2 GROUP MANAGEMENT REPORT

2.1 BASIS OF THE VA-Q-TEC GROUP

2.1.1 Business model, market and strategic orientation

2.1.1.1 Business model and market

va-Q-tec is a worldwide technologically leading supplier of highly efficient products and global solutions in the thermal insulation area. The offerings of va-Q-tec in the Group's divisions of Products, Systems and Services are applied in thermo-logistics, the refrigeration and food industry, in industrial and technical applications such as water boilers, the construction industry and in the mobility area.

In its Products division, the company develops, produces and markets innovative vacuum insulation panels ("VIPs") and phase change materials ("PCMs"). VIPs are high-performance insulation panels between 5 mm and 50 mm in diameter that are particularly suited to space-saving and energy-efficient thermal insulation. PCMs are cold and heat storage materials that absorb and store thermal energy. Various temperature ranges can be established through utilizing various storage materials such as paraffins and salt solutions.

In its Systems division, va-Q-tec manufactures passive thermal packaging, containers and boxes through combining VIPs and PCMs, which maintain constant defined temperature ranges for up to 200 hours without recourse to external energy.

In its Services division (Serviced Rental), va-Q-tec operates a fleet of rental containers it produces itself, which allow temperature-sensitive transports to be operated cost-efficiently and securely. va-Q-tec has run this business through its UK subsidiary since 2011. For this purpose va-Q-tec has built up an extensive global partner network consisting of airlines, forwarders and service partners such as Lufthansa, IAG, Qatar Airways and Cathay Pacific. Since 2015, va-Q-tec AG has also been operating a business for thermal transport boxes the company produces itself. In addition, va-Q-tec assumes accompanying services in the area of preconditioning, preparation and dispatch preparation of thermal packaging systems for well-known customers such as Swiss Post. Such integrated transport solutions from a single source are increasingly in demand in the healthcare industry.

In addition, va-Q-tec offers consulting services for all aspects of thermal insulation, for example to bring technical equipment into higher energy efficiency classes.

With this extensive portfolio, va-Q-tec serves customers from the following target sectors:

- Healthcare & Logistics; e.g. containers and transport boxes for temperature-sensitive transports, plus rental service
- Appliances & Food, e.g. insulation of refrigeration/freezing equipment and food containers
- Technics & Industry, e.g. insulating water boilers, pipelines, laboratory equipment and ultra-low temperature refrigeration units
- Building, e.g. building insulation (façades, roofs, floors)
- Mobility, e.g. insulation in refrigeration trucks, cars, trains and aircraft

In the target industries, all solutions are subject to high requirements for the performance and service life of thermal insulation, and mostly given very restricted construction space.

FURTHER **GROWTH POTENTIAL** RESULT FROM **GLOBALIZATION,** INCREASING DEMANDS ON THE **PRODUCT SAFETY** AND INCREASING **ENERGY EFFICIENCY**

Growth potentials in the target market Healthcare & Logistics result from the increasing globalization of clinical research and pharmaceutical production. At the same time, demand for temperature-sensitive biotech drugs is rising constantly. Demands made of product safety ("good distribution practice of medicinal products for human use" – GDP) are becoming increasingly more stringent. Growth drivers for the Group's businesses in the target markets of Appliances & Food, Technics & Industry, Building and Mobility especially include rising energy efficiency, regulation and urbanization.

2.1.1.2 Strategic orientation

va-Q-tec operates in a very dynamic, innovation-driven and global market environment.

Within this market environment, va-Q-tec pursues the objective of expanding its position as one of the globally leading providers of highly efficient products and solutions in the thermal insulation area, and sustainably influencing temperature-managed logistics. To reach this goal, va-Q-tec pursues, in particular, three strategic approaches:

I. Technology leadership

va-Q-tec is focusing on securing and further expanding its innovation and technology leadership in the thermal insulation area. va-Q-tec stands for its "Always the Right Temperature" mission statement in the TempChain of the healthcare industry and many other end applications. The company works continuously on innovative technologies, process innovations and new business models that can change not only TempChain logistics but also thermal insulation in many industries in the future, such as in the mobility area and in the case of technical applications. va-Q-tec aims to constantly enhance its own innovative strength and capability. This approach focuses on advanced VIP types such as for higher temperatures, new thermal packaging and innovative materials. In addition, va-Q-tec strives to further improve thermologistics under the keyword "TempChain 4.0" with "intelligent" boxes and containers as well as accompanying software and simulation tools. In accordance with this objective, the Group invests in highly qualified personnel, product development and fundamental research. Selected investments, such as acquiring an interest in the Cologne-based materials start-up SUMTEQ to gain access to its new technologies, also form part of the strategy. Above and beyond this, va-Q-tec pursues cooperation ventures with technology partners in externally supported R&D projects. The medium-term target remains to defend the leading technology position and further expand it.

II. Growth

va-Q-tec's end markets offer great growth opportunities through the broad application of the technology platform, consisting of Products, Systems and Services. va-Q-tec is strongly focused on growth especially after the completion of the investments in 2018: the company's processes, organizational structure and business model are aligned to scalability and to the consistent leveraging of growth opportunities. The company is on a clearly defined expansion path with its increasingly international presence, maintaining its solid financing base and focus on business relationships with major customers.

va-Q-tec is oriented to high-growth markets that at the same time offer the company attractive target margins, albeit also incurring high upfront costs. Pharmaceutical and biotech customers are of great significance for va-Q-tec: as its most important business pillar, the Healthcare & Logistics target market accounts for around 59% of the revenue of va-Q-tec in 2018 (previous year: 62%). In the temperature-managed logistics area, the global healthcare industry is relying increasingly on va-Q-tec's high-quality passive solutions.

At present, potential healthcare customers are still frequently using packaging solutions based on conventional insulation materials and basic water and ice mixtures. With the rising quality requirements made of cold chains – according to "good distribution practice" – customers are substituting these types of basic solutions with high-performance thermal packaging. At the same time, va-Q-tec's rental models ("Serviced Rental") are aimed at customers for which a purchase is not economically viable. With precisely customized rental solutions for high-performance thermal packaging, va-Q-tec also offers them a product with attractive price/performance relationship. For this reason, va-Q-tec expects to grow further globally in the Healthcare & Logistics target market over the coming years, while outperforming the growth rates of the underlying markets for (healthcare) cold chain logistics. The aim is to become the globally leading provider of services and packaging solutions in this market.

In the other target sectors, too, the company is endeavoring to benefit to an above-average extent from growth opportunities, such as the energy efficiency trend. The company's technology platform, which has grown over the past years, is to be established in defined target markets. In the medium term, va-Q-tec is aiming for significant growth in the Appliances & Food area. With higher regulatory requirements made of the energy efficiency classes of refrigerators, such equipment is increasingly being fitted with VIPs. VIPs from va-Q-tec – with their insulation performance testable in the manufacturing processes of OEMs – will benefit particularly from this trend. In the e-commerce area, major international providers and start-ups are currently implementing new business models to deliver food products purchased online directly to end-consumers.

We believe the transportation of easily perishable food to the end-customer will be regulated even more stringently in the future. The high-performance thermal packaging of va-Q-tec is very well suited to such transports. In addition, growth in VIP product sales is also anticipated in the target market of Technics & Industry through introducing energy efficiency classes for water boilers, for example. Here, too, manufacturers are increasingly equipping their premium products with va-Q-tec VIPs to achieve the best energy-efficiency class. At the start of 2018, for example, a leading German supplier of building services technology has already converted its entire range of heating system boilers to va-Q-tec VIP superinsulation, for instance. Here, too, the company expects that better insulated products will establish themselves increasingly in the mass market. The end markets of mobility and construction offer additional growth areas in the medium and long term. For example, va-Q-tec realized an important flagship project during the past financial year: in certain areas of building insulation, glass façade elements of the "Grand Tower" in the Europaviertel in Frankfurt – the highest residential high-rise building in Germany in the future – are being insulated with va-Q-tec's VIPs. This means that the leased space in one of the most sought-after inner-city locations in Europe can be significantly increased.

Overall, the company anticipates continued revenue growth in the low to mid double-digit percentage range year-on-year over the next three years.

III. Profitability

Profitability is indispensable in order to secure the company's long-term success and performance as well as its competitiveness. EBITDA profitability forms the third pillar of the corporate strategy and represents a significant corporate steering metric. In view of very high development, set-up and other start-up costs, this objective is of particular importance.

Various measures in the operational excellence area are being continuously advanced to deliver profitable growth. The Board of Management's cost-cutting initiatives were bundled under the "Power 20+ " performance program in the 2018 financial year and primarily concern measures to continuously optimize and harmonize quality, sales processes, organization, resource consumption and IT systems throughout the Group. Economies of scale accompany the expansion of the Group's business activities and corresponding sales revenue growth: the terms on which the Group can purchase intermediate products and third-party services improve significantly with revenue growth, and the rising purchasing volumes that accompany such growth. The cost increases for Group support functions such as personnel, marketing, financial accounting and controlling do not match the top-line growth rate. However, the stock exchange listing requires the highest quality level, entailing corresponding expense. Various aspects of vertical integration into downstream stages of the value chain contribute to improving profitability. This includes services and business models such as the rental of boxes and containers ("Serviced Rental"). This forwards integration and control of upstream value steps to improve profitability forms a central element of the corporate strategy. In the phase of the company's development to date, the dominant focus continued to be on sales growth. As a result of the aforementioned operative and strategic measures, the company is aiming for a medium- and long-term improvement in the EBITDA margin to at least in excess of 20 %.

Group structure, employees, investments and steering

At the start of the period under review, the Group consisted of six companies. Subsidiaries were established in Uruguay and Singapore during the reporting period. A total of eight companies thereby formed the va-Q-tec Group as of the end of the reporting period, comprising the German parent company and seven foreign subsidiaries. The Group's three reporting segments are derived from these eight companies – the German segment (va-Q-tec AG), the UK segment (va-Q-tec Ltd (UK) and the Other segment (va-Q-tec Ltd (Korea), va-Q-tec Inc. (USA), va-Q-tec Switzerland AG (Switzerland), va-Q-tec Japan G.K. (Japan), va-Q-tec Uruguay S.A. and va-Q-tec SG Pte. Ltd).

