release	Appro priation	Currency trans-lation difference	Dec. 31, 2019
Current provisions						
Warranty provision	2,122	-1,271	-45	736	4	1,546
Personnel provisions	885	-641	-145	1,352	1	1,452
Consulting fees	3,551	-333	-668	365	60	2,975
Supplier obligations	7,959	-6,802	-377	7,105	28	7,913
Other short-term provisions	488	-447	-18	467	3	493
	15,005	**-9,494**	**-1,253**	**10,025**	**96**	**14,379**
Non-current provisions						
Warranty provision	1,425	-105	-78	88	7	1,337
Other long-term provisions	28	-	-	15	-	43
	1,453	**-105**	**-78**	**103**	**7**	**1,380**
Provisions total	**16,458**	**-9,599**	**-1,331**	**10,128**	**103**	**15,759**

The estimated expenses related to warranty claims reflect both past experience and current developments and are based on a percentage of sales revenues. Any differences between actual amounts and anticipated amounts are treated as changes in accounting estimates and affect earnings in the period in which the change occurs.

Current personnel provisions mainly include expenses for severance payments as well as employee's accident insurance and other expenses resulting from legal requirements.

(21) Contract liabilities and refund liabilities

On December 31, contract and refund liabilities analyze as follows:

(in thousands of EUR)	Dec. 31, 2019	Dec. 31, 2018
Current contract liabilities		
Outstanding credit notes	-	-
Advance payments received	185	87
Current contract liabilities related to customer loyalty programs	481	460
Current deferred revenues related to service level agreements	11,782	13,514
	12,448	**14,061**
Current refund liabilities	**709**	**511**
Non-current contract liabilities		
Non-current deferred revenues related to service level agreements	7,070	6,469
	7,070	**6,469**
	20,227	**21,041**

Current contract liabilities related to customer loyalty programs include mainly expected volume discounts and refunds to customers.

The revenues generated in the reporting period from contract liabilities existing at the beginning of the period amounted to EUR 14,061 thousand (previous year: EUR 15,975 thousand).

Management expects that 64% of the outstanding or partially outstanding benefit obligations as of December 31, 2019, will be recognized as revenue in the 2020 financial year. As expected, the remaining 36% are recognized as sales in the financial year 2021. The amount stated does not include variable compensation components which are limited.

(22) Stockholders' equity

Common stock and share capital

On December 31, 2019, ADVA Optical Networking SE had issued 50,181,966 (prior year: 49,930,955) no par value bearer shares (hereinafter "common shares"), each representing a notional amount of share capital of EUR 1.00.

The common shares entitle the holder to vote at the annual general meeting and to receive dividends in case of a distribution. No restrictions are attached to the common shares.

Capital transactions

In connection with the exercise of stock options, 251,011 shares were issued to employees of the company and its affiliates out of conditional capital in 2019 (in 2018 in connection with the exercise of stock options 195,406 shares). The par value of EUR 251 thousand (prior year: EUR 195 thousand) was appropriated to share capital, whereas the premium resulting from the exercise of stock options of EUR 1.006 thousand (prior year: EUR 615 thousand) was recognized within capital reserve.

Other information on the share option programs is included in note (39).

Authorized capital

According to the company's articles of association, the management board is authorized, subject to the consent of the supervisory board, to increase subscribed capital until May 21, 2024, only once or in successive tranches by a maximum of EUR 24,965 thousand by issuing new common shares in return for cash or non-cash contributions (conditional capital 2019/I). Subject to the consent of the supervisory board, the management board is further authorized to decide whether to exclude stockholders' subscription rights. Stockholders' subscription rights can be excluded for capital increases for cash contributions as well as contributions in kind if during the term of this authorization and in exclusion of shareholder subscription rights, the shares issued against contributions in cash or in kind do not exceed 20% of the share capital.

Conditional capital

The Annual Shareholder´s Meeting on May 22, 2019, resolved the increase of conditional capital 2011/I by EUR 215 thousand to EUR 4,993 thousand. The resolution was registered in the commercial register on June 6, 2019.

Considering the above described capital transactions, the total conditional capital on December 31, 2019 amounts to EUR 4,742 thousand.

The changes in share capital, authorized and conditional capital are summarized below:

(in thousands of EUR)	Share capital	Authorized capital 2015/I	Authorized capital 2019/I	Conditional capital 2011/I
Jan. 1, 2019	49,931	24,048	-	4,778
Changes due to Annual Shareholders' Meeting resolutions	-	-24,048	24.965	215
Stock options exercised	251	-	-	-251
Dec. 31, 2019	50,182	-	24,965	4,742

Capital reserve
The capital reserve includes premium payments from the issuance of shares, as well as additional contributions to the company's equity associated with the exercise of stock options. Additionally, the capital reserve contains the correspondent accumulated compensation expenses related to stock option rights issued amounting to EUR 22,384 thousand (prior year: EUR 20,894 thousand).

Accumulated other comprehensive income/ (loss)
Accumulated other comprehensive income/ (loss) is used to record exchange differences arising from the translation of the financial statements of foreign operations. In addition, the result from remeasurement of defined benefit obligations is included in this line item.

The tax effect related to components of other comprehensive income/ (loss) is as follows:

	2019		
(in thousands of EUR)	pre-tax	tax effect	after tax
Remeasurement of defined benefit obligations	-3,837	713	-3,124
	-3,837	713	-3,124

	2018		
(in thousands of EUR)	pre-tax	tax effect	after tax
Remeasurement of defined benefit obligations	-2,072	79	-1,993
	-2,072	79	-1,993

Changes in stockholders' equity are summarized in the consolidated statement of changes in stockholders' equity.

Voting Rights

According to section 33 paragraph 1 and 2, section 38 paragraph 1 and section 40 of the German Securities Trading Law (Wertpapier-Handelsgesetz, WpHG) the company published the following information on the ADVA homepage:

Date of change in investment	Name of investment owner	Threshold limit	Share of voting rights
Oct. 24, 2019	DNB Asset Management S.A., Luxemburg, Luxemburg	above 3%	3.04%
Sep. 25, 2019	Morgan Stanley, Wilmington, Delaware, USA	below 3%	0.06%
Sep. 23, 2019	Duke University, Durham, North Carolina, USA	below 3%	0,00%
Sep. 23, 2019	Teleios Capital Partners LLC, Zug, Switzerland	above 20%	22.36%
Jul. 30, 2019	DNB Asset Management AS, Oslo, Norway	above 5%	5.02%
Jan. 17, 2019	Internationale Kapitalanlagegesellschaft mit beschränkter Haftung, Düsseldorf, Germany	below 3%	2.86%
Nov. 30, 2017	EGORA Holding GmbH, Planegg, Germany	below 15%	14.99%
Jul. 28, 2017	The Goldman Sachs Group, Inc., New York, USA	above 3%	4.39%
May 23, 2017	Dimensional Holdings Inc., Oviedo, USA	above 3%	3.01%
May 2, 2017	Ministry of Finance on behalf of the State of Norway, Oslo, Norway	above 3%	3.19%
Feb. 20, 2017	Deutsche Asset Management Investment GmbH, wFrankfurt, Germany	below 3%	2.95%

Notes to the consolidated income statement

(23) Revenues

In 2019 and 2018, revenues included EUR 75,541 thousand and EUR 64,323 thousand for services, respectively. The remaining revenues relate mainly to product sales.

In 2019, revenues related to customer loyalty programs amounting to EUR 134 thousand have been recognized (prior year: EUR 142 thousand).

In 2019, revenues amounting to EUR 497,759 thousand relate to performance obligations that were performed at a specific point in time, and revenues of EUR 59,062 thousand relate to performance obligations that were delivered over a period of time.

A segmentation of revenues by geographic region is provided in the section on segment reporting under note (32).

(24) Other operating income and expenses

Other operating income and expenses analyze as follows:

(in thousands of EUR)	2019	2018
Other operating income		
Government grants received	1,878	2,222
Income for the supply of development services	-	195
Income from payments received on receivables written off in previous periods	55	67
Release of provisions	1,331	4,291
Other	1,500	2,174
	4,764	**8,949**
Other operating expenses		
Derecognition of trade accounts receivable	-219	-80
Other	-315	-427
	-534	**-507**
Other operating income and expenses, net	**4,230**	**8,442**

(25) Interest income and expenses

Interest income primarily includes interest from daily bank deposits and from other short-term deposits with maturities between one day and three months.

Interest expenses are primarily incurred on financial liabilities and on the sale of receivables. In addition, net interest expenses from valuation of defined benefit plans and interest expenses related to leases according to IFRS 16 are included. For further details, refer to notes (11), (16), (17), (19) and (33).

(26) Other financial gains and losses, net

Other financial gains and losses, net, comprise the following:

(in thousands of EUR)	2019	2018
Foreign currency exchange gains	8,217	12,405
Thereof: gains from forward rate agreements	*612*	*675*
Foreign currency exchange losses	-7,613	-13,882
Thereof: losses from forward rate agreements	*-943*	*-289*
Income from investments available for sale	-	381
Write-off of investments	-1,374	-
	-770	**-1,096**

Further information on the foreign currency derivatives is contained in note (33).

(27) Income taxes

Income taxes in Germany consist of corporate income tax, the solidarity surcharge and trade taxes. The tax calculation in foreign countries is based on the applicable local tax rates. They vary between 15% and 31% (prior year: between 15% and 31%).

The table below shows the components of the group's total income tax expenses:

(in thousands of EUR)	2019	2018
Current taxes		
Current income tax charge	-2,328	-1,180
Adjustments in respect of current income tax for prior years	3,707	88
	1,379	-1,092
Deferred taxes		
Temporary differences and tax loss carry-forwards	-3,166	-1,700
Changes in tax rates	-97	-15
	-3,263	**-1,715**
Income tax benefit (expense), net	**-1,884**	**-2,807**

A reconciliation of income taxes based on the accounting profit (loss) and the expected domestic income tax rate for the parent company of 28.88% (prior year: 28.57%) to effective income tax benefit (expense), net, is presented below:

(in thousands of EUR)	2019	2018
Accounting income before tax	8,929	12,485
Expected statutory tax benefit (expense)	-2,579	-3,567
Tax rate adjustments	-97	-15
Tax for prior periods	3,707	88
Foreign tax rate differential	-74	782
Non-tax-deductible stock option expenses	-430	-411
Differences from foreign branch offices	-90	-147
Non-taxable income and other non-tax-deductible expenses	250	137
Other adjustments to recognition of deferred tax assets	9	-
Permanent differences	165	229
Not capitalized deferred tax assets for temporary differences and tax losses	-2,745	142
Other differences	0	-45
Income tax benefit (expense), net	-1,884	-2,807
Effective tax rate	-21.09%	-22.49%

The tax income for prior periods in the amount of EUR 3,708 thousand increased significantly compared to prior year (prior year: EUR 88 thousand). This effect results from the release of an accrual for tax risks.

The income effect resulting from the tax rate changes in the amount of EUR 97 thousand relates, as in the prior year, mainly to the changes in the local tax rate of ADVA Optical Networking SE (prior year: EUR 15 thousand).

The not capitalized deferred tax assets for tax losses are mainly related to ADVA Optical Networking SE in the amount of EUR 3,459 thousand (prior year: EUR 3,537 thousand).

The deferred tax assets and deferred tax liabilities on December 31, 2019 relate to the following:

	2019		2018	
(in thousands of EUR)	Deferred tax assets	Deferred tax liabilities	Deferred tax assets	Deferred tax liabilities
Current assets				
Cash and cash equivalents	1	-	1	-
Trade accounts receivable	97	-	8	-5
Inventories	2,205	-1,753	2,101	-1,546
Other current assets	-	-113	-	-172
Total current assets	**2,303**	**-1,866**	**2,110**	**-1,723**
Non-current assets				
Right-of-use assets	-	-6,903	-	-
Property, plant and equipment	158	-144	156	-89
Goodwill	-	-2,861	-	-2,636
Capitalized development projects	-	-28,448	-	-25,788
Intangible assets acquired in business combinations	1,125	-4,232	1,610	-3,715
Other intangible assets	-	-2	-	-3
Other non-current assets	821	-868	678	-402
Total non-current assets	**2,104**	**-43,458**	**2,444**	**-32,633**

(in thousands of EUR)	2019 Deferred tax assets	2019 Deferred tax liabilities	2018 Deferred tax assets	2018 Deferred tax liabilities
Current liabilities				
Lease Liabilities	1,194	-		
Trade accounts payable	**2**	-124	289	-46
Provisions	**2,288**	-	2,382	-
Deferred revenues	**740**	-	1,271	-
Other current liabilities	**810**	-	422	-
Total current liabilities	**5,034**	**-124**	**4,364**	**-46**
Non-current liabilities				
Lease Liabilities	5,891	-		
Other non-current liabilities	991	-	1,121	-
Total non-current liabilities	**6,882**	**-**	**1,121**	**-**
Tax loss carry-forwards				
German tax loss carry-forwards	19,917	-	17,776	-
thereof: current	-	-	-	-
thereof: non-current	*19,917*	-	*17,776*	-
Foreign tax loss carry-forwards	3,237	-	3,074	-
thereof: current	*3,237*	-	*3,074*	-
thereof: non-current	-	-	-	-
Total tax loss carry-forwards	**23,154**	**-**	**20,850**	**-**
Total deferred tax assets and liabilities	**39,477**	**-45,448**	**30,889**	**-34.402**
thereof: current	*10,574*	*-1,990*	*9,548*	*-1,769*
thereof: non-current	*28,903*	*-43,458*	*21,341*	*-32,633*
Netting	**-33,141**	**33,141**	**-23,574**	**23,574**
Deferred tax net	**6,336**	**-12,307**	**7,315**	**-10,828**

Temporary differences are differences between the carrying amount of an asset or liability in the balance sheet according to IFRS and its tax base.