The parent company va-Q-tec AG wholly owned all seven foreign subsidiaries as of 31 December 2018.

In the German segment, va-Q-tec AG covers all three segments (Products, Systems and Services). Since 2015, the business with rental boxes has been shown in the "Services" segment. va-Q-tec Ltd (UK) primarily comprises the "Services" segment with its focus on the rental business of (returnable) containers. The "Other" segment comprises the business activities of the subsidiaries va-Q-tec Ltd. (South Korea), va-Q-tec USA Inc. (USA), va-Q-tec Switzerland AG (Switzerland) va-Q-tec G.K. (Japan), va-Q-tec Uruguay S.A. and va-Q-tec SG Pte. Ltd. (Singapore). The South Korean subsidiary is responsible for both the purchasing of raw and input materials and the business development of all three of the Group's business areas in Asia. In addition to sales activities, the subsidiary in the USA is primarily engaged in business development in North America. The company has continued to make significant investments in personnel and business development at the US subsidiary during 2018. Warehousing and office spaces were rented, and a local management team was appointed on the US East Coast with the aim of establishing local production of thermal packaging systems, a repair station for rental containers and a local center to rent small boxes. This location was opened at the beginning of the reporting period. va-Q-tec Switzerland AG renders services (conditioning and cleaning of rental boxes, "fulfilment services") for Swiss Post in the cold chain logistics area. Through its fleet of thermal boxes, Swiss Post makes recourse to va-Q-tec's technology and process experience. As a sales company, the subsidiary in Japan pursues the objective of enhancing the perception of va-Q-tec as a locally rooted and reliable provider in the world's third-largest economy, and of distributing va-Q-tec products and services there. With the subsidiaries in Uruguay and Singapore, the aim is to further intensify the sales presence in Latin America and Singapore.

To manage the three reporting segments, the management monitors these areas individually and across the Group based on detailed and regular reports. The management steers the allocation of resources based on this information and institutes countermeasures where performance falls short of target. A streamlined Group structure ensures the Group management can effectively control and coordinate the subsidiaries' important business decisions.

Central metrics of the va-Q-tec Group that serve corporate steering by the management include revenue, earnings before interest, tax, depreciation and amortization (EBITDA) and the equity ratio. Compared with the previous year, the steering system at va-Q-tec AG has not changed. The Group's specific steering metrics are presented in greater detail below:

Sales revenue growth is the basic indicator of business performance and growth, and of the attractiveness of the Group's products, systems and services. Viewed at the level of the reporting segments and geographic distribution, revenue also serves as an indicator of the success and performance of the Group's business models.

EBITDA serves as the metric for profitability. To this is then added as a subsidiary measure the EBITDA margin measured in relation to total income as a benchmark for the Group's operative performance and profitability. As a fast-growing technology company, va-Q-tec AG invests significant shares of its financial resources in machinery, plant and its fleet of containers and boxes for rental services. Furthermore, in the 2018 reporting period the company completed the aggregation of its Würzburg locations into a single management, technology and logistics center. A high level of depreciation during the current phase of establishing infrastructure and fleet distorts the actual picture of financial performance. For this reason, EBITDA, as an earnings figure before depreciation presents a more meaningful metric of the company's performance.

The equity ratio provides information about the strength of the va-Q-tec Group's balance sheet, its capacity to withstand crises, its creditworthiness and its credit risk. In the medium term, the company regards an equity ratio with a target range between 35 % and 40 % as representing a balanced relationship between debt and equity, and consequently of the risk distributed among equity investors and creditors.

In the area of non-financial performance indicators, the number of employees serves as an indicator and central steering metric of the growth in the Group's operating activities.

The following overview shows the growth in the relevant steering metrics.

Section 2.2.4 "Financial position and performance" provides a detailed discussion of these key indicators.

kEUR unless stated otherwise	**2018**	**2017**
Revenue	50,708	46,926
EBITDA (IFRS)	3,027	7,210
EBITDA margin (IFRS)	*5 %*	*13 %*
Equity ratio	42 %	55 %
Year-average number of employees	444	358

2.1.2 Research and development

va-Q-tec is one of the leading technology innovators in the development and production of energy-efficient and space-saving VIPs, high-performance PCMs and thermal packaging systems. The research and development area is of strategic importance to secure and further extend the company's technology leadership in the thermal insulation areas. Group research at va-Q-tec operates across the whole company, developing technologies for future-viable products and solutions for the Group companies.

va-Q-tec operates a portfolio of internal and external R&D projects that not only serve basic research on VIPs but also relate to five of the target sectors defined by va-Q-tec that require advanced thermal heat insulation and energy storage.

As a spin-off from a university – the Bavarian Centre for Applied Energy Research (ZAE Bayern) – va-Q-tec maintains partnerships with international associations, research institutions, universities and colleges. Internally, the company has established its own R&D organization with extensive capacities for basic research and, in particular, application-oriented research.

VA-Q-TEC IS **TECHNOLOGY LEADER** IN THE **VACUUM INSULATION** AND THE **TEMPCHAIN LOGISTICS**

The past years' successful R&D activities have created a portfolio of patents which is reflected in the leading technology platform.

The worldwide unique va-Q-check® quality control system enables the insulation of VIPs to be controlled before use, or boxes and containers to be approved for reuse through measuring internal gas pressure. va-Q-tec VIPs are thereby the only heat insulation whose performance and efficacy can be measured and controlled at the place of use. This fosters confidence and trust in VIP technology and enables va-Q-tec to meet its high-quality requirements of a demanding customer group, including complying securely, and on an evidenced basis, with the thermal protection requirements for cold chain transportation, for example. The patented va-Q-pro is a largely freely formable, powder-filled VIP, from which holes and sections can be cut on the production side and which can be manufactured in three-dimensional geometry. These properties and flexible structuring possibilities allow va-Q-pro to be deployed in very different application areas, including for batteries in e-vehicles or to insulate parts of aircraft, such as the galley, for example.

va-Q-tec conducted basic research in 2018 in applying VIPs in entirely new temperature ranges, for example. While conventional VIPs are typically deployed in the -80 to +80°C temperature range, va-Q-tec is working on expanding VIPs' deployment range through optimally combining various case materials and core materials, e.g. in temperature classes from 80 – 180°C as well as >400°C. The significant interest held in the Cologne-based start-up SUMTEQ is of strategic importance in the area of fundamental research for core VIP materials. The joint target of va-Q-tec and SUMTEQ is the pilot testing and market launch of SUMTEQ's submicroporous foams as a further high-performance insulation material. This strategic partnership offers both companies the opportunity to contribute their respective specialist and technical research and development expertise, and thereby generate added value for customers.

In the year under review, va-Q-tec worked mainly on expanding and improving its existing product portfolio: with va-Q-shell, va-Q-tec optimized a product in partnership with customers from the water boiler area: va-Q-shell consists essentially of two polyurethane shell halves with integrated VIPs. Deploying va-Q-shell enables 50-60% energy savings compared with traditional solutions with conventional insulation. With VIPs, water boilers achieve the A+ labelling according to the EU norm mandatory since September 2015.

With the stackable "va-Q-tray", a thermal packaging system, food can be transported in such a way that it remains warm, cold or frozen for hours or in some cases days. The temperature-holding time can optionally be extended by PCM rechargeable batteries. With the va-Q-tray, for example, bakery branches can be supplied efficiently with fresh produce: in contrast to existing styrofoam systems, va-Q-tray meets the highest hygiene and temperature chain requirements, can be used universally (e.g. as a portable refrigerator), and as a combinable system with non-insulated standard containers. In addition to the hygienic advantages, this also results in cost savings because additional refrigerated vehicles can be dispensed with.

Also in the Systems area, "va-Q-pal" was further developed as thermal packaging in pallet size for the temperature-controlled transport of valuable biological pharmaceuticals. It consists of a surrounding packaging consisting of carbon, VIPs, and PCM batteries that protect from temperature fluctuations due to external temperatures. In this context, va-Q-pal is being developed as a particularly cost-efficient and marketable solution for single use, rounding out the offering of va-Q-tec in this area.

"va-Q-med" was significantly further developed with external logistics partners in the past financial year. It ensures safe last-mile logistics without temperature deviations directly to the receiver. Unlike conventional, inefficient one-way packaging or CO2-intensive extra transports with refrigerated vehicles in congested inner cities, the va-Q-med boxes enable environmentally compatible, traffic-reducing and at the same time safe transport logistics. The transport system consists to a large extent of vacuum insulation panels. Phase change materials ("PCMs") from va-Q-tec supplement the strong insulation performance of VIPs. They ensure reliable and energy-efficient temperature control in the required range.

The "va-Q-box", one of the company's first systems, was continuously further developed following the redesign in the previous financial year. The related aims included improvements to design and handling as well as adjusting to standard market sizes, in order to expand the potential customer base for the va-Q-box in the gastronomy sector. The va-Q-box is being marketed through a proprietary webshop directly to end-customers (B2C), among other channels, thereby also serving as the basis for an expanded portfolio in this sector.

In order to control these logistic processes, va-Q-tec is increasingly developing advanced software and simulation solutions under the key term "TempChain 4.0". In combination with the va-Q-tec thermal packaging, these enable the smart control of TempChains. To this end, IT resources were significantly strengthened in the period under review.

The technology platform is secured through around 170 industrial property rights and filings for industrial property rights. These relate mainly to efficient manufacturing methods for powder-filled VIPs as well as the va-Q-check® quality control system, a sensor technology to measure vacuums in VIPs. A total of 7 industrial property rights were filed, including 5 patents and 2 registered designs.

The company made further investments in its research and development area in the year under review. Expenditure for this area amounted to kEUR 2,451, up on the previous year's level (kEUR 1,938). Research and development costs of kEUR 144 in total (previous year: kEUR 104) were capitalized in the reporting period. Amortization of development costs capitalized in previous years amounted to kEUR 119.