Deferred tax assets have been recognized for German and foreign tax loss carry-forwards since net deferred tax liabilities arising from temporary differences as well as a positive tax planning, which are relevant for the recognition of tax loss carry-forwards as reported, exists.

The German and foreign tax loss carry-forwards on December 31 comprise as follows:

(in thousands of EUR)	2019	2018
ADVA Optical Networking SE	184,175	165,090
ADVA Optical Networking North America	87,622	94,807
OSA Switzerland	15,711	15,667
ADVA Optical Networking Israel	19,609	622
ADVA NA Holdings	61	58
ADVA IT Solutions	11	11
	307,189	**276,255**

Deferred tax assets have been recognized in respect of tax losses in the ADVA Optical Networking SE amounting to EUR 68,966 thousand (prior year: EUR 62,220 thousand) due to a reasonable assurance that taxable profits will be recognized in the near future that can be offset against tax loss carry-forwards.

ADVA Optical Networking North America reports further tax income over an aggregated four-year-period and taking into account the following restrictions there is a reasonable assurance that taxable profits will be recognized in the near future that can be offset against tax loss carry-forwards.

Pursuant to the U.S. Tax Act, federal tax loss carry-forwards in the U.S. expire after twenty years. Furthermore, the utilization of a portion of tax loss carry-forwards is subject to annual limitations. Consequently, deferred tax assets have not been recognized in respect of tax loss carry-forwards in ADVA Optical Networking North America in the amount of EUR 74.674 thousand (prior year: EUR 82,513 thousand).

Furthermore, deferred tax assets for tax loss carry-forwards for state and local purposes expire in between five and twenty years. Deferred tax assets in respect of these tax loss carry-forwards have been recognized in the amount of EUR 381 thousand (prior year: EUR 354 thousand).

Whether or not deferred tax assets are realized depends on the generation of future taxable income during periods in which these temporary differences are deductible. The group has considered the scheduled reversal of deferred tax liabilities and projected future taxable income in making this assessment.

On December 31, 2019 and 2018, no deferred tax liabilities on retained earnings of group companies have been recognized. ADVA committed that there will be no distribution of currently undistributed earnings from the company's major subsidiaries in the near future. The amount of temporary differences for which no deferred tax liabilities have been recognized totals to EUR 12,049 thousand (prior year: EUR 15,815 thousand).

Deferred tax assets for pensions and similar employee benefits in the amount of EUR 713 thousand are recognized in accumulated other comprehensive loss (prior year: EUR 79 thousand).

(28) Employees and personnel expenses

In 2019 and 2018, respectively, the ADVA group had an average of 1,884 and 1,831 permanent employees and an average of 25 and 26 apprentices on its payroll, respectively in the following departments:

	2019	2018
Purchasing and Operations	392	379
Sales and Marketing	368	343
General and Administration	166	164
Research and Development	958	945
Apprentices	25	26
	1,909	**1,857**

Furthermore, ADVA employs 35 and 24 people on a temporary basis effective December 31, 2019 and 2018, respectively.

Personnel expenses for 2019 and 2018 totaled EUR 187,785 thousand and EUR 173,024 thousand, respectively:

(in thousands of EUR)	2019	2018
Wages and salaries	157,227	144,231
Social security costs	22,326	21,398
Expenses for post-employment benefits	6,742	5,982
Share-based compensation expenses	1,490	1,413
	187,785	**173,024**

Expenses for retirement benefits include expenses related to defined contribution plans as well as service costs for defined obligation plans.

Further details on expenses for post-employment benefits are included in note (19).

Details regarding share-based compensation expenses are shown in note (39).

(29) Restructuring expenses

In 2019, restructuring expenses including severance payments as well as related legal costs and expenses related to changed use of facilities amounting to EUR 5,655 thousand have been recognized (2018: EUR 1,338 thousand). The allocation to functional areas in the consolidated income statement is included in note (32).

Other disclosures

(30) Consolidated cash flow statement

The consolidated cash flow statement has been prepared in accordance with IAS 7.

Cash and cash equivalents include short-term cash and short-term financial assets whose original remaining maturity does not exceed three months. Bank overdrafts are reported in financial liabilities.

Cash flows from investing and financing activities are determined directly, whereas the cash flow from operating activities is derived indirectly from the consolidated income before tax. When cash flow from operating activities is calculated, the changes in assets and liabilities are adjusted for the effects of currency translation. As a result, it is not possible to reconcile the figures to the differences in the published consolidated statement of financial position.

The movements of liabilities from financing activities analyze as follows:

(in thousands of EUR)	Lease liabilities	Liabilities to banks	Total liabilities from financing activities
Jan. 1, 2018	**n/a**	**96,561**	**96,561**
Cash flows	n/a	-7,083	-7,083
Non-cash changes	n/a	6	6
Foreign exchanges adjustments	n/a	-	-
Dec. 31, 2018	**n/a**	**89,484**	**89,484**
Recognized on adoption of IFRS 16	37,138	-	37,138
Cash flows	-6,508	-8,500	-15,008
Non-cash changes	2,484	-5	2,479
Foreign exchanges adjustments	1,316	-	1,316
Dec. 31, 2019	**34,430**	**80,979**	**115,409**

Actual interest payments for liabilities to banks amounting to EUR 1,640 thousand (prior year: EUR 1,953 thousand) and interest related to lease liabilities of EUR 1,161 thousand (prior year: n/a) are included in cash flow from financing activities.

Cash and cash equivalents to which the group only has restricted access are explained in note (10).

(31) Earnings per share

In accordance with IAS 33, basic earnings per share are calculated by dividing consolidated net income by the weighted average number of shares outstanding.

There were no material dilution effects in the current fiscal year. Diluted earnings per share are calculated by adjusting the weighted average number of shares outstanding by the number of potential shares arising from granted and exercisable stock options on the balance sheet date.

No effects of dilution had to be considered in net income in 2019 and 2018.

The following table reflects the number of shares used in the computation of basic and diluted earnings per share:

	2019	2018
Weighted average number of shares (basic)	**50,031,396**	**49,810,321**
Effect of dilution from stock options	489,175	423,895
Weighted average number of shares (diluted)	**50,520,571**	**50,234,216**

There have been no other material transactions involving ordinary shares or potential shares between the balance sheet date and the date of authorization for issue of these financial statements.

(32) Segment reporting

In accordance with IFRS 8, operating segments are identified based on the way information is reported internally to the chief operating decision maker, i.e. the management board, and regularly reviewed to make decisions about resources to be assigned to the segment and assess its performance. The internal organizational and management structure and the structure of internal financial reporting activities are the key factors in determining what information is reported. For making decisions about resource allocation and performance assessment, management does not monitor the operating results separately on the level of business units.

Within the ADVA group, management decisions are based on pro forma operating income. Pro forma financial information excludes non-cash charges related to share-based compensation plans and amortization and impairment of goodwill and acquisition-related intangible assets. Additionally, expenses related to restructuring measures are not included. Income from capitalization of development expenses is shown as a separate line item and not deducted from research and development expenses.

Segment information on December 31, 2019 presents as follows:

(in thousands of EUR)	Pro forma financial information	Intangible assets from acquisitions	Goodwill	Compensation expenses	Restructuring expenses	Disclosure of R&D expenses	Consolidated financial information
Revenues	556,821	-	-	-	-	-	556,821
Cost of goods sold	-361,457	-3,622	-	-71	-758	-	-365,908
Gross profit	**195,364**	**-3,622**	**-**	**-71**	**-758**		**190,913**
Gross margin	**35.1%**		**-**				**34.3%**
Selling and marketing expenses	-68,318	-2,041	-	-561	-1,908	-	-72,828
General and administrative expenses	-33,851	-	-	-322	-953	-	-35,126
Research and development expenses	-115,057	-	-	-536	-2,036	42,443	-75,186
Income from capitalization of development expenses	42,443	-	-	-	-	-42,443	-
Other operating income	4,764	-	-	-	-	-	4,764
Other operating expenses	-534	-	-	-	-	-	-534
Operating income	**24,811**	**-5,663**	**-**	**-1,490**	**-5,655**	**-**	**12,003**
Operating margin	**4.5%**						**2.2%**
Segment assets	**443,475**	**20,864**	**72,023**	**-**	**-**	**-**	**536,362**

Segment information on December 31, 2018 presents as follows:

(in thousands of EUR)	Pro forma financial information	Intangible assets from acquisitions	Goodwill	Compensa-tion expenses	Restructuring expenses	Disclosure of R&D expenses	Consolidated financial information
Revenues	501,981	-	-	-	-	-	501,981
Cost of goods sold	-316,360	-3,536	-	-58	-299	-	-320,253
Gross profit	**185,621**	**-3,536**	**-**	**-58**	**-299**	**-**	**181,728**
Gross margin	**37.0%**						**36.2%**
Selling and marketing expenses	-61,010	-1,990	-	-438	-131	-	-63,569
General and administrative expenses	-34,494	-	-	-346	-184	-	-35,024
Research and development expenses	-107,165	-	-	-571	-724	31,872	-76,588
Income from capitalization of development expenses	31,872	-	-	-	-	-31,872	-
Other operating income	8,949	-	-	-	-	-	8,949
Other operating expenses	-507	-	-	-	-	-	-507
Operating income	**23,266**	**-5,526**	**-**	**-1,413**	**-1,338**	**-**	**14,989**
Operating margin	**4.6%**						**3.0%**
Segment assets	**390,126**	**26,012**	**70,400**	**-**	**-**	**-**	**486.538**

Additional information by geographical regions:

(in thousands of EUR)	2019	2018
Revenues		
Germany	102,691	113,082
Rest of Europe, Middle East and Africa	196,263	136,109
Americas	213,793	192,087
Asia-Pacific	44,074	60,703
	556,821	**501,981**

(in thousands of EUR)	Dec. 31, 2019	Dec. 31, 2018
Non-current assets		
Germany	129,055	114,393
Rest of Europe, Middle East and Africa	30,294	15,642
Americas	91,714	86,586
Asia-Pacific	6,304	2,281
	257,367	**218,902**

Revenue information is based on the shipment location of the customers.

In 2019, revenues with two major customers exceeded 10% of total revenues (2018: no major customers). In 2019, the share of revenues allocated to major customers was EUR 137,728 thousand; thereof revenue with the biggest customer was EUR 77,710 thousand and with the second biggest customer was EUR 60,018 thousand.

Non-current assets including property, plant and equipment, intangible assets and finance lease equipment are attributed based on the location of the respective group company.

(33) Financial instruments

The following tables analyze carrying amounts and fair values according to valuation categories. Only assets and liabilities, which fall into the categories defined by IFRS 7, are presented, so that the total amounts disclosed do not correspond to the balance sheet totals of each year.

(in thousands of EUR, on Dec. 31, 2019)	Valuation category in accordance with IFRS 9
Assets	
Cash and cash equivalents	AC
Trade accounts receivable without underlying factoring agreement	AC
Trade accounts receivable with underlying factoring agreement	FVTPL FK
Other current financial assets	AC
Other non-current financial assets	AC
Derivatives without a hedging relationship	FVTPL
Investments	FVTPL
Total financial assets	
Liabilities	
Current lease liabilities	n/a
Non-current lease liabilities	n/a
Current liabilities to banks	AC
Non-current liabilities to banks	AC
Trade accounts payable	AC
Other current financial liabilities	AC
Other non-current financial liabilities	AC
Derivatives without a hedging relationship	FVTPL
Total financial liabilities	

* Due to the short-term nature, it was assumed that the book value as of the reporting date approximates the fair value.

	Carrying amount	Categories recognized according to IFRS 9		Fair value	Hierarchy of fair values
		Amortized cost	Fair value recognized in profit and loss		
	54,263	54,263	-	n/a*	n/a*
	85,872	85,872	-	n/a*	n/a*
	10,321	-	10,321	10,321	Level 2
	2,906	2,906	-	n/a*	n/a*
	3,419	3,419	-	3,419	Level 2
	0	-	0	0	Level 2
	-	-	-	-	Level 3
	156.781	**146.460**	**10.321**	**13.740**	
	6,082	n/a	-	n/a	n/a
	28,348	n/a	-	n/a	n/a
	19,221	19,221	-	18.500	Level 2
	61,758	61,758	-	63.000	Level 2
	73,398	73,398	-	n/a*	n/a*
	20,627	20,627	-	n/a*	n/a*
	505	505	-	505	Level 2
	336	-	336	336	Level 2
	210.275	**175,509**	**336**	**82.341**	

(in thousands of EUR, on Dec. 31, 2018)	Valuation category in accordance with IFRS 9
Assets	
Cash and cash equivalents	AC
Trade accounts receivable without underlying factoring agreement	AC
Trade accounts receivable with underlying factoring agreement	FVTPL FK
Other current financial assets	AC
Other non-current financial assets	AC
Derivatives without a hedging relationship	FVTPL
Investments	FVTPL
Total financial assets	
Liabilities	
Current financial liabilities (bank loans)	AC
Non-current financial liabilities (bank loans)	AC
Trade accounts payable	AC
Other current financial liabilities	AC
Other non-current financial liabilities	AC
Total financial liabilities	

* Due to the short-term nature, it was assumed that the book value as of the reporting date approximates the fair value.

	Amounts recognized according to IFRS 9			
Carrying amount	Amortized cost	Fair value recognized in profit and loss	Fair value	Hierarchy of fair values
62,652	62,652	-	n/a*	n/a*
93,685	93,685	-	n/a*	n/a*
4,251	-	4,251	4,251	Level 2
2,775	2,775	-	n/a*	n/a*
1,731	1,731	-	1,731	Level 2
108	-	108	108	Level 2
1,767	-	1,767	1,767	Level 3
168,412	**162,286**	**6,126**	**7,857**	
19,400	19,400	-	19,372	Level 2
70,084	70,084	-	70,628	Level 2
63,195	63,195	-	n/a*	n/a*
18,098	18,098	-	n/a*	n/a*
62	62	-	62	Level 2
170,839	**170,839**	**-**	**90,062**	

The group uses the following hierarchy for determining the fair value of financial instruments:

Level 1: Quoted prices in active markets for identical assets or liabilities.

Level 2: Techniques for which all inputs that have a significant effect on the recorded fair value are observable, either directly or indirectly.

Level 3: Techniques, which use inputs that are not based on observable market data.

In 2019 and 2018, no transfers between hierarchy levels occurred.

In the case of cash and cash equivalents, current trade receivables valued at amortized cost, other current financial assets and liabilities as well as trade accounts payable, the carrying amounts represent reasonable approximations for the fair values.

Forward rate agreements are measured using quoted forward exchange rates and yield curves derived from quoted interest rates according to the maturities of the contract.

Investments relate to equity instruments of Saguna Networks Ltd. with no quoted prices in active markets. Input factors for the valuation are share prices from past investment rounds and current purchase price offers from other investors in Saguna Networks Ltd. In 2019, the investment was fully impaired, as ADVA does not expect the investment to be recoverable.

The fair values of financial liabilities as well as other non-current financial assets and liabilities have been calculated based on future cash flows by using arm’s length interest rates.

The fair value of the balance sheet items valued at Level 3 on December 31, 2019 totaled nil (December 31, 2018: in total EUR 1,767 thousand). The change in value in the current financial year resulted from the disposal of an investment of EUR 393 thousand which had been available for sale at year-end 2018 and from the complete write-off of an investment amounting to EUR 1,374 thousand. The expense from the write-off is included in financial result.

The following table shows the net results per valuation category according to IFRS 9:

(in thousands of EUR)	Note	2019	2018
Financial assets measured at amortized cost	(14)	-1,053	323
Financial liabilities measured at amortized cost	(17)	-1,444	-1,751
Financial assets and liabilities measured at fair value through profit or loss	(24)	-1,813	477
Net result		**-4,310**	**-951**

The net result from financial assets measured at amortized cost includes the impairment loss recognized in the current period and the derecognition expense on the relevant assets. Net results of financial instruments at fair value through profit or loss consist of changes in the fair value of derivative financial instruments, trade receivables subject to factoring agreements and equity investments.

Total interest income and expenses from financial assets and liabilities are as follows:

(in thousands of EUR)	Note	2019	2018
Financial assets measured at amortized cost			
Total interest income	(25)	372	219
Financial liabilities measured at amortized cost			
Total interest expense	(25)	-2,674	-1,774

As the necessary prerequisites have not been fulfilled, no financial assets and liabilities are offset in the balance sheet. Master netting agreements exist with the contractual partners of the derivatives, according to which a set-off can be made in the event of insolvency. As of the balance sheet date, there were only insignificant offsetting potentials from derivative financial instruments.

(34) Financial risk management

The following section describes the group's position with regard to risks arising from financial instruments and their potential future impact on the net assets, financial position and operational results. The classification into material and immaterial financial risks considered in the risk and opportunity report has been disregarded.

Goals, guidelines and processes of the group’s risk management system are discussed in detail in the risk and opportunity report within the management report. ADVA’s capital management is described in note (35).

The management board establishes principles for overall risk management and decides on the use of derivative financial instruments and the investment of excess liquidity. The compliance department is responsible for group-wide monitoring of observance of the processes and guidelines of the risk management system defined by the ADVA management board.

Foreign currency risks

Risk exposure

ADVA is exposed to foreign currency risks as investments, financing and operations are carried out in several currencies. This results in foreign currency risks from future transactions as well as from recognized assets and liabilities denominated in a currency other than the functional currency of the respective group company. As part of the reporting date analysis of balance sheet exposures and exchange rate sensitivities, the currency pairs USD/ILS, EUR/USD, EUR/ILS and EUR/CNY were identified as relevant. The risks from the currency pairs EUR/CHF, SGD/USD and ILS/USD considered in 2018 are insignificant on the balance sheet date. The relevance of the different currencies can vary depending on the reporting date.

The foreign currency risk of ADVA on the basis of the underlying operating activities at the end of 2019 in the major currencies is as follows:

(in thousands)	USD
Trade accounts receivable	8,062
Trade accounts payable	35,110

There were no receivables from or liabilities to third parties in ILS and CNY on the reporting date.

At the end of 2018, the foreign currency risk in the major currencies was as follows:

(in thousands)	USD	CHF
Trade accounts receivable (specific allowance)	9,049	4
Trade accounts payable	24,141	11

The group's risk with regard to other currency fluctuations was insignificant at the reporting date.

Risk management
ADVA's risk management framework considers operational business risks to the business that affect the income statement. Specific hedging transactions are only concluded if larger non-recurring foreign exchange risks are expected (e.g. due to a planned M&A transaction). Regarding intercompany payments, the treasury department is closely involved in order to optimize the cash flows with regard to currencies and separate hedging considerations. Foreign currency risks from recognized financial assets and liabilities are only considered by ADVA's risk management in specific cases.

In 2018 and 2019, the group recorded significant external net cash inflows in GBP and significant external net cash outflows in USD. In order to mitigate these material operational risks and as a means to offset cash flow fluctuations, ADVA's Treasury Department has been hedging some of its net cash flows in USD versus GBP through the use of forward foreign exchange agreements in GBP already in 2018. These transactions became due in the current year and resulted in a net gain of EUR 5 thousand.

To hedge exchange rate risks from future cash flows, the group entered into derivatives that will mature in the first quarter of 2020. The fair value of these foreign exchange agreements is recognized in other current assets or other current liabilities. The related fair values amounted to positive EUR 0 thousand and negative EUR 336 thousand, respectively (December 31, 2018: positive EUR 108 thousand). As of December 31, 2019, the nominal value of these derivatives amounted to EUR 14,951 thousand (December 31, 2018: EUR 8,786 thousand). The nominal value is the accounting value from which payments are derived. Since the nominal value itself is not at risk, the potential for changes in foreign currency exchange rates is hedged.

Sensitivity analysis
The foreign exchange rate sensitivity of the most relevant currency pairs with respect to balance sheet risks on earnings after tax at the end of the reporting period is illustrated below. The analysis does not take into account effects from the translation of the financial statements of the group`s foreign subsidiaries into euro the company's reporting currency.

If, at the balance sheet date, the relevant exchange rates would have appreciated or depreciated by 10% relative to the base currency in the relevant currency relations (base currency/spot currency), the following impact on earnings after tax would have to be considered:

(in thousands of EUR, on December 31)	**2019**	
	+10%	-10%
USD/ILS	2,036	-2.489
EUR/USD	-1,483	1.813
EUR/ILS	-387	473
EUR/CNY	-353	432

As described in the section on foreign currency risk positions, the relevant currency pairs have changed in 2019 compared to 2018. In the previous year, the following sensitivities were reported for the currency relations relevant in 2018:

(in thousands of EUR, on December 31)	**2018**	
	+10%	-10%
USD/CHF	-1,668	2,039
EUR/USD	-1,165	1,424
USD/SGD	-508	6213
USD/ILS	463	-566

In addition, the currency pair USD/GBP is relevant for risk management considerations. The currency pairs USD/GBP and USD/EUR are hedged by using forward contracts. If, at the balance sheet date, the spot currency GBP had appreciated or depreciated by 10% against the base currency USD, the following effects would have been recognized in profit or loss:

(in thousands of EUR, on December 31)	**2019**	
	GBP +10%	GBP -10%
USD/GBP	1,142	-934
	EUR +10%	EUR -10%
USD/EUR	-462	444

The following sensitivities have been reported in 2018:

(in thousands of EUR, on December 31)	**2018**	
	GBP +10%	GBP -10%
USD/GBP	980	-792

In 2018 the USD/EUR currency risk has not been considered in hedging.

Interest rate risk

Risk exposure
The interest rate risk is the risk that fair values or future interest payments on existing and future financial liabilities will fluctuate due to changes in market interest rates.

In addition to medium- and long-term financial instruments with fixed interest rates, ADVA Optical Networking SE has a variable rate loan of EUR 65,000 thousand to finance its investments, which fundamentally results in an interest rate risk. Additionally, there is an outstanding credit line of EUR 10,000 thousand which has not been drawn as of December 31, 2019. The interest on a loan drawn under this credit line would depend on EURIBOR. Further information on existing financial liabilities can be found in note (17).

Risk management
The treasury department regularly analyzes the existing interest rate risk and, in the event of a material risk, makes proposals for the use of appropriate hedging instruments. As part of risk management to limit interest rate risks, derivative financial instruments such as interest rate caps and interest rate swaps can be used. Due to the continued expansive interest rate policy of the European Central Bank, the EURIBOR interest rate is negative at the reporting date. Due to low economic forecasts and low core inflation, ADVA does not expect any significant interest rate spreads change in the euro area and thus rates the interest rate risk as low as at December 31, 2019.

Sensitivity analysis
The interest rate sensitivity of the result after taxes is shown below. At the reporting date, financial instruments having a potential effect on equity did not exist. As of December 31, 2019, the 3-month EURIBOR was negative. Due to the floor agreed in the loan agreement, a reduction in EURIBOR as at December 31, 2019 would have had no effect on the interest rate. An EURIBOR increase of 0.5% would have resulted in an additional interest expense of EUR 54 thousand (prior year: EUR 27 thousand).

Default risk

Risk exposure
The default risk arising from financial assets involves the risk of the default of a contractual partner and thus includes at maximum the amount of the related recognized carrying

amounts. At ADVA default risks arise from cash at banks, contract assets and contractual cash flows from debt instruments that are measured at amortized cost or at fair value through profit or loss, including outstanding trade receivables.

Risk management
All default risks are managed at group level. The default risk is mitigated by various measures, depending on the class of financial assets. In addition, the credit risk from non-derivative financial assets is taken into account by means of risk provisioning and bad debt allowances.

ADVA enters into transactions with creditworthy banks and financial institutions. To assess the creditworthiness of banks and financial institutions, ADVA uses current credit ratings from rating agencies (S&P, Moody's or Fitch) as well as current default rates (credit default swaps). Based on the capital market ratings, ADVA divided the banks into three internal rating classes, determining their exposure at default and calculating the expected loss at default as of December 31, 2019 and 2018. Due to immateriality, no risk provisions were recognized at the balance sheet date.