2.2 BUSINESS REPORT

2.2.1 Macroeconomic environment and Group-specific conditions

In the course of the past financial year, a series of political crises and external shocks had a negative impact on major economies. In particular, trade tensions weighed on corporate sentiment. The export-oriented German economy is particularly dependent on unhindered and flourishing world trade. It has thereby responded to a more significant extent than others to trade tensions, the somewhat slower growth dynamic of the Chinese economy and economic problems in emerging markets. Growth in domestic demand also weakened from mid-2018 onwards. The high price of oil has caused problems for consumers. Consumer spending has recently fallen sharply. Supply-side difficulties have also affected the economy. Since October, increasing uncertainty about the Brexit process and the withdrawal of economic reforms in Italy have also dampened the business climate in Europe. Overall, growth in the Eurozone and Japan slowed considerably in the course of 2018. In the USA, positive fiscal stimuli (extensive tax relief at the beginning of 2018) and higher revenues for oil producers up until November currently outweigh the costs of trade wars and other shocks. With the fiscal stimulus, the USA had decoupled itself from the rest of the world in 2018. The UK must decide on the nature if its future relations with the European Union. At the time of final editing of this management report, it is still unclear which of the possibilities the country will opt for. "Hard Brexit" (no free trade agreement, trade conducted according to World Trade Organization rules), "May's half-soft Brexit", "soft Brexit" (UK remains part of the internal market and the customs union – i.e. "Norway plus") or "no Brexit" (UK revokes withdrawal from the EU) are only some of the possible shades and borderline cases of the current discussion. va-Q-tec has set up a dedicated team to evaluate the impact of Brexit on the Group's value chain.

Overall, assuming a constructive solution, va-Q-tec does not expect any significant negative effects, especially on business in the UK reporting segment. Although operational control derives from the United Kingdom, the real added value is generated by the globally distributed container fleet. For further information on the opportunities and risks arising from Brexit, please refer to section 2.4. of this annual report.

The International Monetary Fund (IMF) estimates that the world economy expanded by 3.7 % in 2018. While the US is only slowly losing momentum and China could continue to report somewhat muted data, weak growth in Europe and Japan continues for the time being. Provided political risks ease slightly in 2019 and the Fed does not tighten its monetary policy excessively, economic growth could accelerate again in the second half of 2019. For 2019, the IMF expects a growth rate of 3.5 %. Developing and emerging economies will make an above-average contribution to global growth, according to the forecast. As a globally active Group, va-Q-tec consequently sees itself exposed to both opportunities and risks in macroeconomic terms.

Key revenue drivers for the va-Q-tec Group include the two end-markets of Healthcare & Logistics as well as Appliances & Food, which together account for an 82 % share of consolidated revenue.

With its German and UK segments, va-Q-tec is active in the market for thermal packaging systems – particularly for the healthcare industry as the most important sales market for va-Q-tec. Market research agency MarketsandMarkets takes an optimistic view of market growth over the coming years: over the 2016-2021 period, MarketsandMarkets expects an average annual growth rate of 9.1 %, whereby va-Q-tec assumes the relevant market subsegments (high-performance packaging systems) will grow faster. More stringent regulatory requirements made of cold chain logistics (according to "good distribution practice") are making ever more efficient packaging systems necessary for pharmaceutical industry customers. Moreover, market research agency IMARC assumes that 27 of the 50 top-selling medications worldwide will require cold chain logistics in the 2-8°C range by 2020. va-Q-tec is convinced it can grow faster than the market with its high-quality system solutions for sale as well as rental solutions ("Serviced Rental" of thermal packaging systems). Especially with groundbreaking rental solutions, va-Q-tec aims to enter markets that conventional thermal packaging systems have served to date.

After the healthcare industry, manufacturers of refrigeration and freezing equipment are the second most important customer. The market for vacuum insulation panels in refrigeration and freezing equipment is growing at an annual rate of almost 21 % in the 2014-2019 period, according to an estimate produced by LUX Research. va-Q-tec expects to enjoy somewhat higher growth rates in this target market thanks to its particularly durable and high-quality products.

Overall, va-Q-tec addresses growing markets with its product business with VIPs: in Germany, approximately 60 % of primary energy is harnessed for thermal purposes – refrigeration or heating in other words – according to the Working Group on Energy Balances (AGEB). With a worldwide increase in primary energy prices for consumers, greater awareness among customers about energy saving and more stringent statutory regulation, the economic and political incentive is increasing to invest in energy efficiency. This leads to very interesting business opportunities for va-Q-tec products.

2.2.2 Business trends

The Group's entrepreneurial activities in the 2018 financial year focused on continuing and completing the investment program as the basis for further growth. This created essential personnel, organizational and structural conditions for the further expansion of business. The company also further advanced the internationalization of its business and the expansion of its capacities in its production area and for rental containers.

Products division (sale of VIPs)

In the Products division, new customers were acquired, particularly in the target market of Technics & Industry, and business with existing customers was further expanded. This reflects, firstly, the high quality, performance and durability of VIPs. Secondly, regulatory changes exerted a favorable impact on business. Hot water tanks in heating systems with volumes up to 2,000 liters have formed part of Europe-wide energy efficiency labelling since September 2017, as has already been standard for refrigerators for some years. The currently highest energy efficiency class of A+ is technically feasible only with VIPs in this context.

Boilers with energy efficiency classes below the "C" category can no longer be produced. Blue-chip customers of va-Q-tec utilize VIPs to upgrade their products to the highest energy efficiency classes through better insulation. At the start of 2018, a leading German supplier of building services technology already converted all its range of heating system boilers to va-Q-tec VIP superinsulation, for instance.

Systems division (sale of thermal packaging systems)
New customers were acquired in 2018 with the "va-Q-one" thermal box, a cost-efficient one-way solution for secure temperature-sensitive freight transportation. This product is particularly suitable for transports with no return transport of the thermal box for economic reasons. At the same time, business with existing major customers proved stable.

Services division (rental and pre-cooling of thermal packaging systems)
Overall, the Services division presented a mixed picture in the reporting period:

in February 2018, va-Q-tec successfully launched a project in the temperature-controlled air freight transportation area with a leading supplier of systems for the semiconductor industry. This enabled a reference customer exerting a major impact on the entire industry to be acquired. Its extremely complex production machines play an important role in microchip manufacturing. The customer utilizes the va-Q-tec service to transport temperature-sensitive optical and mechanical systems more securely and considerably more cost-efficiently between production sites in Europe and Asia than previously. The va-Q-tec technology ensures the stability of these temperature-sensitive supply chains, including in extreme temperature conditions.

In the area of temperature-controlled air freight containers, revenue reported below-average growth. While revenues generated with a major pharmaceutical customer decreased by almost one half year-on-year due to the customer's own reduction in business, the revenue contribution generated by all other customers grew at a significant overall rate of over 30% in 2018. Although this major customer effect was offset by dynamic new business in 2018, the expected growth rates could not be achieved. Nonetheless, va-Q-tec recorded a significant upswing in the course of the year after an unusually weak start and, at EUR 5.6 million, achieved its highest quarterly revenue to date in the fourth quarter.

National and international business trends
During 2018, the aggregation of the three remaining Würzburg sub-locations into one technology and logistics headquarters was completed. This step serves to boost operating efficiency, expand capacities for production and logistics, and bundle technological competencies. Considerable rental and transport costs are thereby eliminated in the future. In the second quarter, all production lines at the former main premises of va-Q-tec AG were dismantled and transported to the new production site, where they were recommissioned. Costs in a high six-digit range in euros were incurred in this connection, which exerted a marked effect on the EBITDA of va-Q-tec AG. The company nonetheless continued to invest in the requisite production capacities and personnel in order to secure the continuation of va-Q-tec's planned growth track. Internal resources were significantly strengthened for this purpose, such as the IT, marketing and sales areas.

With the opening of a new branch operation in the USA in January 2018, va-Q-tec reached an important milestone in its internationalization overall and in the expansion of its business in North America in particular. Especially the production of small thermal boxes and sales operations are to occur locally from the USA in the future. The new fulfilment center in Langhorne, Pennsylvania, forms a central element of the va-Q-tec growth strategy, as its location adjacent to Philadelphia, New York and Boston and their renowned biotechnology, healthcare and pharmaceutical hubs provides ideal infrastructures. This close proximity enables the company to offer its customers even faster and more reliable service. The company sees high demand for high-performance thermal transport boxes in the USA and, with its new fulfilment center, is becoming a full-service provider in the temperature-controlled transportation of high-quality products in North America. Furthermore, the new head office in the USA comprises a network station for container rental, which will serve as the platform to supply customers with pre-cooled containers. Based on these potentials the North American business is to be further expanded.

During the period under review, va-Q-tec expanded its international presence with a new Latin American headquarters and network station in Montevideo, Uruguay. The new location will function in the future as a central hub for va-Q-tec's rental business and as a fulfilment station.

"Power 20+" performance program designed and launched in 2018

Since the IPO two years ago, most of the investments and measures intended for the proceeds as part of business expansion and internationalization have been realized. This creates the essential prerequisites for the next growth steps. Given this, and in light of revenue and earnings trends in the first three quarters of the year falling short of expectations, the Management Board of va-Q-tec AG has approved a package of measures to enhance sales and efficiency, and has started to implement the measures for the 2018 financial year and for the current 2019 financial year. The management's focus is now on the next growth and efficiency phase in the development of va-Q-tec AG.

These measures aim to significantly re-accelerate sales revenue growth, especially in the attractive Services business, and further improve transparency in relation to sales processes in this division. At the same time, costs are to be better controlled and reduced as far as possible. Specifically, the steps aim at more dynamic sales revenue growth accompanied by a sustained improvement in the EBITDA margin in the current and subsequent financial year. Important measures to improve the sales dynamic are specifically as follows:

- In order to enhance sales performance and forecasting quality in the Services business, the Management Board as well as the senior management of va-Q-tec AG and of va-Q-tec UK Ltd have started to position sales overall, and especially in the Services division, with an even clearer orientation to core customers. Accordingly, a need for change at the head of the sales organization in the container rental area was identified and addressed in 2018.