The gross carrying amounts (risk positions) by rating class on 31 December are as follows:

(in thousands of EUR)	2019	2018
Rating class 1	54,209	62,608
Rating class 2	12	12
Rating class 3	42	32
Total	**54,263**	**62,652**

ADVA has distributed its investments to more than 10 international credit institutions. As of December 31, 2019, one bank was responsible for approximately 91% of all investments (as of December 31, 2018: for approximately 75%). This results in a risk exposure of EUR 49.345 thousand. (2018: EUR 46,906 thousand).

When concluding contracts with clients, the creditworthiness and credit quality of the client is assessed on the basis of independent ratings (e.g. Duns & Bradstreet), audited financial statements, or historical experience. Depending on the risk assessment, deliveries are made solely only under reasonable payment terms, which may include down payments or advance payments.

The group uses the simplified approach under IFRS 9 to measure the expected credit losses on trade receivables carried at amortized cost and contract assets. Trade receivables are summarized on the basis of common credit risk characteristics and overdue days.

As of December 31, 2019 and 2018, the expected loss ratios are based on historical payment profiles of receivables and the corresponding historical defaults. There are adjusted to reflect up-to-date and forward-looking information on macroeconomic factors (such as geopolitical events, currency fluctuations, inflation, trade wars, state subsidies) that may affect clients' solvency. Contract assets relate to work that has not yet been invoiced, and accordingly have the same risk characteristics as trade receivables of the underlying contracts.

In addition, ADVA applies a specified valuation if certain criteria are met.

The following table shows the overdue structure of gross carrying amounts of trade accounts receivable and contract assets by as of December 31, 2019:

(in thousands of EUR)	Not yet due	Overdue up to 90 days	90 - 180 days overdue	180 days to 1 year overdue	more than 1 year overdue	high default risk	Total
Trade accounts receivable (simplified approach)	83,346	9,779	744	1,170	353	2,492	97,884
Contract assets	654	-	-	-	-	-	654

As of 31 December 2018, the overdue structure of gross carrying amounts of trade receivables and contract assets were as follows:

(in thousands of EUR)	Not yet due	Overdue up to 90 days	90 - 180 days overdue	180 days to 1 year overdue	more than 1 year overdue	high default risk	Total
Trade accounts receivable	82,344	14,363	415	882	570	-	98,574
Contract assets	320	-	-	-	-	-	320

Due to immateriality, no valuation allowances were recognized relating to contract assets as of December 31, 2019. The reconciliation of risk provisions for trade receivables is shown in note (11).

For other financial assets carried at amortized cost with a total carrying amount of EUR 6,325 thousand (prior year: EUR 4,506 thousand), the group analyzes the risk on a case-by-case basis. As of December 31, 2019 and 2018, there were no significant default risks. Therefore, no valuation allowances were recognized.

Liquidity risk

Risk exposure
In general, the inability to meet its financial obligations, such as servicing its debts, composes the liquidity risk of ADVA.

Risk management
Management uses rolling forecasts to monitor the group's liquidity reserves, consisting of cash and cash equivalents based on expected cash flows and unused credit lines. To manage liquidity, ADVA considers compliance with internally defined operating liquidity at all times.

The group's liquidity management policies include the forecast of cash flows in the major currencies and the assessment of required cash in these currencies, the monitoring of balance sheet liquidity ratios and the management of debt financing plans. In general, ADVA pursues a conservative and risk-avoiding strategy.

Financing agreements
The loan agreements contain restrictions and covenants that restrict the financial and operating scope of ADVA. A breach of these agreements would result in a compulsory early repayment of the loans. The company estimates this risk as low as at the reporting date and the prior year-end.

At the end of the reporting period, ADVA had financing agreements with various banks. This includes a syndicated loan of a nominal amount of EUR 59,000 thousand with maturity in September 2023, bilateral term loans in the amount of EUR 12,500 thousand with ending maturity in September 2020 and a bilateral bullet term loan of EUR 10,000 thousand due in September 2022. In addition, the syndicated loan has an undrawn revolving credit facility over EUR 10,000 thousand. Some of the credit agreements are subject to financial and non-financial covenants that the Group must always comply with. Failure to comply would result in an event of default. All agreements complied in the reporting period. See also note (17) on liabilities to banks.

Maturities of financial liabilities

The table below analyzes the group's non-derivative financial liabilities according to their maturity based on the remaining time at the balance sheet date to the contractual maturity date:

(in thousands of EUR, on Dec. 31, 2019)	Note	Carrying value	Future cash flows					
			≤ 12 months		13 – 36 months		> 36 months	
			Redemption	Interest	Redemption	Interest	Redemption	Interest
Lease liabilities	(16)	34,430	6,082	1,058	16,772	2,033	11,576	1,074
Liabilities to banks	(17)	80,979	19,221	1,038	40,019	1,379	21,739	215
Trade accounts payable	(18)	73,398	73,398	-	-	-	-	-
Other financial liabilities	(18)	21,468	20,963	-	447	-	58	-
		210,275	119,664	2,096	57,238	3,412	33,373	1,289

(in thousands of EUR, on Dec. 31, 2018)	Note	Carrying value	Future cash flows					
			≤ 12 months		13 – 36 months		> 36 months	
			Redemption	Interest	Redemption	Interest	Redemption	Interest
Financial liabilities	(17)	89,484	19,400	1,291	34,205	1,818	35,879	836
Trade accounts payable	(18)	63,195	63,195	-	-	-	-	-
Other financial liabilities	(18)	18,160	18,098	-	62	-	-	-
		170,839	100,693	1,291	34,267	1,818	35,879	836

(35) Capital management

Risk management

ADVA's capital management aims to ensure the continued existence of the company and optimization of its capital structure to reduce its cost of capital.

The group defines capital as the sum of equity and financial liabilities. In 2019, the accounting standard IFRS 16 became effective. Due to the first-time adoption of IFRS 16 ADVA had to recognize lease liabilities of EUR 34,430 thousand that increased financial debt to EUR 115,412 thousand (prior year: EUR 89,484 thousand). Equity at December 31, 2019 amounted to EUR 255,792 thousand or 47.7% of the balance sheet total (previous year: EUR 244,641 thousand or 50.3% of the balance sheet total). For liabilities to banks of EUR 80,979 thousand as of December 31, 2019 (previous year: EUR 89,484 thousand), the term usually exceeds the life of the assets financed. ADVA aims for an equity ratio of at least 30% and a ratio of gross debt to EBITDA of a maximum of 2.5 x. Both financial ratios were met in the past financial year.

Financial covenants

The loan agreements include compliance with certain financial covenants that should be guaranteed at all time within the scope of capital management. As of December 31, 2019, ADVA needs to comply with a gross leverage (proportion of gross debt to EBITDA for the last 12 months).

A breach of the commitment clauses may lead to early repayment of the borrowed funds. ADVA minimizes risk through ongoing monitoring of financial metrics.

Within the scope of capital management, ADVA seeks to minimize interest expenses, provided that the availability of funds is not jeopardized. Excess funds are usually used to pay off debt. For USD bank accounts, a so-called cash pooling is implemented. Under this agreement, the funds will be transferred daily to a collective account. The interest is calculated on the basis of the combined balances.

(36) Other financial obligations and financial commitments

On December 31, 2019, the group had purchase commitments totaling EUR 45,473 thousand (on December 31, 2018: EUR 38,851 thousand) in respect to suppliers.

Group entities have issued guarantees in favor of customers. On December 31, 2019, performance bonds with a maximum guaranteed amount of EUR 2,422 thousand were issued (on December 31, 2018: EUR 3,066 thousand). At year-end 2019, ADVA does not expect claims from these guarantees.

With respect to various financing agreements there are certain guarantee obligations from ADVA North America Inc. and ADVA Ltd. to ADVA Optical Networking SE.

(37) Contingent liabilities

In the normal course of business, claims may be asserted, or lawsuits filed against the company and its subsidiaries from time to time. On December 31, 2019, ADVA does not expect that potential titles or litigations in detail or in total will have a material impact on its financial position or operating performance.

(38) Auditor's fees and other services from auditors

Since June 9, 2010, PricewaterhouseCoopers GmbH Wirtschaftsprüfungsgesellschaft (PwC), Munich, Member of the German Wirtschaftsprüfungskammer in Berlin, is the auditor of the company and the group. After internal rotation in 2014, Holger Graßnick is the responsible certified accountant for the company.

In 2019 and 2018, the following fees charged by the legal auditor were recognized as expenses:

(in thousands of EUR)	2019	2018
Year-end audit	385	373
Other consulting services	74	22
	459	395

In 2019, other consulting services mainly include services in relation to the separate nonfinancial report and the financial covenants.

(39) Stock option programs

To date, the company has issued stock options for employees (Plan XIV) and for management board (Plan XIVa). Generally, both share-based compensation programs for the management board and employees of the company and its subsidiaries are still available for issuance of share-based compensation instruments.

All contracts stipulate a four-year vesting period and a total contractual life of seven years for the respective rights issue. The rights may only be exercised if the volume weighted average of the company share closing prices on the ten stock exchange trading days before the first day of each exercise period in which the option is exercised is at least 20% of the purchase price. In addition, options issued to the management board from Plan XIV include a profit limitation. They are referred to as Plan XIVa.

All option rights are non-transferable. They may only be exercised as long as the entitled person is employed on a permanent contract by the company or by a company in which ADVA Optical Networking SE has direct or indirect interest. Option rights issued to apprentices may only be exercised if the apprentices are hired by the company or by an affiliated company on a permanent contract. All option rights expire upon termination of the employment contract. In the event that the person entitled dies, becomes unable to work or retires, special provisions come into force.

The group of people to whom option rights can be issued is defined separately for each stock option program. According to the resolution on May 22, 2019, 35.0% of option rights - in total 1,747,583 options rights - authorized pursuant to Plan XIV and Plan XIVa could be issued to members of the management board, 5.0% - in total 249,655 options rights - to the management of affiliated companies, 22.5% - in total 1,123,446 options rights - to company employees, and 37.5% - in total 1,872,411 options rights - to employees of affiliated companies. The management board specifies the exact group of people entitled to exercise rights and the scope of each offer. Options rights awarded to the management board are approved by supervisory board.

Subject to the conditions under which option rights are issued, each option right entitles the individual to purchase one common share in the holding company. The conditions of issue specify the term, the exercise price (strike price), any qualifying periods and the defined exercise periods.

Exercise periods are regularly linked to key business events in the company's calendar and each have a defined term. Certain other business events can lead to blocking periods, during which option rights cannot be exercised. Insofar as regular exercise periods overlap with such blocking periods, the exercise deadline shall be extended by the corresponding number of exercise days immediately after the end of such a blocking period. Option rights may be exercised only on days on which commercial banks are open in Frankfurt am Main, Germany.

The fair value of stock options is estimated by simulation (Monte Carlo method) using a program that was especially adjusted to the underlying plans and based on the assumed strategy for the exercise (earliest possible date).

The following computation parameters apply for option rights issued in 2019:

	Plan XIV
Weighted average share price (in EUR)	7.50
Weighted average strike price (in EUR)	7.07
Weighted expected volatility (in % per year)	46.56%
Term (in years)	7
Weighted risk-free interest rate (in % per year)	-0.62%

The volatility is specified as fluctuation of the share price compared to the average share price of the period. In each case, expected volatility is calculated based on historic share prices (historic volatility). The risk-free interest rate is based on information on risk-free investments with corresponding terms.

For the calculation of the fair value of options, ADVA assumed that no dividends will be paid to stockholders.

The tables below present changes in the number of option rights outstanding.

Stock option program 2011 (Plan XIV)

	Number of options	Weighted average strike price (in EUR)
Options outstanding on Jan. 1, 2018	**2,069,418**	**6.42**
Granted options	425,000	7.8
Exercised options	-195,406	4.15
Forfeited options	-110,700	6.66
Expired options	-23,100	3.93
Options outstanding on Dec. 31, 2018	**2,165,212**	**6.91**
Granted options	436,000	7.07
Exercised options	-151,011	4.98
Forfeited options	-212,300	7.41
Expired options	-3,001	5.05
Options outstanding on Dec. 31, 2019	**2,234,900**	**7.03**
Of which exercisable	587,400	8.36

The weighted average remaining contractual life for option rights outstanding on December 31, 2019 is 4.82 years (December 31, 2018: 5.01 years). The strike price for these options is between EUR 2.87 and EUR 10.16 (2018: between EUR 2.87 and EUR 10.16).

The average fair value of option rights granted in 2019 is EUR 3.14 (December 31, 2018: EUR 3.13).

Stock options exercised in 2019 had an average share price of EUR 6.76 on the exercise date.

Stock option program 2011 for the management board (Plan XIVa)

	Number of options	Weighted average strike price (in EUR)
Options outstanding on Jan. 1, 2018	**991,667**	**6.27**
Granted options	175,000	5.79
Exercised options	-	-
Forfeited options	-	-
Expired options	-	-
Options outstanding on Dec. 31, 2018	**1,166,667**	**6.20**
Granted options	-	-
Exercised options	-100,000	5.05
Forfeited options	-	-
Expired options	-	-
Options outstanding on Dec. 31, 2019	**1,066,667**	**6.31**
Of which exercisable	340,000	4.33

The weighted average remaining contractual life for option rights outstanding on December 31, 2019, is 3.46 years (December 31, 2018: 4.14 years). The strike price for these options is between EUR 3.19 and EUR 8.70 (2018: between EUR 3.19 and EUR 8.70).

Compensation expenses arising from share-based compensation programs included in operating income were as follows:

(in thousands of EUR)	2019	2018
Plan XIV	1,023	945
Plan XIVa	467	493
Plan XV	-	-25
	1,490	**1,413**

(40) Related party transactions

Teleios Capital Partners LLC Zug, Switzerland, EGORA Holding GmbH, Martinsried/Munich, and its subsidiaries (the EGORA group), Saguna Networks Ltd., Nesher, Israel, Arista Networks, Santa Clara, USA, Fraunhofer Heinrich Hertz Institute, Berlin, Harmonic Inc., San Jose, USA, and all members of the company's governing bodies and their relatives qualify as related parties to ADVA on December 31, 2019, in the sense of IAS 24.

Teleios Capital Partners LLC is an investment company based in Zug, Switzerland. On December 31, 2019, Teleios Capital Partners LLC and its subsidiaries held a 22.36% share in the equity of ADVA. No business relations existed with Teleios Capital Partners LLC.

On December 31, 2019, the EGORA group held a 14.86% share in the equity of ADVA Optical Networking SE.

ADVA Optical Networking SE holds 7.1% of the shares of Saguna Networks Ltd., Nesher, Israel. A service agreement with Saguna Networks Ltd. exists regarding the provision of development services for the companies of ADVA group.

In 2019, ADVA acquired components with an amount of EUR 12 thousand from the EGORA group (2018: EUR 75 thousand.) In 2019 and 2018, ADVA did not sell any products to the EGORA group.

ADVA has entered into several agreements with the EGORA group under which ADVA is entitled to make use of certain facilities and services of the EGORA group. In 2019 and 2018, these agreements were not utilized.

On December 31, 2019 and 2018, no trade accounts payable and provision existed in respect to EGORA group.

In 2019 and 2018, Saguna Networks Ltd. has not performed development services for the group.

In 2019 and 2018, respectively, ADVA acquired no components from Arista Networks, Inc. On December 31, 2019, no trade accounts payable and provisions existed in respect to Arista Networks, Inc. (December 31, 2018: nil).

ADVA entered a service agreement with Fraunhofer Heinrich-Hertz-Institute. In 2019, ADVA acquired no services (2018: EUR 77 thousand). On December 31, 2019, no trade accounts payable existed in respect to Fraunhofer Heinrich-Hertz-Institute (December 31, 2018: nil).

In 2019, Harmonic Inc. acquired products with an amount of EUR 3 thousand from ADVA (December 31, 2018: EUR 2 thousand). On December 31, 2019 no trade receivables existed in respect to Harmonic Inc. (December 31, 2018: nil).

All transactions with the related parties listed above are conducted on an arm’s-length basis.

See note (41) for detailed information about compensation of the management board and the supervisory board.

(41) Governing boards and compensation

Management board

	Resident in	External mandates
Brian Protiva Chief executive officer	Berg, Germany	Member of the board of directors of AMS Technologies AG, Martinsried, Germany
Christoph Glingener Chief technology officer & chief operating officer	Jade, Germany	Member of the board of trustees of Fraunhofer Heinrich-Hertz-Institute, Berlin, Germany
Ulrich Dopfer Chief financial officer	Alpharetta, Georgia, USA	-
Scott St. John Chief marketing & sales officer	Raleigh, North Carolina, USA	-

Supervisory board

	Resident in	Occupation	External mandates
Nikos Theodosopoulos Chairman	Manhasset, New York, USA	Founder and managing member, NT Advisors LLC, Manhasset, New York, USA	Member of the board of directors of Arista Networks, Inc., Santa Clara, CA, USA Member of the advisory board of Columbia Engineering Entrepreneurship, New York, NY, USA Member of the board of directors of Harmonic, Inc., San Jose, CA, USA Board member of Driving Management Systems, Inc., Colorado Springs, CO, USA
Johanna Hey Vice chairwoman	Cologne, Germany	Professor for tax law, University of Cologne, Cologne, Germany	Director of the Institut Finanzen und Steuern e.V., Berlin, Germany Member of the supervisory board of Gothaer Versicherungsbank VVaG, Cologne, Germany Member of the supervisory board of Gothaer Finanzholding AG, Cologne, Germany Member of the supervisory board of Cologne Executive School GmbH, Cologne, Germany Member of the supervisory board of Flossbach von Storch AG, Cologne, Germany
Michael Aquino (since June 13, 2018)	Peachtree City, Georgia, USA	Consultant	-

Compensation of the management board

The total management board compensation according to section 314 paragraph 1 no. 6a HGB was EUR 1,695 thousand in 2019 and EUR 2,099 thousand in 2018.

The value of benefits granted to the individual Board members analyzes as follows:

(in thousands of EUR)	Fixed	Bonus (variable)	Issuance of stock options (variable)	Total 2019	Total 2018
Brian Protiva Chief executive officer	262	206	-	468	642
Christoph Glingener Chief technology officer & chief operating officer	267	146	-	413	417
Ulrich Dopfer Chief financial officer	268	131	-	399	415
Scott St. John Chief marketing & sales officer	268	147	-	415	625

The fixed compensation includes non-performance-based considerations and fringe benefits (company car allowances). The variable compensation considers components related to short-term performance goals that are reported as current liabilities on December 31, 2019, as well as components based on long-term performance goals (none in 2019; prior year: EUR 367 thousand which solely related to issuance of options to Brian Protiva and Scott St. John).

The total management board compensation according to IFRS amounts to EUR 2,179 thousand (prior year: EUR 2,242 thousand) and includes current considerations (fixed compensation, fringe benefits and current variable compensation) totaling EUR 1,712 thousand (prior year: EUR 1,749 thousand) as well as long-term incentive components amounting to EUR 467 thousand (prior year: EUR 493 thousand) which relate exclusively to remuneration components in connection with stock options.

The group paid pecuniary damage liability insurance premiums on behalf of members of the management board totaling EUR 13 thousand in 2019 and 2018 EUR 13 thousand (in equal amounts for each management board member), respectively.

In 2019 and 2018, no loans were granted to the members of the management board. At December 31, 2019, no receivables outstanding from members of the management board have been reported.

On December 31, the members of the management board held the following shares and stock options:

	Shares		Stock options	
	2019	2018	2019	2018
Brian Protiva Chief executive officer	401,030	401,030	285,000	335,000
Christoph Glingener Chief technology officer & chief operating officer	-	-	275,000	325,000
Ulrich Dopfer Chief financial officer	500	500	256,667	256,667
Scott St. John Chief marketing & sales officer	-	-	250,000	250,000

On December 31, 2019 and 2018, the options to members of the management board were granted solely out of Plan XIVa. The option rights authorize the management board to purchase the said number of common shares in the company once the qualifying period has elapsed. Plan XIVa includes a profit limit of EUR 20.00 per option.

The strike price for these option rights is

- EUR 3.90 for 130,000 options granted on November 15, 2013,
- EUR 3.19 for 60,000 options granted on May 15, 2014,
- EUR 5.15 for 150,000 options granted on May 15, 2015,
- EUR 8.70 for 401,667 options granted on May 15, 2016,
- EUR 4.98 for 150,000 options granted on November 15, 2017, and
- EUR 5.79 for 175,000 options granted on May 15, 2018, respectively.

The management board received cash inflows of EUR 118 thousand from the exercise of stock options in 2019 (2018: EUR 9 thousand).

Further information on compensation of the management board is included in the remuneration report in the group management report.

Compensation of the supervisory board
The fixed compensation to be paid to the supervisory board for 2019 and 2018 totaled EUR 235 thousand, respectively. This amount analyzes across the individual board members as follows:

(in thousands of EUR)	2019	2018
Nikos Theodosopoulos Chairman	100	100
Johanna Hey Vice chairwoman	90	90
Hans-Joachim Grallert (until June 13, 2018)	-	20
Michael Aquino (since June 13, 2018)	45	25

The compensation for the supervisory board of ADVA Optical Networking SE is paid out in quarterly installments. The fixed compensation for Q4 2019 amounting to EUR 59 thousand was paid out in January 2020. In the consolidated financial statements, this amount is recognized in other current liabilities.

The group paid pecuniary damage liability insurance premiums on behalf of members of the supervisory board totaling EUR 10 thousand in 2019 and 2018 EUR 10 thousand, respectively.

On December 31, 2019, no shares or stock options were held by members of the supervisory board (December 31, 2018: none).

Further information on compensation of the supervisory board is included in the remuneration report in the group management report.

(42) Events after the balance sheet date

There were no events after the balance sheet date that materially affected the net assets and financial position of the group on December 31, 2019, or its financial performance for 2019. Similarly, there were no events considered material for disclosure.

Declaration of compliance with the German Corporate Governance Code

Pursuant to section 161 of the German Stock Corporation Law (AktG), the management board and the supervisory board have issued a declaration of compliance with the German Corporate Governance Code. This declaration is published on the group's website www.adva.com.

Meiningen, February 18, 2020

Brian Protiva　　　Christoph Glingener

Ulrich Dopfer　　　Scott St. John

Affirmative declaration of the legal representatives

We, the members of the management board of ADVA Optical Networking SE, to the best of our knowledge affirm that, in accordance with the applicable reporting principles, the management report and the consolidated financial statements of the ADVA group represent a true and fair view of the net assets, financial position and performance of the group, together with a description of the principal opportunities and risks associated with the expected development of the group.

Meiningen, February 18, 2020

Brian Protiva　　　Christoph Glingener

Ulrich Dopfer　　　Scott St. John

Independent auditor's report

To ADVA Optical Networking SE, Meiningen

Report on the audit of the consolidated financial statements and of the group management report

AUDIT OPINIONS

We have audited the consolidated financial statements of ADVA Optical Networking SE, Meiningen, and its subsidiaries (the Group), which comprise the consolidated statement of financial position as at December 31, 2019, and the consolidated statement of comprehensive income, consolidated statement of profit or loss, consolidated statement of changes in equity and consolidated statement of cash flows for the financial year from January 1 to December 31, 2019, and notes to the consolidated financial statements, including a summary of significant accounting policies. In addition, we have audited the group management report of ADVA Optical Networking SE, which is combined with the Company's management report, for the financial year from January 1 to December 31, 2019. We have not audited the content of those parts of the group management report listed in the "Other Information" section of our auditor's report.

In our opinion, on the basis of the knowledge obtained in the audit,

- the accompanying consolidated financial statements comply, in all material respects, with the IFRSs as adopted by the EU, and the additional requirements of German commercial law pursuant to § [Article] 315e Abs. [paragraph] 1 HGB [Handelsgesetzbuch: German Commercial Code] and, in compliance with these requirements, give a true and fair view of the assets, liabilities, and financial position of the Group as at December 31, 2019, and of its financial performance for the financial year from January 1 to December 31, 2019, and
- the accompanying group management report as a whole provides an appropriate view of the Group's position. In all material respects, this group management report is consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. Our audit opinion on the group management report does not cover the content of those parts of the group management report listed in the "Other Information" section of our auditor's report.

Pursuant to § 322 Abs. 3 Satz [sentence] 1 HGB, we declare that our audit has not led to any reservations relating to the legal compliance of the consolidated financial statements and of the group management report.

BASIS FOR THE AUDIT OPINIONS

We conducted our audit of the consolidated financial statements and of the group management report in accordance with § 317 HGB and the EU Audit Regulation (No. 537/2014, referred to subsequently as "EU Audit Regulation") and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Our responsibilities under those requirements and principles are further described in the "Auditor's Responsibilities for the Audit of the Consolidated Financial Statements and of the Group Management Report" section of our auditor's report. We are independent of the group entities in accordance with the requirements of European law and German commercial and professional law, and we have fulfilled our other German professional responsibilities in accordance with these requirements. In addition, in accordance with Article 10 (2) point (f) of the EU Audit Regulation, we declare that we have not provided non-audit services prohibited under Article 5 (1) of the EU Audit Regulation. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions on the consolidated financial statements and on the group management report.