COST EFFICIENCY AND **PROFITABLE GROWTH** ARE THE FOCUS OF THE **POWER 20+ PROGRAM**

- As a further measure, va-Q-tec has introduced an innovative order management system in the container rental in Q4 2018. As a consequence, va-Q-tec anticipates significantly improved visibility in this area. This visibility relates particularly to the number and progress of customers in the qualification and ramp-up process for temperature-controlled air freight containers.
- As a medium-term adjusting lever, the package of measures comprises an adapted go-to-market approach: this includes an adapted pricing model that is to be more aligned to the benefits of passive high-performance containers. Furthermore, partnerships that already exist in many areas are to be expanded and strengthened. External logistics partners are to increasingly serve their (pharmaceutical) customers with va-Q-tec rental solutions.
- The aforementioned initiatives also achieve a greater integration of the UK subsidiary with va-Q-tec AG, which also leads to improved cross-selling possibilities between container rental and "small" thermal boxes.

Since the IPO in the 2016 financial year, around 177 new employees have been hired across the Group at all qualification levels. This hiring has led to a marked rise in the personnel cost ratio from 27 % in 2016 to 33 % in 2018. The aim is to leverage economies of scale in the medium term with the currently available personnel cost block and thereby significantly further reduce the personnel cost ratio. Furthermore, the temporarily sharp increase in the number of temporary help staff was reduced considerably in Q3 2018 with the conclusion of the removal work and normalization of capacity utilization, especially at va-Q-tec AG. As part of the package of measures, all existing consultant contracts have been reviewed as to their necessity for the next growth phase. Further optimizations relate mainly to costs for IT and marketing. Establishing internal expertise will reduce demand for external resources in this context, for example. Overall, the program had no significant impact on earnings in the 2018 financial year. A noticeable impact is expected for the first time in H1 2019.

In the third and fourth quarters in particular, specific measures were taken to optimize liquidity and financing. Examples include the refinancing – through long-term bank loans and public subsidies for Würzburg and Kölleda – of significant growth investments, especially in real estate, plant and machinery, which were initially financed from equity. Further refinancing occurred in the fourth quarter. This has enabled us to achieve congruence of maturities for the long-term investments and to create financial scope for further business development.

2.2.3 Non-financial performance indicators

Employees at va-Q-tec

As a technology company with broad coverage of the value chain, va-Q-tec ascribes particular significance to its staff and their qualifications. The employees' knowledge, skills, further development and commitment are essential for the further success and performance of va-Q-tec. Staff received both in-house and external training measures during the year under review. Along with corresponding functional training sessions for employees, the focus was on the cross-functional topic of project management. va-Q-tec employs a high number of students, especially in research and development. A total of 18 working students were employed at va-Q-tec (previous year: 17). The average of employees (excluding Management Board members and trainees) grew in the previous by 86, from 358 in the previous year to 444 in the 2018 financial year.

2.2.4 Business results and analysis of the financial position and performance

Results of operations

kEUR unless stated otherwise	2018	2017	Δ 18/17
Revenue	50,708	46,926	8 %
Total income	61,364	57,447	7 %
Cost of materials and services	-25,722	-24,676	4 %
Gross profit	35,642	32,771	9 %
Personnel expenses	-20,403	-15,616	31 %
Other operating expenses	-12,212	-9,945	23 %
EBITDA	3,027	7,210	-58 %
EBITDA margin	*5 %*	*13 %*	-
Depreciation, amortization and impairment losses	-9,864	-7,528	31 %
EBIT	-6,837	-318	-
Result from equity accounted investments	-110	-79	-
Net financial result	-828	-513	-
EBT	-7,775	-910	-

Overall, incoming orders in the 2018 financial year were slightly above the previous year's level. Nonetheless, the order book position as of 31 December 2018 increased significantly compared with the previous year, supporting the company's positive outlook. Given this, va-Q-tec grew its revenues in the past financial year by 8 % year-on-year to reach kEUR 50,708. The revenue growth in this context was driven particularly and to an extent beyond planning by the Products business (sale of VIPs). Business with Products was up by kEUR 2,091, from kEUR 18,031 to kEUR 20,122 (+12 %). In the Systems division, revenues grew by kEUR 488, from kEUR 10,820 to kEUR 11,308 (+5 %). With Services, the Group generated revenues of kEUR 18,386, compared with kEUR 17,366 in the previous year (kEUR +1,020, +6 %,).

Due to the development in 2018 – delayed ramp-up of projects in the high-margin Services business with simultaneous revenue declines with a major customer – the revenue dynamic in the 2018 financial year failed to correspond to the company's original expectations and planning. As a result of these developments, especially in the first half of 2018, it was not possible to achieve the original revenue forecast of EUR 56 million to EUR 63 million. In the course of the publication of the report on the first half of the year in August 2018, the revenue range was consequently adjusted to a new range of EUR 51 million to EUR 56 million. With revenue of around EUR 51 million, the lower end of this adjusted forecast for 2018 was reached.

The German segment (va-Q-tec AG) contributed kEUR 33,650 to consolidated revenue (previous year: kEUR 32,613), the UK segment (va-Q-tec UK) kEUR 14,737 (previous year: kEUR 13,986), and the Other segment kEUR 2,321 (previous year: kEUR 326).

Total income was up by 7% to kEUR 61,364 in the past financial year, reflecting the revenue growth. Work performed by the company and capitalized of kEUR 5,620 in 2018 (previous year: kEUR 6,702) was generated mainly from the continued expansion of the container and box fleets. Other operating income of kEUR 2,581 (previous year: kEUR 1,813) derived from releasing the special item deriving from container sale-and-leaseback transactions. This special liability item arises from the sale of self-produced containers by the parent company va-Q-tec AG or by va-Q-tec UK Ltd to leasing companies, and subsequent finance leaseback by the UK subsidiary. It represents the difference between the market price of the container and its production cost, and is released over a five-year depreciation period and added to other operating income (please see note 3.2.1 "Sale and finance leaseback transactions" in the notes to the consolidated financial statements for more information).

The cost of materials was up from kEUR 24,676 to kEUR 25,722, below the average rate of total income growth and leading to a cost of materials ratio of 42% (previous year: 43%). The cost of purchased services also formed part of costs of materials, and increased by kEUR 428 to kEUR 8,446 (previous year: EUR 8,018). The reason for the absolute increase was the significantly increased use of warehousing, logistics and fulfilment services at partner companies within the scope of "Serviced Rental" as well as more complex repositioning of air freight containers in the network.

Personnel expenses were up from kEUR 15,616 in the previous year to kEUR 20,403 in the 2018 financial year (+31%), thereby rising to 33% in relation to total income. This growth is attributable to the increase in the number of employees required to realize the targeted growth and the recruitment of highly qualified specialists to further optimize business processes. This sharp rise in costs is of a prefinancing nature.

Other operating expenses rose from kEUR 9,945 in the previous year to kEUR 12,212 (+23%) in the reporting period. Along with the growth-related expansion, this rise reflected higher expenses as part of business expansion (external IT implementation advice), as well as double and removal costs incurred temporarily and on a one-off basis due to the relocation to the new Group headquarters, as well as costs incurred as part of returning the former site. At the same time, greater recourse was made to temporary help labor in the production of VIPs during the transfer, in order to handle both demand peaks as well as the move.

In addition, marketing and sales expenses were further increased as a basis for continued growth. Rental expenses, especially for the locations of the newly established or significantly expanded foreign subsidiaries, also grew disproportionately and serve as a foundation for further growth. Measured against total income, this results in a higher other operating expense ratio of 20% for 2018 (previous year: 17%).

As a result of these developments, earnings before interest, tax, depreciation and amortization (EBITDA) fell from kEUR 7,210 in the previous year to kEUR 3,027. This corresponds to an EBITDA margin of 5% (previous year: 13%). The Group's forecast, adjusted as of H1 2018, of a significant decline in the EBITDA margin compared with the previous year and a simultaneous improvement in the margin in the second half compared with the first half, was thereby achieved (originally: strong year-on-year EBITDA growth).

Depreciation, amortization and impairment losses recorded an increase of 31% to kEUR 9,864 (previous year: kEUR 7,528), reflecting a high level of growth investments in buildings, infrastructure, containers and boxes.

Earnings before interest and tax (EBIT) reduced from kEUR -318 in previous year to kEUR -6,837. This is equally attributable to the higher level of depreciation and amortization charges incurred in line with the business growth and the higher personnel expenses and cost of materials, as well as an increase in other operating expenses.

The financial result amounted to kEUR -828 after kEUR -513 in the previous year. In the previous year, the company generated financial income of kEUR 359 as part of the acquisition and refinancing of loans assumed for the new location in Würzburg, which reduced borrowing costs accordingly in the previous year. After adjusting for this effect, the net financial result in the prior-year period would have been kEUR -872.

A pre-tax loss (EBT) of kEUR -7,775 is incurred for the 2018 reporting period, compared with a loss of kEUR -910 in the prior-year period.

German reporting segment (va-Q-tec AG)

kEUR unless stated otherwise	2018 (IFRS)	2017 (IFRS)	Δ 18/17
Revenue	44,565	43,174	3 %
EBITDA	580	5,740	-90 %
Equity ratio	57 %	71 %	-
Average number of employees	390	317	+73

The German reporting segment (va-Q-tec AG) grew its revenues by kEUR 1,391 (+3 %), from kEUR 43,174 in the previous year to kEUR 44,565 in the 2018 financial year. The sales revenue growth was generated mainly thanks to additional business in the Technics & Industry target market (manufacturers of hot water storage units, boilers and other equipment), as well as to the sale and rental of thermal packaging. The sale of containers and the UK subsidiary also contributed to revenue growth, although the pace of growth slowed in some areas in the second half of 2018. In the past financial year, revenue also includes payments from customers for thermal boxes unreturned within the rental network in an amount of kEUR 629 (previous year: kEUR 921). The establishment of box fleets was reflected in a significantly higher level of work performed by the company and capitalized. EBITDA decreased to kEUR 580 (previous year: kEUR 5,740). The equity ratio stood at 57 % as of 31 December 2018 (previous year: 71 %). The average number of employees rose by 73 to 390 (previous year: 317).