KEY AUDIT MATTERS IN THE AUDIT OF THE CONSOLIDATED FINANCIAL STATEMENTS

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements for the financial year from January 1 to December 31, 2019. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our audit opinion thereon; we do not provide a separate audit opinion on these matters.

In our view, the matters of most significance in our audit were as follows:

1) Recoverability of goodwill

2) Accounting treatment of internally generated intangible assets

3) Accounting treatment of deferred taxes

Our presentation of these key audit matters has been structured in each case as follows:

1. Matter and issue

2. Audit approach and findings

3. Reference to further information

Hereinafter we present the key audit matters:

1) Recoverability of goodwill

1. In the Company's consolidated financial statements goodwill amounting to EUR 72,023 thousand is reported under the balance sheet item "Goodwill". Goodwill is tested for impairment by the Company once a year or when there are indications of impairment to determine any possible need for write-downs. The impairment test is carried out at the level of the groups of cash-generating units to which the relevant goodwill is allocated. The carrying amount of the relevant cash generating units, including goodwill, is compared with the corresponding recoverable amount in the context of the impairment test. The recoverable amount is generally determined using the value in use. The present value of the future cash flows from the respective group of cash-generating units normally serves as the basis of valuation. Present values are calculated using discounted cash flow models. For this purpose, the adopted medium-term business plan of the Group forms the starting point which is extrapolated based on assumptions about long-term rates of growth. Expectations relating to future market developments and assumptions about the development of macroeconomic factors are also taken into account. The discount rate used is the weighted average cost of capital for the relevant group of cash-generating units. The impairment test determined that no write-downs were necessary.

The outcome of this valuation is dependent to a large extent on the estimates made by the executive directors with respect to the future cash inflows from the respective group of cash-generating units, the discount rate used, the rate of growth and other assumptions, and is therefore subject to considerable uncertainty. Against this background and due to the complex nature of the valuation, this matter was of particular significance in the context of our audit.

2. As part of our audit, we assessed the methodology employed for the purposes of performing the impairment test, among other things. After matching the future cash inflows used for the calculation against the adopted medium-term business plan of the Group, we assessed the appropriateness of the calculation, in particular by reconciling it with general and sector-specific market expectations. In addition, we assessed the appropriate consideration of the costs for Group functions. In the knowledge that even relatively small changes in the discount rate applied can have a material impact on the value in use calculated in this way, we focused our testing in particular on the parameters used to determine the discount rate applied, and assessed the calculation model. In order to reflect the uncertainty inherent in the projections, we evaluated the sensitivity analyses performed by the Company.

Overall, the valuation parameters and assumptions used by the executive directors are in line with our expectations and are within the ranges considered by us to be reasonable.

3. The Company's disclosures on goodwill are contained in sections (6) Recognition and measurement, (7) Significant accounting judgments, estimates and assumptions and (15) Fixed assets in the notes to the consolidated financial statements.

2) Accounting treatment of internally generated intangible assets

1. In the Company's consolidated financial statements an amount of EUR 96,169 thousand is reported under the balance sheet item "capitalized development projects". This item represents development costs incurred for new products, which have been capitalized in accordance with the provisions of IAS 38 and have already been partially amortized in line with their useful lives. An impairment test is carried out at least once annually for projects still under development in accordance with IAS 36. Own expenses capitalized in accordance with these provisions during the financial year amounted to EUR 42,443 thousand, representing a reduction in the expenses charged to profit or loss. The eligibility of the development expenses for capitalization depends on the criteria established by IAS 38.57 and includes considerable scope for judgment, for example with respect to future cash inflows or the expected useful lives of the products developed. Against this background and due to the underlying complexity of the methodological requirements relating to measurement and eligibility for capitalization, this matter was of particular significance for our audit.

2. As part of our audit, we evaluated the internal processes and controls for recording the development projects, among other things. We also assessed the methodology used to calculate the expenses eligible for capitalization. We assessed the eligibility for capitalization of material projects on the basis of the criteria set out in IAS 38.57. We evaluated the stage of progress of the particular project by means of discussions with members of staff in the R&D controlling department and inspection of the project documentation. We assessed the amount of the development costs capitalized and the recoverability of the development expenditure on the basis of suitable supporting evidence. In our view, the methodology applied by the Company for capitalizing development projects is appropriate, and the stage of completion of the projects and the development costs capitalized have been clearly documented.

3. The Company's disclosures on internally generated intangible assets are contained in sections (6) Recognition and measurement, (7) Significant accounting judgments, estimates and assumptions, (15) Fixed assets, (27) Income taxes and (32) Segment reporting in the notes to the consolidated financial statements.

3) Accounting treatment of deferred taxes

1. After netting, deferred tax assets amounting to EUR 6,336 thousand and deferred tax liabilities of EUR 12,307 thousand are reported in the Company's consolidated financial statements. Deferred tax assets were recognized to the extent that the executive directors consider it probable that taxable profit will be available in the foreseeable future which will enable the deductible temporary differences and unused tax losses to be utilized. For this purpose, insofar as sufficient deferred tax liabilities are not available, future taxable profits are projected on the basis of the business plan. No deferred tax assets were recognized in respect of unused tax losses and other deductible temporary differences amounting in total to EUR 225,275 thousand, since it is currently not probable that they will be utilized for tax purposes by means of offsetting against taxable profits. Deferred tax liabilities mainly arise from differences between the carrying amounts of the development projects as well as the goodwill recognized at company level in accordance with IFRSs and their tax bases in accordance with the applicable tax laws. From our point of view, the accounting treatment of deferred taxes was of particular significance in the context of our audit, as it depends to a large extent on the estimates and assumptions made by the executive directors and is therefore subject to uncertainties.

2. As part of our audit, we assessed, among other things, the internal processes and controls for recording tax matters as well as the methodology used for the determination, accounting treatment and measurement of deferred taxes. We also assessed the recoverability of the deferred tax assets relating to deductible temporary differences and unused tax losses on the basis of the Company's internal forecasts of its future earnings situation, and the appropriateness of the underlying estimates and assumptions.

Based on our audit procedures, we were able to satisfy ourselves that the estimates and assumptions made by the executive directors are substantiated and sufficiently documented

3. The Company's disclosures on deferred taxes are contained in sections (6) Recognition and measurement, (7) Significant accounting judgments, estimates and assumptions and (27) Income taxes in the notes to the consolidated financial statements.

OTHER INFORMATION

The executive directors are responsible for the other information. The other information comprises the following non-audited parts of the group management report, which we obtained prior of the date of our auditor's report:

- the statement on corporate governance pursuant to § 289f HGB and § 315d HGB included in section "Declaration on corporate governance and corporate governance report" of the group management report
- the separate non-financial report pursuant to § 289b Abs. 3 HGB and § 315b Abs. 3 HGB

The other information comprises further the remaining parts of the annual report, which we obtained prior to the date of our auditor's report, – excluding cross-references to external information – with the exception of the audited consolidated financial statements, the audited group management report and our auditor's report.

Our audit opinions on the consolidated financial statements and on the group management report do not cover the other information, and consequently we do not express an audit opinion or any other form of assurance conclusion thereon.

In connection with our audit, our responsibility is to read the other information and, in so doing, to consider whether the other information

- is materially inconsistent with the consolidated financial statements, with the group management report or our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

RESPONSIBILITIES OF THE EXECUTIVE DIRECTORS AND THE SUPERVISORY BOARD FOR THE CONSOLIDATED FINANCIAL STATEMENTS AND THE GROUP MANAGEMENT REPORT

The executive directors are responsible for the preparation of the consolidated financial statements that comply, in all material respects, with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to § 315e Abs. 1 HGB and that the consolidated financial statements, in compliance with these requirements, give a true and fair view of the assets, liabilities, financial position, and financial performance of the Group. In addition the executive directors are responsible for such internal control as they have determined necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the executive directors are responsible for assessing the Group's ability to continue as a going concern. They also have the responsibility for disclosing, as applicable, matters related to going concern. In addition, they are responsible for financial reporting based on the going concern basis of accounting unless there is an intention to liquidate the Group or to cease operations, or there is no realistic alternative but to do so.

Furthermore, the executive directors are responsible for the preparation of the group management report that, as a whole, provides an appropriate view of the Group's position and is, in all material respects, consistent with the consolidated financial statements, complies with German legal requirements, and appropriately presents the opportunities and risks of future development. In addition, the executive directors are responsible for such arrangements and measures (systems) as they have considered necessary to enable the preparation of a group management report that is in accordance with the applicable German legal requirements, and to be able to provide sufficient appropriate evidence for the assertions in the group management report.

The supervisory board is responsible for overseeing the Group's financial reporting process for the preparation of the consolidated financial statements and of the group management report.

AUDITOR'S RESPONSIBILITIES FOR THE AUDIT OF THE CONSOLIDATED FINANCIAL STATEMENTS AND OF THE GROUP MANAGEMENT REPORT

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and whether the group management report as a whole provides an appropriate view of the Group's position and, in all material respects, is consistent with the consolidated financial statements and the knowledge obtained in the audit, complies with the German legal requirements and appropriately presents the opportunities and risks of future development, as well as to issue an auditor's report that includes our audit opinions on the consolidated financial statements and on the group management report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with § 317 HGB and the EU Audit Regulation and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer (IDW) will always detect a material misstatement. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements and this group management report.

We exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements and of the group management report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our audit opinions. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit of the consolidated financial statements and of arrangements and measures (systems) relevant to the audit of the group management report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an audit opinion on the effectiveness of these systems.
- Evaluate the appropriateness of accounting policies used by the executive directors and the reasonableness of estimates made by the executive directors and related disclosures.
- Conclude on the appropriateness of the executive directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in the auditor's report to the related disclosures in the consolidated financial statements and in the group management report or, if such disclosures are inadequate, to modify our respective audit opinions. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to be able to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in a manner that the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the Group in compliance with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to § 315e Abs. 1 HGB.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express audit opinions on the consolidated financial statements and on the group management report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinions.

- Evaluate the consistency of the group management report with the consolidated financial statements, its conformity with German law, and the view of the Group's position it provides.
- Perform audit procedures on the prospective information presented by the executive directors in the group management report. On the basis of sufficient appropriate audit evidence we evaluate, in particular, the significant assumptions used by the executive directors as a basis for the prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not express a separate audit opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with the relevant independence requirements, and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, the related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter.

Other legal and regulatory requirements

FURTHER INFORMATION PURSUANT TO ARTICLE 10 OF THE EU AUDIT REGULATION

We were elected as group auditor by the annual general meeting on May 22, 2019. We were engaged by the supervisory board on November 20, 2019. We have been the group auditor of the ADVA Optical Networking SE, Meiningen, without interruption since the financial year 2010.

We declare that the audit opinions expressed in this auditor's report are consistent with the additional report to the audit committee pursuant to Article 11 of the EU Audit Regulation (long-form audit report).

GERMAN PUBLIC AUDITOR RESPONSIBLE FOR THE ENGAGEMENT

The German Public Auditor responsible for the engagement is Holger Graßnick.

Munich, February 18, 2020

PricewaterhouseCoopers GmbH
Wirtschaftsprüfungsgesellschaft

sgd. Holger Graßnick
Wirtschaftsprüfer
(German Public Auditor)

sgd. ppa. Sonja Knösch
Wirtschaftsprüferin
(German Public Auditor)

Additional information

Quarterly overview 2018-2019

(IFRS, in thousands of EUR, unless stated otherwise)	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4
INCOME STATEMENT								
Revenues	**128,160**	**133,216**	**144,310**	**151,135**	**120,538**	**123,752**	**126,178**	**131,513**
Pro forma cost of goods sold	-83,028	-86,703	-95,224	-96,502	-76,275	-78,363	-78,874	-82,848
Pro forma gross profit	**45,132**	**46,513**	**49,086**	**54,633**	**44,263**	**45,389**	**47,304**	**48,665**
Pro forma selling and marketing expenses	-16,589	-17,407	-15,442	-18,880	-15,348	-15,375	-14,515	-15,772
Pro forma general and administrative expenses	-8,617	-8,661	-8,521	-8,052	-8,853	-9,414	-7,640	-8,587
Pro forma research and development expenses	-29,886	-29,011	-28,384	-27,776	-27,882	-26,420	-26,219	-26,644
Income from capitalization of development expenses	11,472	11,085	10,170	9,716	7,973	7,865	7,060	8,974
Other operating income and expenses, net	1,236	1,818	484	692	2,086	4,100	786	1,470
Pro forma operating income	**2,748**	**4,337**	**7,393**	**10,333**	**2,239**	**6,145**	**6,776**	**8,106**
Amortization of intangible assets and goodwill from acquisitions	-1,415	-1,409	-1,417	-1,422	-1,347	-1,373	-1,395	-1,411
Stock compensation expenses	-465	-431	-292	-302	-348	-354	-359	-352
Restructuring expense	-1	-1	-2,484	-3,171	-968	-331	-28	-11
Operating income (loss)	**868**	**2,497**	**3,200**	**5,438**	**-424**	**4,087**	**4,994**	**6,332**
Interest income and expenses, net	-415	-671	-645	-573	-228	-435	-364	-381
Other financial gains and losses, net	784	-44	782	-2,292	-1,894	1,272	100	-574
Income (loss) before tax	**1,237**	**1,782**	**3,337**	**2,573**	**-2,546**	**4,924**	**4,730**	**5,377**
Income tax benefit (expense), net	-201	-485	-1,147	-51	106	-347	-822	-1,744
Net income (loss)	**1,036**	**1,297**	**2,190**	**2,522**	**-2,440**	**4,577**	**3,908**	**3.633**
Earnings per share in EUR								
basic	0.02	0.03	0.04	0.05	-0.05	0.09	0.08	0.07
diluted	0.02	0.03	0.04	0.05	-0.05	0.09	0.08	0.07

(IFRS, in thousands of EUR, except stated otherwise)	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4
BALANCE SHEET (as of period end)								
Cash and cash equivalents	49,323	48,275	38,396	54,263	57,695	59,656	53,949	62,652
Inventories	84,577	88,136	98,029	105,355	73,048	76,263	80,100	85,734
Goodwill	71,667	70,820	73,073	72,023	67,186	69,946	69,914	70,400
Capitalized development projects	92,188	94,702	96,030	96,169	86,481	87,097	86,442	87,926
Other intangible assets	30,066	27,572	26,863	24,568	34,559	33,896	32,251	31,524
Total intangible assets	193,921	193,094	195,966	192,760	188,226	190,939	188,607	189,850
Other assets	188,573	189,540	197,414	183,984	139,291	147,855	157,432	148,302
Total assets	516,394	519,045	529,805	536,362	458,260	474,713	480,088	486,538
Liabilities to banks	86,208	80,143	77,049	80,979	101,875	96,250	92,605	89,484
Lease liabilities (according to IFRS 16 from Jan. 1, 2019)	36,817	36,249	36,220	34,430	n/a	n/a	n/a	n/a
Total financial debt **	123,025	116,392	113,269	115,409	101,875	96,250	92,605	89,484
Leverage per last twelve months *	1.3	1.2	1.2	1.2	2.4	2.3	1.6	1.4
Total stockholders' equity	248,674	247,861	254,977	255,792	223,468	233,201	238,608	244,641
Equity ratio in % **	48.2%	47.8%	48.1%	47.7%	48.8%	49.1%	49.7%	50.3%
CASH FLOW STATEMENT								
Cash flow from operating activities	6,332	21,998	9,015	29,546	5,647	18,074	9,508	27,131
Gross capital expenditures for property, plant and equipment and intangible assets	-15,152	-15,091	-15,007	-15,222	-10,903	-10,580	-11,604	-15,181
FINANCIAL RATIOS (as of period end)								
Net debt ***	73,702	68,117	74,873	61,146	44,180	36,594	38,656	26,832
Net working capital	132,043	127,612	137,789	125,150	122,505	121,776	131,020	120,475
Capital employed	357,306	360,534	363,772	366,462	282,620	286,602	301,406	309,317
ROCE in %	1.0%	1.9%	2.4%	3.3%	-0.6%	2.6%	3.8%	4.8%
Days sales outstanding*	69.4	69.9	69.2	65.8	64.3	67.4	67.8	67.8
Inventory terms last twelve months*	4.1	4.0	4.0	4.0	4.1	3.9	3.9	4.0
Days payables outstanding*	57.2	60.8	61.6	63.3	54.2	54.3	51.3	55.5
EMPLOYEES (as of period end)								
	1,885	1,917	1,935	1,903	1,848	1,842	1,862	1,886

* 12-months rolling.

** The first-time adoption of IFRS 16 in 2019 has an impact on some key figures.

Glossary: *Page 154*

Multi-year overview 2009 - 2019

(in thousands of EUR unless stated otherwise)	2009 IFRS	2010 IFRS
INCOME STATEMENT		
Revenues	**232,808**	**291,725**
Pro forma cost of goods sold	-140,041	-181,874
Pro forma gross profit *	**92,767**	**109,851**
Pro forma selling and marketing expenses	-36,725	-42,947
Pro forma general administrative	-23,280	-23,277
Pro forma research and development expenses	-40,714	-49,391
Income from capitalization of development expenses	12,404	15,291
Other operating income and expenses, net	1,650	3,761
Pro forma operating income (loss)	**6,102**	**13,288**
Amortization of intangible assets and goodwill from acquisitions	-2,443	-2,141
Stock compensation expenses	-1,378	-1,848
Restructuring expense	0	0
Operating income (loss)	**2,281**	**9,299**
Interest income and expenses, net	-1,215	-1,439
Other financial gains and losses, net	543	3,130
Income (loss) before tax	**1,609**	**10,990**
Income tax benefit (expense), net***	-289	-3,983
Net income (loss)***	**1,320**	**7,007**
Earnings per share in EUR***		
basic	0.03	0.15
diluted	0.03	0.15

	2011 IFRS	2012 IFRS	2013 IFRS	2014 IFRS	2015 IFRS	2016 IFRS	2017 IFRS	2018 IFRS	2019 IFRS	Change 2019 vs. 2018
	310,945	**330,069**	**310,702**	**339,168**	**441,938**	**566,686**	**514,471**	**501,981**	**556,821**	**11%**
	-191,560	-196,820	-188,561	-220,408	-284,521	-398,161	-340,094	-316,360	-361,457	14%
	119,385	**133,249**	**122,141**	**118,760**	**157,417**	**168,525**	**174,377**	**185,621**	**195,364**	**5%**
	-43,411	-46,259	-46,717	-48,003	-55,296	-58,970	-60,513	-61,010	-68,318	12%
	-24,007	-25,725	-26,225	-27,151	-30,114	-31,974	-3,398	-34,494	-33,851	-2%
	-60,083	-65,055	-65,649	-67,461	-78,493	-99,260	-105,746	-107,165	-115,057	7%
	23,648	23,529	22,490	27,108	32,071	39,282	39,033	31,872	42,443	33%
	1,751	2,059	2,531	6,214	4,392	5,812	6,369	8,442	4,230	-50%
	17,283	**21,798**	**8,571**	**9,467**	**29,977**	**23,415**	**19,522**	**23,266**	**24,811**	**7%**
	-2,493	-1,620	-683	-733	-346	-2,997	-4,426	-5,526	-5,663	2%
	-1,583	-1,344	-913	-382	-2,876	-1,051	-1,259	-1,413	-1,490	5%
	0	0	0	0	0	0	-9,434	-1,338	-5,655	323%
	13,207	**18,834**	**6,975**	**8,352**	**26,755**	**19,367**	**4,403**	**14,989**	**12,003**	**-20%**
	-1,531	-1,163	-1,144	-1,267	-838	-60	-785	-1,408	-2,304	64%
	2,328	834	-1,475	1,142	2,159	-292	-3,809	-1,096	-770	-30%
	14,004	**18,505**	**4,356**	**8,227**	**28,076**	**19,015**	**-191**	**12,485**	**8,929**	**-28%**
	2,935	-1,783	7,279	148	-1,228	2,517	-4,037	-2,807	-1,884	-33%
	16,939	**16,722**	**11,635**	**8,375**	**26,848**	**21,532**	**-4,228**	**9,678**	**7,045**	**-27%**
	0.36	0.35	0.24	0.17	0.55	0.44	-0.09	0.19	0.14	-26%
	0.35	0.34	0.24	0.17	0.55	0.43	-0.09	0.19	0.14	-26%

(in thousands of EUR except stated otherwise)	2009 IFRS	2010 IFRS
BALANCE SHEET (as of December 31)		
Cash and cash equivalents	50,882	54,085
Inventories	25,400	39,588
Goodwill	19,103	19,653
Capitalized R&D expenses	25,449	29,571
Other intangible assets	9,991	7,467
Total intangible assets	54,543	56,691
Other assets***	66,172	83,758
Total assets***	196,997	234,122
Liabilities to banks	28,055	29,330
Lease liabilities (according to IFRS 16 from Jan, 1, 2019)	n/a	n/a
Total financial debt,*	28,055	29,330
Leverage per last twelve months,*	1,4	1,0
Total stockholders' equity***	101,270	115,414
Equity ratio in %**	51.4%	49.3%
CASH FLOW STATEMENT		
Cash flow from operating activities	29,105	21,100
Gross capital expenditures for property, plant and equipment and intangible assets****	-19,937	-24,294
FINANCIAL RATIOS (as of period end)		
Net debt,**	-22,827	-24,755
Net working capital	37,004	54,374
Capital employed	136,712	144,400
ROCE in %	1.7%	6.4%
Days sales outstanding	63.4	51.8
Inventory terms last twelve months	5.5	5.6
Days payables outstanding	63.8	60.9
EMPLOYEES (as of December 31)		
	1,100	1,203

* 12-months rolling.
** The first-time adoption of IFRS 16 in 2019 has an impact on some key figures.
*** From 2017, deferred tax assets and liabilities are reported net according to IAS 12.74. 2016 reporting has been adjusted accordingly.
**** In 2019, the relevant definition of free cashflow was revised to include investments in capitalized development projects in the calculation. The prior-year figures were adjusted accordingly.

Glossary: *Page 154*

2011 IFRS	2012 IFRS	2013 IFRS	2014 IFRS	2015 IFRS	2016 IFRS	2017 IFRS	2018 IFRS	2019 IFRS	Change 2019 vs. 2018
59,110	70,625	80,934	83,877	93,850	84,871	58,376	62,652	54,263	-13%
36,536	41,339	40,074	46,982	72,950	92,800	81,694	85,734	105,355	23%
19,842	19,876	19,875	23,581	24,881	41,538	68,036	70,400	72,023	2%
39,231	47,497	52,080	56,438	62,439	76,263	85,175	87,926	96,169	9%
5,541	3,586	2,699	2,861	4,238	16,429	36,785	31,524	24,568	-22%
64,614	70,959	74,654	82,880	91,558	134,230	189,996	189,850	192,760	2%
99,636	101,172	103,544	111,098	133,177	132,651	133,822	148,302	183,984	24%
259,896	284,095	299,206	324,837	391,535	444,552	463,888	486,538	536,362	10%
27,906	28,984	39,196	34,983	42,669	59,365	96,591	89,484	80,979	-10%
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	34,430	n/a
27,906	28,984	39,196	34,983	42,669	59,365	96,591	89,484	115,409	29%
0.7	0.6	1.1	0.8	0.7	1.0	1.9	1.4	1.2	-14%
135,986	153,909	163,948	177,114	215,921	238,947	227,021	244,641	255,792	5%
52.3%	54.2%	54.8%	54.5%	55.1%	51.1%	48.9%	50.3%	47.7%	-.2,6
39,736	45,156	31,413	46,186	39,415	61,350	27,134	60,360	66,891	11%
-33,514	-34,204	-30,597	-36,273	-41,001	-54,214	-54,573	-48,268	-60,472	25%
-31,204	-41,641	-41,738	-48,894	-51,181	-25,506	38,215	26,832	61,146	128%
58,186	58,725	66,298	67,984	99,608	97,984	123,828	120,475	128,150	6%
159,638	188,746	211,066	230,791	257,812	307,679	315,598	309,317	366,462	18%
8.3%	10.0%	3.3%	3.6%	10.4%	6.3%	1.4%	4.8%	3.3%	-.1,5
58.2	58.7	64.0	62.0	58.1	60.2	60.5	67.8	65.8	-3%
5.4	5.2	4.6	5.2	4.4	5.2	4.1	4.0	4.0	0%
59.9	61.9	64.8	55.9	62.4	63.4	58.7	55.5	63.3	14%
1,304	1,378	1,425	1,491	1,524	1,764	1,894	1,886	1,903	1%

Glossary

A

ALM (advanced link monitoring)

ALM is a device that provides non-intrusive monitoring of fiber access networks independent of the services running over that fiber.

C

Carrier

Carriers, in general, are companies that build and maintain communications networks for commercial use. Beyond incumbent telephony companies, these also include new alternative carriers, which were established during the deregulation of the telecommunications market, and special service providers, which offer outsourced services (e.g., software applications or data storage) for enterprise customers.

CE (Carrier Ethernet)

Ethernet is a protocol of packet-based data transfer that was originally developed and used for local area networks. Carriers require additional features for data transmission in wide area networks that go beyond traditional Ethernet. The CE protocol resulting from these requirements has become the dominant data link protocol in carrier infrastructure.