UK reporting segment (va-Q-tec UK Ltd)

kEUR unless stated otherwise	2018 (IFRS)	2017 (IFRS)	Δ
Revenue	16,044	15,401	4 %
EBITDA	4,334	4,656	-7 %
Equity ratio	15 %	15 %	-
Average number of employees	37	32	+5

Sales revenues in this segment grew by 4 % from kEUR 15,401 in the previous year to kEUR 16,044 in 2018. Here, the absolute number of rented containers continued to report a further rise compared with the prior-year period. A major customer significantly reduced its order volume due to a decline in its own sales of certain drugs. The loss of a major customer from the network station in Puerto Rico as a result of the hurricane at the end of 2017 also had a negative impact on revenue and earnings. By contrast, business with other customers developed positively, with revenue up 32 % on the previous year.

EBITDA was down by 7 %, from kEUR 4,656 in the previous year to kEUR 4,334. The average number of employees rose from 32 to 37. Given the current business situation – characterized by the constant expansion of the container fleet and the operating business – it is anticipated that the parent company will continue to provide support for the capital backing of the UK subsidiary for two more years.

Other reporting segment

kEUR unless stated otherwise	2018 (IFRS)	2017 (IFRS)	Δ
Revenue	4,089	1,404	+191 %
EBITDA	53	14	+279 %
Equity ratio	10 %	24 %	-
Average number of employees	17	9	+8

The subsidiaries in Korea, Japan, Switzerland, the USA, Uruguay and Singapore together comprise the Other reporting segment. The subsidiaries in the Other reporting segment are important for local presence, the expansion of regional operating activities, and the perception of va-Q-tec as a reliable global and regional partner. The Other reporting segment reports higher revenue overall, reflecting Services revenue (Swiss subsidiary), an increased level of sales and purchasing commissions, as well as strengthened business activities in the USA in the reporting period. EBITDA grew to kEUR 53 in 2018 (previous year: kEUR 14). The average number of employees amounted to 17 individuals (previous year: 9), and the equity ratio stood at 10 % (previous year: 24 %).

Financial position

Principles and goals of financial management

The financing strategy of va-Q-tec is oriented to providing the funds required for strong growth. Recourse is made in this context to various financing instruments such as loans, leasing, factoring, overdrafts and government subsidies. Existing credit lines were optimized continuously in terms of their rate of interest. Interest-rate risks are hedged with corresponding swaps.

The most important investments for further growth towards EUR 100 million of revenue were already largely completed and at a faster than expected rate in 2018. Given this, and as the result of comprehensive financing measures, va-Q-tec had comfortable liquidity as of 31 December 2018 with bank balances plus open credit lines totaling EUR 16.7 million. Together with further financing facilities of up to EUR 6 million, which are in final negotiations, the financial scope would amount to almost EUR 23 million. Further improvements are expected from the normalization of working capital following the completed moves to the new headquarters. In consequence, despite the investments and the high burdens from the company's expansion (internationalization, fleet expansion, production capacities, product developments, personnel expansion, costly training for new customers), considerable relocation costs, significant research activity and burdens from stock market requirements, the available liquidity plus the further financing facilities would still amount to more than half of the funds provided by investors in 2016 in the initial public offering.

Liquidity

Net cash flow from operating activities before working capital changes stood at kEUR -419 in the period under review. In the prior-year period, this figure was kEUR 3,608 higher at kEUR 3,190. Including working capital changes, total net cash flow from operating activities reduced to kEUR -3,653 (previous year: kEUR 1,470). The changes are mainly due to the deterioration in earnings and the higher personnel and other operating expenses reported under this item. The increase in working capital is chiefly attributable to the kEUR 1,983 rise in inventories as of the reporting date, which were accumulated especially to ensure that the company was capable of making deliveries during the relocation-related standstill in the production lines, and partly to raise security stocks of materials required for production and to initially equip the subsidiaries abroad. While trade receivables hardly changed during the reporting period, trade payables report a marked reduction as of the reporting date, despite the inventory accumulation.

Cash flow from investing activities changed from kEUR -1,099 in the prior-year period to kEUR -11,965 in 2018. This includes kEUR 9,000 of proceeds from liquidating short-term deposits (previous year: kEUR 21,000). The purchase of property, plant and equipment resulted in kEUR -19,789 of this amount, compared with kEUR -22,439 in the previous-year period. This is particularly attributable to outgoing payments to purchase the new building complexes in Würzburg and Kölleda and to establish the container and box fleets. Cash flow from financing activities of kEUR 22,624 (previous year: kEUR 294) derives from the scheduled net increase in bank borrowings to finance the long-term investments in buildings as well as plant and machinery. In contrast, investments in the previous year were largely financed or pre-financed from existing liquidity.

kEUR	**2018**	**2017**
Net cash flow from operating activities before working capital changes	-419	3,190
Net cash flow from operating activities	-3,653	1,470
Net cash flow from investing activities	-11,965	-1,099
Net cash flow from financing activities	22,624	294
Net change in cash and cash equivalents	6,953	601

Net assets and capital structure

Assets

kEUR	31.12.2018	31.12.2017
Non-current assets		
Intangible assets	2,437	885
Property, plant and equipment	69,390	55,402
Investment property	1,614	1,614
Capitalized contract costs	157	-
Equity accounted investments	580	357
Financial assets	184	283
Other non-financial assets	647	634
Deferred tax assets	2,961	2,880
Total non-current assets	**77,970**	**62,055**
Current assets		
Inventories	10,924	8,942
Trade receivables	7,557	8,005
Other financial assets - of which term deposits (6-12 months): kEUR 0 (previous year: kEUR 9,000)	334	9,117
Tax assets	135	67
Other non-financial assets	1,073	2,104
Cash and cash equivalents	12,154	5,201
Total current assets	32,177	33,436
Non-current assets held for sale	-	-
Total assets	**110,147**	**95,491**

The portfolio property at Alfred-Nobel-Strasse 33 in Würzburg, which had already been acquired in the previous year, was further expanded during the period under review as the company's central and sole location in Würzburg, with production machinery having been installed and with the building having been occupied by the end of the reporting period. Investments were also made in a second plant at the main production site in Kölleda (Thuringia). The official opening was held in May 2018. Furthermore, the container fleet of the UK reporting segment and the box fleets of the German reporting segment continued to grow in the past financial year in order to provide sufficient capacity for the expected future demand. A total of kEUR 28,474 gross was invested in property, plant and equipment as well as intangible assets in the Group (previous year: kEUR 36,570). Taking depreciation and disposals into account, property, plant and equipment rose by a total of kEUR 13,988 from kEUR 55,402 in the previous year to kEUR 69,390 as of 31 December 2018.

Total non-current assets rose by kEUR 15,915, from kEUR 62,055 to kEUR 77,970 as of 31 December 2018.

Inventories rose by kEUR 1,982 to kEUR 10,924 (previous year: kEUR 8,942), which is attributable not only to the revenue growth but also to a higher level of security stocks and preproduction for the planned, relocation-related production interruption in Würzburg as well as the initial equipping of the foreign subsidiaries with warehouse stocks. Trade receivables were unchanged compared with 31 December 2017 at kEUR 7,557 as of 31 December 2018 (previous year: kEUR 8,005). Other current financial assets, which also include IPO proceeds invested without interest, decreased by kEUR -8,783 to kEUR 334 in 2018 (previous year: kEUR 9,117). This is chiefly attributable to the aforementioned investments, for which predominantly the company's own funds were also deployed on a temporary basis. Total current assets declined from kEUR 33,436 as of 31 December 2017 to kEUR 32,177 as of 31 December 2018. Total assets grew from kEUR 95,491 to kEUR 110,147 as of 31 December 2018.

The cash inflow from the IPO in the 2016 financial year led initially to an increase in liquid assets, which were invested on an interest-neutral basis as deposits with terms of between six and twelve months. These were gradually invested in accordance with the IPO plans.

Overall, borrowing capacity also improved significantly as a result of the stock market listing, so that the high cash outflows from growth were sufficiently financed with low-interest borrowings. This ongoing structuring of an appropriate financing structure from the point of view of the capital market was largely completed in 2018, but will be further optimized in 2019.

Investments

Capital expenditure focused on continued investments in the central production and administrative headquarters in Würzburg and the main production site in Kölleda as well as the expansion of the container fleet for the global container rental business and establishing the thermal box fleet. A total of kEUR 26,851 gross was invested in property, plant and equipment, with property, plant and equipment thereby rising from kEUR 55,402 to kEUR 69,390 net after depreciation and other movements. The existing production capacities at the two plants in Würzburg and Kölleda were in some cases exhausted due to increased demand in all target industries and to relocation-related shutdowns at peak times. For this reason, the planning and almost complete implementation of new capacities was almost completed in the 2018 reporting period. In this respect, the investments that have now been made will enable the company to expand further in the direction of a target figure of EUR 100 million of revenue. A total of kEUR 10,517 was invested in the container fleet (previous year: kEUR 11,099). An amount of kEUR 1,124 was invested in intangible assets the company itself has created (previous year: kEUR 499).