Cesium clocks

Many network services and applications require the availability of a highly accurate primary frequency reference. This can be achieved using cesium atomic clocks. Unlike off-air receivers, cesium clocks are autonomous, self-contained primary references immune to external influences.

Cloud

Cloud in the context of IT describes a concept where applications no longer run on the user's in-house IT infrastructure (for example, a server) but are outsourced to a service provider whose IT infrastructure is not visible or known in detail – as if it was hidden in a cloud. A typical example is the use of software as a service, where the software is not stored on the user's machine, but on servers of the software service provider.

ConnectGuard™

Brand name for ADVA's encryption technology, implemented in many of the company's products.

COSO framework

Five major accounting organizations formed a group known as COSO (Committee of Sponsoring Organizations of the Treadway Commission) to provide guidance on evaluating internal control. They issued this guidance as the COSO Internal Control Framework.

CSP (communication service provider)

CSPs are companies that build and maintain large-scale networks to offer communication services.

D

DCI (data center interconnect)

Network that connects geographically dispersed data centers.

DevOps (development and operations)

The term DevOps has its origins in software development. It describes a methodology that stresses communication, collaboration and cooperation between software developers and other information technology (IT) professionals. In a broader sense DevOps refers to the tight alignment between product development teams and operational teams responsible for product introduction.

DSL (digital subscriber line)

DSL is a technology that provides fast digital data transmission over the copper wires of a local telephone network. The advantage of DSL is that broadband services like fast internet access and internet television signals can be delivered over the same twisted pair of copper wires that was originally deployed for phone service only.

E

EMS (electronics manufacturing services)

ADVA works with EMS partners that specialize in the volume production of electronic components and sub-assemblies.

Ensemble

Ensemble is a trademark used by ADVA for the company's software solutions.

Ensemble Connector

Ensemble Connector is a family of software packages that enables communication service providers to provide the data path and virtual hosting functionality at a location of their choice.

ePRTC (enhanced primary reference time clocks)

Synchronization in communication networks is organized hierarchically and requires primary reference sources, so-called primary reference time clocks (PRTC). An ePRTC system provides additional security against GNSS outages, allowing a network operator to take back control over the time source used for network synchronization.

Ethernet

Ethernet is a packet-based data transmission protocol with a data rate of 10Mbit/s. Fast Ethernet provides a data rate of 100Mbit/s, Gigabit Ethernet 1Gbit/s and 10 Gigabit Ethernet 10Gbit/s. Today also 40, 100 and 400 Gigabit Ethernet solutions are commercially available with data rates of 40Gbit/s, 100Gbit/s and 400Gbit/s, respectively.

F

FSP (Fiber Service Platform)

The Fiber Service Platform is ADVA's comprehensive product portfolio that provides carriers and enterprises with innovative connectivity solutions for access, metro and long-haul networks.

G

Gbit/s or G (Gigabit per second)

Bits are binary symbols of zero or one and are the standard unit by which data is stored and processed by computers. "Giga" stands for one billion (1,000,000,000). Bit/s is the basic unit of a data rate, which describes how many bits per second are being transmitted. One Gbit/s or G is therefore a data rate that transmits one billion bits of data per second.

GDPR (global data protection regulation)

GDPR is a regulation in EU law on data protection and privacy in the European Union (EU).

GNSS (global navigation satellite system)

GNSS refers to a constellation of satellites transmitting positioning and timing data from space. GNSS receivers determine their location by using that data. By definition, a GNSS provides global coverage.

GRI (global reporting initiative)

GRI is an independent, multi-stakeholder network dedicated to developing globally applicable sustainability reporting guidelines.

I

ICP (internet content provider)

Internet content providers are entities whose primary business is the creation, storage and dissemination of digital information. ICPs are also commonly referred to as over-the-top (OTT), web 2.0 and digital media companies.

IoT (internet of things)

Network of devices such as vehicles and home appliances that contain electronics, software, sensors, actuators, and connectivity which allows these things to connect, interact and exchange data.

ISO (international standards organization)

ISO is an organization that defines and publishes internationally valid standards. Several of the ISO standards are relevant to ADVA, including 9001 (quality management), 14001 (environmental management system), 22301 (business continuity management), 31000 (risk management) and 50001 (energy management).

L

Leverage

The leverage shows the liabilities to banks in relation to the EBITDA of the last 12 months. EBITDA is calculated as if the accounting approach had been unchanged, i.e., without taking IFRS 16 into account. The leverage is thus determined explicitly without taking into account the accounting effects in accordance with IFRS 16. This is a new ratio from 2018 onwards due to covenant requirements. Prior period information in the multi-year overview has been calculated accordingly.

LTE (long term evolution) / LTE-Advanced / LTE-TDD

LTE is the project name of a high-performance air interface for cellular mobile communication systems. It is often used as the synonym for the 4th generation (4G) of radio technologies designed to increase the capacity and speed of mobile networks. LTE-Advanced provides further enhancements to the LTE technology, enabling operators to deliver even more bandwidth to more mobile users. The TDD (time division duplex) version of the standard uses a single frequency for uploading and downloading data, alternating between the two through time.

M

Mbit/s (Megabit per second)

Bits are binary symbols of zero or one and are the standard unit by which data is stored and processed by computers. "Mega" stands for one million (1,000,000). Bit/s is the basic unit of a data rate, which describes how many bits per second are being transmitted. One Mbit/s is therefore a data rate that transmits one million bits of data per second.

MSO (multiple service operator)

The term MSO emerged in the 1990s when cable television companies, mainly in the US, started to offer telecom services in addition to their traditional television and video offerings. Technically, most telecom service providers today could be called multiservice operators, but the term MSO still implies the historical roots in the cable television space.

N

Net debt

Net debt is calculated by subtracting cash and cash equivalents from total financial debt comprising of current and non-current liabilities to banks and current and non-current lease liabilities from the first-time adoption of IFRS 16 Leases. Since Q1 2019, ADVA has been reporting net debt instead of the previous reporting of net liquidity.

Net liquidity

Net liquidity is calculated by subtracting current and non-current financial liabilities as well as current and non-current finance lease obligations from cash and cash equivalents.

NFV (network functions virtualization)

NFV is an alternative design approach for building complex IT applications, particularly in the telecommunications and service provider industries. NFV virtualizes entire classes of functions into building blocks that may be connected, or chained, together to create services. With the introduction of NFV, the architecture of service provider networks will change. Functions that were previously tied to a particular network element can now be hosted centrally leading to a new distribution of hardware and software functionality across networks.

NFVI (network functions virtualization infrastructure)

NFVI includes both the hardware and software components for the network, which are necessary for the support and operation of virtual network functions (VNF) in carrier networks. NFVI resources include, for example, ADVA's Ensemble Connector, an operating system (software) that converts a generic server (hardware) into a high-performance network termination device.

Jointly NFVI elements form platforms to support NFV and host VNFs. NFVI can span multiple locations. In such a case, the networks connecting these locations are also part of the overall NFVI.

NPS (net promoter score)

The NPS is obtained by asking customers a single question on a 0 to 10 rating scale: "How likely is it that you would recommend our company to a friend or colleague?" Based on their responses, customers are categorized into one of three groups: promoters (9–10 rating), passives (7–8 rating), and detractors (0–6 rating). The percentage of detractors is then subtracted from the percentage of promoters to obtain a net promoter score.

NOC (network operation center)

A NOC, also known as a network management center, is one or more locations from which network monitoring and control are exercised over a telecommunication network.

NTP (network timing protocol)

NTP is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks.

O

OEM (original equipment manufacturer)

OEM partners purchase products from other companies to fill gaps in their portfolio and offer an end-to-end solution. They typically re-label and market the products under their own brand name.

OLS (open line system), OT (open terminal)

An optical transmission system basically consists of two main components. The terminal generates and receives the optical signals. The line system bundles wavelengths and amplifies the signal power. In an open system architecture, terminals and line systems can be deployed independently and openly combined with third-party equipment.

P

Pro forma operating income

Pro forma operating income is calculated prior to non-cash charges related to the stock compensation programs and amortization and impairment of goodwill and acquisition-related intangible assets. Additionally, non-recurring expenses related to restructuring measures are not included.

Protocol

A protocol defines the "language" elements that networks use to communicate with each other.

PRTC (primary reference time clock)

The synchronization in communication networks is hierarchically organized and requires primary reference sources, so-called primary reference time clocks. A PRTC-A is based on a single-band GNSS receiver and is accurate to within 100ns of coordinated universal time (UTC). A PRTC-B is based on a multi-band GNSS receiver and delivers accuracy of better than 40ns. Even higher accuracies are possible using so-called enhanced PRTC solutions (see ePRTC).

PTP grandmaster

The precision time protocol (PTP) is a protocol used to synchronize clocks throughout a network. The grandmaster is a reference point that delivers precise synchronization. See also: IEEE 1588v2 Mini-Grandmaster Clock

ROADM (reconfigurable optical add/drop multiplexer)

ROADM is an innovative functionality in optical networks that enables cost-effective switching of wavelengths.

ROCE (return on capital employed)

ROCE is the operating result for the current period divided by the capital employed. The capital employed is the difference between the average balance sheet total and the average current liabilities of the period, calculated as the arithmetic average of the quarterly balance sheet date values.

S

SDN (software-defined networking)

SDN is an approach to building networks where the control function is separated from the forwarding engine. I.e., SDN decouples the system that makes decisions about where traffic is sent from the underlying hardware that forwards traffic to the selected destination. SDN has the potential to be disruptive to the networking industry and is seen as a key enabler on the road to network virtualization.

SFP (small form-factor pluggable)

The SFP is a standardized, compact, pluggable transceiver used for both telecommunication and data communications applications.

SLA (service level agreement)

Commitment between a service provider and a client. Aspects of the service such as quality and availability are agreed between the service provider and the service user.

SSU (synchronization supply unit)

Many services running on digital telecommunication networks require accurate synchronization for correct operation. Telecommunication networks rely on the use of highly accurate primary reference clocks (see also cesium Clocks), which are distributed network wide using synchronization links and synchronization supply units.

T

TeraFlex™

Brand name for ADVA's high-speed terminal, which generates data rates of up to 600Gbit/s per wavelength. TeraFlex™ is a so-called open terminal (OT) and part of the ADVA FSP 3000 platform.

TIP (telecom infra project)

TIP is a community of companies building a dynamic, collaborative telecommunications ecosystem to accelerate technological advances in communications infrastructure. TIP was launched in February 2016. Members include besides ADVA well-known companies such as British Telecom, Deutsche Telekom, Facebook, and Vodafone.

TL 9000: R6.1/R5.6

TL 9000: R6.1/R5.6 is a quality management system standard defined specifically for the telecommunications industry. It standardizes the quality system requirements for the design, development, delivery, installation and maintenance of telecommunication products and services, and it also defines the performance metrics required to measure the situation at the time of the implementation of the standard as well as progress made.

U

uCPE (universal customer premise equipment)

A CPE is a terminal unit located at a subscriber's premises and connected with a carrier's telecommunication network. The CPE provides demarcation functionality between the network domains of the service provider and his client. In the context of NFV, certain functions of the CPE can be virtualized and hosted centrally in the service provider network. This software package defining the CPE function is called virtual CPE (vCPE). In this architecture, CSPs can define a universally usable CPE (hardware) to define different services via software.

V

VAR (value-added reseller)

VAR partners combine products from a number of different vendors together with their own services to offer customers a complete and comprehensive solution.

VNF (virtual network function)

Implementation of a network function using software that is decoupled from the underlying hardware.

W

WDM (wavelength division multiplexing)

WDM expands the capacity of networks by allowing a greater number of signals to be transmitted over a single fiber. WDM enables numerous channels of data to be multiplexed into unique color bands, and then to be combined and transmitted over a single fiber and de-multiplexed at the other end.

Corporate information

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ADVA on the web

More information about ADVA, including solutions, technologies and products, can be found on the company's website at www.adva.com.

PDF files of this annual report, as well as quarterly reports, presentations and general investor information, are also located on the company's website and can be downloaded in both English and German. Quarterly conference calls are conducted on the day of earnings announcements. Related PDF, audio and transcript files are available for download in the investor relations section of the group's website, www.adva.com.

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Wirtschaftsprüfungsgesellschaft, Munich, Germany

Legal counsels

Hogan Lovells, Munich, Germany

Tax advisers

Deloitte, Munich, Germany

Financial calendar 2020

Publication of quarterly statement Q1 2020	April 23, 2020 Martinsried/Munich, Germany
Annual Shareholders' Meeting	May 13, 2020 Meiningen, Germany
Publication of six-month report 2020	July 23, 2020 Martinsried/Munich, Germany
Publication of quarterly statement Q3 2020	October 22, 2020 Martinsried/Munich, Germany

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