Equity and liabilities

kEUR	31.12.2018	31.12.2017
Equity		
Issued share capital	13,090	13,090
Treasury shares	-54	-54
Additional paid-in capital	46,158	46,158
Cumulative other comprehensive income	-39	-28
Retained earnings	-13,895	-6,174
Equity attributable to parent company owners	45,260	52,992
Non-controlling interests	-	-
Total equity	**45,260**	**52,992**
Non-current liabilities and provisions		
Provisions	79	39
Bank borrowings	24,732	11,146
Other financial liabilities	6,814	3,949
Other non-financial liabilities	9,310	8,438
Deferred tax liabilities	-	-
Total non-current liabilities and provisions	**40,935**	**23,572**
Current liabilities and provisions		
Provisions	62	38
Bank borrowings	9,400	2,958
Other financial liabilities	4,873	6,507
Contractual liabilities	19	-
Trade payables	4,594	5,244
Tax liabilities	79	15
Other non-financial liabilities	4,925	4,165
Total current liabilities and provisions	**23,952**	**18,927**
Total equity and liabilities	**110,147**	**95,491**

Compared with 31 December 2017, changes to the capital structure occurred as of 31 December 2018 due to debt-financed investments. As a consequence of the losses incurred for the year, consolidated equity reduced by kEUR 7,732 to kEUR 45,260, which corresponds to an equity ratio of 41 % on the basis of total assets (31 December 2017: 56 %).

Non-current bank borrowings increased from kEUR 11,146 to kEUR 24,732 as a result of new loans to finance land and investments in real estate in Würzburg, the production plant in Kölleda and machinery and equipment. The real estate loans were concluded with terms of 15 to 20 years and fixed interest conditions at the current low level. Current bank borrowings reported a marked rise from kEUR 2,958 to kEUR 9,400 reflecting greater utilization of overdraft lines.

Non-current other financial liabilities increased from kEUR 3,949 to kEUR 6,814 due to sale-and-finance leaseback financing for the container fleet. Non-current other non-financial liabilities also increased, by kEUR 872, from kEUR 8,438 to kEUR 9,310. Development banks disbursed kEUR 1,664 of funds to va-Q-tec in the reporting period for investments (previous year: kEUR 795). Current other non-financial liabilities rose from kEUR 4,165 to kEUR 4,925 as a consequence of the further appreciation of the special item for container profits.

Bank borrowings plus plant leasing of kEUR 42,186 comprised 38% of total equity and liabilities (previous year: kEUR 21,220; 22%). At the level of the UK reporting segment, further container-sale-and-leaseback transactions were concluded as part of expanding the container fleet. The total volume of finance leases increased by kEUR 938, from kEUR 7,117 in the 2017 year to kEUR 8,054 in the 2018 financial year. Current liabilities and provisions stood at kEUR 23,952 in the financial year under review, representing 22% of total equity and liabilities (previous year: kEUR 18,927, 20%). The Group's non-current liabilities amounted to kEUR 40,935, corresponding to 37% of total assets (previous year: kEUR 23,572; 25%). Despite inventory accumulation, trade payables reduced to kEUR 4,594, compared with kEUR 5,224 in the previous year.

Apart from this, the credit terms for new borrowings, particularly in finance leasing, were significantly improved as a result of the enhanced credit standing following the IPO.

The talks initiated with the syndicate under the multi-bank agreement at the end of the first half of the year with the aim of adjusting the terms and conditions and covenants to the requirements of a company in a strong investment phase and with initiatives in advance of growth, such as is the case with va-Q-tec, have since been successfully completed after the balance sheet date. As a consequence, new conditions have been negotiated according to which va-Q-tec will in future make its inventories available to the syndicate banks as collateral for the credit lines and commit itself to maintaining a minimum equity ratio of 30%.

Overall statement on business progress

Overall, the Management Board believes that substantial progress for the company's future was achieved in 2018, although revenue and earnings failed to meet expectations. The massive investments in the future realized over the past 24 months, the relocation to new production facilities in Würzburg and Kölleda and the associated additional expenditure and start-up costs had a significant impact on EBITDA in 2018. Increased use of external consulting services, e.g. in the IT area, as well as expenses in the course of international business expansion led to higher additional expenses for future business development. Strong demand in the Products business as well as the preproduction of orders ahead of the relocation of the production lines and related capacity utilization (peak utilization) also incurred higher expenses, such as in the temporary help labor area. The significant increase in the number of employees – indispensable to the future growth trend – also generated higher personal expenses. However, as most of the planned investments and initiatives as well as hiring have meanwhile been completed, economies of scale are anticipated as revenue grows further. Continued demand in the Products division (VIP sales) continued to drive overall revenue growth. In its Services business, the company serves a growth market. Fleet capacities were further expanded, and the company advanced its internationalization. However, operational issues led to a temporary decline in revenue in the course of the financial year under review. A significant revival in growth already occurred during the course of the year, and especially in the fourth quarter.

EVEN THOUGH BUSINESS TRENDS IN 2018 FELL SHORT OF OUR EXPECTATIONS, THE OUTLOOK AT THE END OF THE YEAR BRIGHTENED CONSIDERABLY AND ALL OF OUR MAJOR GROWTH INVESTMENTS HAVE BEEN COMPLETED.

\- STEFAN DÖHMEN, CFO

Gross profit proved unsatisfactory given the current product mix with lower-margin Products revenues and the temporarily elevated network costs in the Services business. Overall, however, the Management Board continues to appraise the target markets of va-Q-tec as highly attractive, and regards the company as well positioned to leverage the growth opportunities on offer thanks to the investments in personnel and infrastructure it has already completed.

2.3 FORECAST

2.3.1 Outlook

The following forecasts for the trend in management metrics were made under the assumption of the macroeconomic trends for 2019 described in section 2.2.1. Moreover, they are also based on the expected positive growth rates in the market for VIPs and insulation materials overall. A high growth dynamic is expected in the market for thermal packaging and services, particularly in the high-performance thermal packaging segment. These assumptions are underpinned by estimates produced by market research institute IMARC and Lux Research, which already expect growth in the low double-digit percentage range (see 2.2.1 Macroeconomic environment and Group-specific conditions). Above and beyond this, va-Q-tec expects to benefit to an above-average extent from the megatrends of energy efficiency, regulation of cold chains (product safety) and globalization of value chains. Also taking into consideration the opportunities and risks entailed in operating activities as outlined in section 2.4.2, the company identifies growth levers in tapping new markets and application areas in terms of both products (e.g. last mile to the pharmacy, the utilization of rental containers for temperature-sensitive goods outside the pharmaceuticals industry, TempChain 4.0 applications) and geography (new and further developed country markets such as North America).

Overall statement

After revenue had grown very strongly on average by 25 % per year in the past five years and moderately by 8 % in 2018, va-Q-tec expects medium to strong overall revenue growth for the 2019 financial year compared to 2018 in its three reporting segments and its underlying business segments. Strong revenue growth is expected in the Services division in particular.

As far as earnings before interest, tax, depreciation and amortization (EBITDA) are concerned, the company expects strong year-on-year growth for the 2019 financial year due to operating economies of scale and a changed product mix with a growing proportion of higher-margin services. The elimination of relocation-related and other temporary burdens should also have a positive impact compared with 2018.

The equity ratio will remain almost constant at 40 % in the 2019 financial year.

The number of employees will remain almost constant in 2019.

As a consequence, the Management Board of va-Q-tec AG expects above-average revenue growth compared with the target markets, accompanied by a return to significantly improved EBITDA profitability compared with 2018.

2.3.2 Forward-looking statements

This report includes forward-looking statements based on current assumptions and forecasts of the management of va-Q-tec AG. Such statements are subject to risks and uncertainties. These and other factors can lead the company's actual results, financial position, development, or performance to differ significantly from the estimates provided here. The company assumes no obligation of any kind to update such forward-looking statements and adjust them to future events or developments.

2.4 REPORT ON OPPORTUNITIES AND RISKS

2.4.1 Risk management and internal control system

Risk management va-Q-tec is based on three main aspects:

- a risk-aware corporate culture
- a formalized risk management system
- the internal control system

Anchoring risk awareness within the corporate culture
All successful business activity is connected with the conscious assumption of risk. It is crucial to the corporate governance of va-Q-tec that existing and newly added risks be handled in such a way to enable them to be managed actively, and incur as few losses as possible. Opportunities in a business sense should also be utilized to enhance the company's value for all stakeholders. va-Q-tec enjoys a high degree of "risk awareness", which is communicated openly and transparently. From the Management Board's perspective, risk awareness that is translated into practice is one of the most efficient instruments for handling risks. If employees are aware of risks and manage them professionally, the risk of losses being incurred because of risks being realized is diminished. Risks are disclosed and managed proactively and transparently in such an environment. The establishment and company-wide communication of compliance guidelines also fosters greater awareness of compliant behavior. A compliance management system is in place that defines a code of conduct for both internal and external business activity. The compliance officer appointed in this context records, processes and reports to the Supervisory Board and its Audit Committee on all relevant compliance cases.

Risk management system
Risk management at va-Q-tec refers to the systematic engaging with risks, understood as negative events whose occurrence can incur losses and/or unforeseen costs within the company. To meet this requirement, internal and external risks for all segments and subsidiaries are systematically surveyed, measured, steered, managed and reported to the Management and Supervisory boards with the risk management system.

To supplement the existing internal and external control system, the Group management of va-Q-tec already implemented a further developed and formalized risk management system (RMS) in the 2016 financial year for this purpose. The RMS incorporates the experience of the past years in identifying risks, e.g. those risks described in the prospectus for the IPO in 2016. In addition, the findings on the risk inventory gained since 2017 when preparing the risk inventories are taken into account. At the meetings of the Management Board, the Audit Committee and the Supervisory Board, the developments/changes in existing risks and the emergence of new risks regularly form the subject of consultations. As in the previous year, the risk situation in the 2018 financial year was evaluated on the basis of two risk inventories as of the reporting date. In between, a regular exchange of information on the risk situation also occurred between those responsible for risk officers, risk managers, the Management Board and the Supervisory Board. Furthermore, the RMS was continuously further developed during the course of the 2018 financial year.

A new data protection concept was implemented, and a new IT security manager was appointed to improve the protection of critical company data. A legal department was also created for the Management Board in order to efficiently support the legal evaluation of business matters in-house. Moreover, the RMS was integrated into the overarching quality management system according to ISO, and now forms part of the ISO-based auditing process.

The aims of the risk management system at va-Q-tec are, as a matter of principle, to avoid, reduce and transfer risks, including through corresponding insurance cover, for example. Besides compliance with regulatory requirements, systematic risk management secures sustainable competitiveness long-term. Such risk management also aims to identify potential going concern risks at an early stage. Risk management at va-Q-tec is not only a security instrument but also a management instrument. Identified risks also offer new business opportunities and competitive advantages.

The RMS is based on a reporting process, a defined risk inventory and risk assessment during the course of the year. As part of the risk inventory, the respective decision-makers and experts within the specialist areas appraise all significant risks. Risks identified within the va-Q-tec Group are measured according to their potential loss, taking event probabilities into account. The risks identified as part of the risk analysis are categorized into risk classes according to their event probability and impact, by multiplying their respective effect by their respective event probability. The bandwidth of event probabilities and effects starts at "very low" and ends at "very high". Risks can thereby be differentiated and prioritized according to the resultant expected risk value. The specialist areas are required to identify and report new risks as part of risk appraisal during the course of the year. The information that is aggregated in this manner is summarized in risk files that are addressed and reported to the Management Board of the va-Q-tec Group. All risks – newly added as well as existing – are also to be monitored and reported continuously. Requisite countermeasures are launched quickly, and monitored subsequently.

New risks and significantly changed risks also form fixed agenda items at all regular management meetings, at each Management Board meeting and at each Supervisory Board meeting. They are discussed as part of results briefings between the Management Board of the va-Q-tec Group and the managers of the specialist areas. A review is also conducted as to whether risk minimizing measures that have already been taken are sufficient, or whether further steps are to be initiated (such as in terms of ad hoc capital market communications). The Group risk management system enables the company's management to identify significant risks at an early stage, to initiate countermeasures and to monitor their implementation. The auditor also examines the risk early warning system to ensure it is suited to the early identification of going concern risks.

Accounting-related internal control system

va-Q-tec operates a clear organisational, corporate, as well as control and supervision structure. Planning, reporting, controlling and early warning systems and processes exist across the company for the comprehensive analysis and management of earnings-relevant risk factors and going concern risks. The functions in all areas of the (Group) financial accounting process (e.g. financial accounting, bookkeeping and controlling) are clearly allocated. To date, va-Q-tec AG has refrained from operating a separate internal audit function due to the company's somewhat small dimensions and limited complexity.

Use is mainly made of standard software (Navision) as far as installed financial systems are concerned. Recourse is made to standard consolidation software to prepare separate and consolidated financial statements. Here, existing structures have to be adjusted constantly to reflect the company's growth and changing conditions, such as capital market requirements.

The IFRS consolidated financial statements are prepared based on a standard reporting format for submission by all Group companies to the central administration in Würzburg. The validation processes applied there and additional plausibility checks ensure that the separate financial statements of the subsidiaries and of va-Q-tec AG are complete and correct.

The internal control and risk management system relating to the financial accounting process ensures that business transactions are recorded, processed and appraised correctly from a financial accounting standpoint, before being transferred to external financial reporting.

Payment transactions are performed electronically with embedded control mechanisms (dual control principle with a selected group of individuals). External service providers implement payroll transactions.

The organisational, corporate as well as controlling and supervisory structure determines the framework of the ICS. Clear statutory and in-house regulations and guidelines ensure a standard and proper financial accounting process. Check mechanisms within the areas directly involved in the financial accounting process, review by the internal control function, backup from the independent auditors and early risk identification by the risk management function should ensure that (Group) financial accounting is free of error.

2.4.2 Operating risks

va-Q-tec measures risks based on their estimated event probabilities and potential effects on the company's financial position and performance, as well as reputation. Measurement of risk loss levels and event probabilities leads to the following examples of key risk indicators.

Event probability	Loss level in EUR	Risk indicator
very low	0 - 50,000	1
low	50,000 - 500,000	4
medium	500,000 - 1,000,000	9
high	1,000,000 - 5,000,000	16
very high	> 5,000,000	25

The Management Board applies the following scheme to measure the characteristic of a risk based on its risk indicator:

Risk indicators	Risk characteristic
0 - 5	Low
5 - 15	Medium
> 15	High

Overall, the following section presents risks after instituting countermeasures.

Risks in the value chain

As a manufacturing company, va-Q-tec has to make recourse to suppliers for intermediate products. va-Q-tec procures the main raw materials, consumables and intermediate products from a limited number of key suppliers. For some materials, only a few purchasing sources are available due to the specific characteristics. The purchasing strategy of va-Q-tec consequently aims to reduce dependency on individual or a few suppliers by qualifying and selecting new suppliers ("dual" or "multiple" sourcing). As in previous years, in 2018 the company continued to newly qualify and select second- and third-tier suppliers for intermediate products and materials. The company also intentionally includes international suppliers in its selection to avoid regional dependency. A medium risk exists for va-Q-tec AG overall due to its limited number of suppliers.

Production stoppages and operational interruptions represent a further risk. The company depends on the continuous operation of its production systems to ensure it can meet delivery requirements, especially to major industrial customers whose value chains are closely intermeshed with that of va-Q-tec. va-Q-tec produces at two geographically separate sites in Würzburg and Kölleda. Stoppage at one site has no significant effects on the other site, where production can continue. The individual production systems, where possible and economically feasible, are also decoupled from each other through technical measures, so the stoppage of an individual system does not restrict the operation of other plants.

Along with the outage of existing systems, a risk can also arise in the insufficient overall capacity of the production systems. Along with productivity and efficiency improvements to the existing systems, the company's strong growth can also require early and forward-looking investment in capacity expansions, as the requisite plants sometimes require long delivery times. The company could nevertheless be surprised by sudden market developments, potentially being unable to satisfy all customer orders on the customers' requested dates.

Through regular ad hoc reporting on new order trends between the sales areas and the Management Board, the company endeavors to identify such developments at an early stage and counteract them with appropriate measures. For example, these can temporarily consist of higher levels of security stocks, additional working shifts or the utilization of less appropriate plant for production, in order to bridge the time gap until additional capacities are commissioned. The Management Board also gauges the risk of long-lasting production outage from the aforementioned reasons as low, and also appraises the risk of insufficient capacity as low following the almost completed growth investments.

The rental services ("Serviced Rental") are particularly dependent on external logistics providers, which are not only responsible for operative processes at the network stations – for cleaning, warehousing and cooling processes, in other words – but also for transporting the preconditioned containers and boxes to the end-customers. This can lead to interruptions to operations, loss compensation claims and damage to reputation. Auditing and close-meshed controlling by the company's own logistics specialists serve to assure the quality of "Serviced Rental" for the pharmaceuticals industry globally. For this reason, the Management Board gauges this risk as medium.

Personnel risks

The company's operating activities and success depend on qualified managerial and key personnel. The company's very well-trained personnel has acquired specific knowledge, skills and commercial contacts, in part through working for the company for many years. va-Q-tec counters the risk of losing such staff not only through measures aimed at employee loyalty, but also through diversifying the knowledge base through the workforce: key staff departures at va-Q-tec are avoided through employee development, diversification of the knowledge base within the company, and compensation in line with the market. Employee motivation and satisfaction is also boosted through performance-based compensation components, regular further training and the good corporate culture with the possibility to help shape disruptive business models. The risks to which va-Q-tec is exposed due to a change of key staff are appraised as medium level risks.

Market and competition risks

The Group in its business activities has a strong focus on major industrial customers. This initially leads to a greater level of customer concentration. The company is constantly reducing the resultant risk through its growing number of customers, and diversification. Further protection exists thanks to a high level of customer loyalty, especially in the healthcare industry. The Group generally endeavors to establish and maintain a close, trusting and sustainable business relationship with all partners, employees and customers, and consequently gauges such risk as medium, and as a risk that can be reduced further.

As a young, fast-growing company, va-Q-tec might potentially be unable to effectively advance and shape its growth. The Group has almost completed a phase of significant investment in personnel, sales activities, rental fleets, infrastructure and research & development. To this extent, were actual growth to prove lower than planned, the risk exists of a negative effect on operating results. As a matter of principle, the Management Board decides on such future investments with due objectivity and sense of proportion, and always based on specific expectations about market trends, as well as taking into consideration the ability to finance such investments. Insufficiently researched and/or excessively early investments are avoided as a consequence.

At the same time, significantly higher actual growth than planned generates the risk of a negative effect on the customer relationship due to non-compliance with delivery deadlines, delivery bottlenecks etc., and thereby also on the operating results. Here, too, sound judgement and the early identification of market developments through regular coordination with the sales areas constitute an important instrument to reduce risk, thereby identifying in good time the requirement for capacity expansions, with early decisions being made by the Management and Supervisory boards concerning the necessary investments in production plants and buildings. The Management Board assesses the remaining risk as medium.

An intensification of the competitive environment also represents a significant risk. This can generate more pressure on prices and margins.

The company protects itself from such risk through two strategic levers, namely cost optimization measures and innovative products and services. Cost optimization includes, for example, increasingly automated production and the particularly efficient purchasing of intermediate products, with selective backwards integration to upstream value chain steps. The innovation topic includes research and development activities, which have already led to commercially successful, high-quality and particularly differentiated products since the company was formed. The company's range of products and services is distinguished from that of its competitors in many aspects: examples include the unique possibility to test the quality of the insulation "in situ", or the production of VIPs with sections extracted and in three-dimensional form. Overall, the Group gauges the risk due to newly emerging competitors or a more aggressive competitive situation as medium.

Brexit

A cross-departmental and cross-border Brexit team was formed in order to prepare va-Q-tec for various UK withdrawal scenarios and to be able to react immediately to political decisions. Risks were identified together with the operating units in va-Q-tec UK, the other Group companies, customers and logistics partners, particularly in the event of a hard Brexit without a withdrawal agreement and transition phase, and measures were developed to avoid disruptions in the supply chain. This includes, for example, technical enhancements in our ERP systems in order to be able to respond to extended customs requirements on the system side. The imminent "Brexit" will entail risks for our business, for example through a possible weakening of the economy. Supply chains may also shift and medicines or their preliminary products may no longer be transported to the UK but rather to France, Germany and the Netherlands. If the drugs or preliminary products originate in the USA, they still have to be transported across the Atlantic. va-Q-tec's TempChain service centers on the European mainland provide opportunities to deal with such changed logistics chains. Generally, less revenue is calculated in pounds sterling than costs are incurred in pounds sterling. If the pound depreciates against the euro as a result of the Brexit, opportunities for va-Q-tec will arise as a consequence. Possible tax benefits could also create opportunities for va-Q-tec. Overall, va-Q-tec consequently considers the Brexit-related risk to be low.

Cyclical target markets

Especially the target sectors of Appliances & Food, Technics & Industry and Building are dependent on the economic situation. The Management Board gauges this risk as low, as the underlying drivers of va-Q-tec's business (increasing regulation and energy efficiency) are less susceptible to economic cycles.

Financial risks

The central finance department of va-Q-tec utilizes revolving liquidity plans to monitor liquidity risk. The Group was solvent at all times. Interest risks deriving from existing long-term lending facilities are partly hedged through interest-rate swaps. The Group is exposed to interest-rate risk on its short-term overdrafts, although such risk is currently unlikely to materialize. Currency risks are also limited due to the fact that most invoicing occurs in euros (the company's functional currency) as well as by way of the company's internationalization. Overall, the Group consequently gauges risks in its financial area as low.

Since the IPO, the company has invested more than EUR 70 million in its rental fleets of containers and boxes, further product development, real estate and machinery plant for capacity expansion, the internationalization of the business and general business development.

Major growth investments, particularly in real estate, plant and machinery, were initially financed from the company's own funds to save interest and were financed until the end of 2018 by means of long-term bank loans and public subsidies for Würzburg and Kölleda, in order to reduce the amount of capital tied up and to be able to deploy the funds released for the company's further development. In this respect, long-term debt financing was implemented downstream. According to the Management Board's current assessment, however, the now planned slowdown in the pace of investment exerts only an insignificant effect on the targeted growth, as most of the planned business expansion investments have already been realized and completed since the IPO.

The talks initiated with the syndicate under the multi-bank agreement at the end of the first half of the year with the aim of adjusting the terms and conditions and covenants to the requirements of a company in a strong investment phase and with initiatives in advance of growth, such as is the case with va-Q-tec, have since been successfully completed after the balance sheet date. As a consequence, new conditions have been negotiated according to which va-Q-tec will in future make its inventories available to the syndicate banks as collateral for the credit lines and commit itself to maintaining a minimum equity ratio of 30 %.

Liquidity was secured and comfortable at over EUR 16.7 million at all times in the 2018 financial year and at the end of the year. Furthermore, additional liquidity of approximately EUR 6 million will be generated by the ongoing reduction of high inventories and further financing measures, which have meanwhile been extended further. For this reason, the Management Board gauges liquidity risk as low at present.

In an overall view of risks, va-Q-tec is predominantly exposed to general business risks (performance risks) and financial risks. The Management Board does not identify any individual or aggregated risks as going concern risks. The company is positioned both strategically and financially to leverage the business opportunities on offer to it.

2.4.3 Future development opportunities

Increasing regulation

Increasing regulation in cold chain logistics for pharmaceutical products is enhancing the requirements made of the reliability of thermal packaging and consequently demand for high-performance thermal packaging. In terms of their conformity with regulatory requirements, the passive packaging solutions of va-Q-tec offer significant benefits compared with conventional solutions based on styrofoam and ice. va-Q-tec possesses extensive knowledge concerning regulatory compliance in the respective countries and regions. Laborious and expensive qualification measures at healthcare industry customers – along with corresponding quality assurance and process documentation – deliver the requisite expertise for the successful implementation of packaging solutions for customers. Only a few companies are currently capable of successfully combining the necessary characteristics of thermal packaging within a complex, reliable and at the same time user-friendly offering. With its technology platform, va-Q-tec is one of the few companies worldwide to meet the high requirements. Increasingly complex regulation makes it necessary for a company to constantly further develop itself and research new technologies. In such an environment, high barriers to entering the market for thermal packaging are beneficial for va-Q-tec.

In other target sectors, too, demand for VIPs is increasing due to regulation: customers in the "Technics & Industry" target sector currently face a change in the regulatory environment in important core markets – like many household devices, heating system boilers have since recently been subject to the European Union's Ecodesign Directive – in other words, their energy efficiency is made transparent to the end-consumer through a labelling system consisting of energy efficiency classes. Moreover, equipment with high energy consumption and a low energy efficiency class is excluded from the European domestic market. Customers of va-Q-tec currently use VIPs mainly to position premium boilers in the highest efficiency classes. In future, and with more stringent regulation, we believe VIP-insulated boilers from the premium segment will also penetrate the mass market.

New markets

Since it was founded, va-Q-tec has worked on developing new products and services that open up additional markets and application possibilities for vacuum insulation. Along with basic research and product predevelopment – such as VIPs for entirely new temperature ranges – examples in this context include food logistics and the mobility area.

COMPREHENSIVE **PRACTICAL KNOWLEDGE, INNOVATIVE DEVELOPMENT SPIRIT**, AND INCREASING **GOVERNMENT** REGULATIONS OPEN **FUTURE MARKETS** SUCH AS TEMPCHAIN **DOOR-TO-DOOR TRANSPORTATION** AND **MOBILITY APPLICATIONS**

To date, both existing thermal packaging and thermal packaging in development, as well as the "service rental" of va-Q-tec, are designed for deployment almost exclusively in the healthcare industry. A trend to increasingly temperature-sensitive goods and manufacturing processes is now identifiable in many industries, however. As a result, growth opportunities arise from the development of new application areas with va-Q-tec technologies, such as food transport and the opto-electronic industry.

In the e-commerce area, major international providers and start-ups are currently implementing new business models to deliver food products purchased online directly to end-consumers. We believe the transportation of easily perishable food to the end-customer will be regulated even more stringently in the future. The high-performance thermal packaging of va-Q-tec are very well suited to such transports.

Strong growth opportunities are also on offer to va-Q-tec in the target sector of mobility: in the future, thermal management in vehicles with both conventional and electric engines will become increasingly significant. CO_2 can be saved in conventional vehicles through insulation measures in vehicle cabins and through storing heat energy from the cooling cycle. In vehicles with electric engines, range depends on the optimal working temperature of the vehicle battery as well as the electricity consumed by peripheral functions such as heating and interior air conditioning. In the opinion of va-Q-tec, OEMs can extend the related vehicle range by deploying vacuum insulation.

In the building sector, the opportunity arises to benefit from the currently outstanding situation in the construction cycle, along with ever more stringent energy efficiency standards for new buildings and renovations. va-Q-tec VIPs could be deployed here to enhance energy efficiency.

Along with the aforementioned market opportunities in terms of products and services, the Management Board also identifies considerable future growth opportunities in geographic expansion. The internationalization of business activities and the company's entry into new global markets open up major sales opportunities for the Group. Equally, its international presence can be exploited to tap new sources of raw materials, consumables and intermediate products, and for efficient purchasing.

Innovative services and offerings

In the future, the innovative combination of hardware and IT solutions – referred to as TempChain 4.0 – will become ever more important. Such new services and offerings, consisting of intelligent boxes, fleet data management and predictive analysis in the area of temperature-controlled transports can be offered to customers with a premium.

By way of summary, the Management Board is of the opinion that the opportunities pertaining to the development and growth of the business outweigh the aforementioned risks.

2.4.4 Risk reporting on the deployment of financial instruments

The Group is exposed to various financial risks due to its operating activities. The Group's risk management aims to minimize the potential negative effects on the Group's financial position. Financial instruments are deployed to only a limited extent at va-Q-tec.

Currency risk within the Group was medium in 2018. In the German reporting segment, almost 100 % of sales and approximately 96 % of purchases were processed in euros. In the UK reporting segment, some sales revenues were generated in US dollars. The costs attributable to such revenues are largely also incurred in US dollars. Risk-reducing natural hedging consequently exists for the US dollar. The Management Board gauges the remaining currency risk relating to the US dollar as medium.

Interest-rate hedging instruments continue to exist to hedge interest payments on long-term loans at a standard market interest rate level. None of these hedges is recognized as a hedge in the meaning of IFRS 9. The real estate loans taken out in 2018 were largely financed on a long-term basis with fixed interest rates over the term on the basis of the current, low interest level. No interest-rate hedge was arranged for existing variable interest overdrafts.

No separate financial instruments are held to hedge against default on receivables. The risk of defaults on receivables is relatively low due to the high credit standing of the customer base. Reverse factoring is currently only implemented for a small number of customers with long receivables terms (e.g. in Italy) as is customary in the market.

In 2018, the financial investments reported under other financial assets in the consolidated financial statements exclusively comprise euro-denominated deposits with a term of up to twelve months held at German banks belonging to a German deposit guarantee fund.

Above and beyond the financial instruments described here, the Group holds no further financial instruments that are important for appraising the Group's position or prospective development. Please refer to the sections on "Financial instruments" and "Risk management" in sections 4.4 and 4.6 of the notes to the consolidated financial statements for more details.

2.5 COMPENSATION REPORT

In accordance with its corporate government principles, va-Q-tec aims for performance-based and sustainable compensation for the work of the Management and Supervisory boards. Compensation comprises both basic and variable components.

Management Board

In accordance with the requirements of the German Stock Corporation Act (AktG), and the recommendations of the German Corporate Governance Code (DCGK), the compensation of the Management Board members consists of both fixed and variable elements. Variable compensation comprises a cash component paid as an annual bonus. All compensation elements are appropriate both individually and in their entirety. The Supervisory Board concerns itself intensively with the appropriateness and standard nature of Management Board compensation, taking into consideration all criteria set out in Section 87 of the German Stock Corporation Act (AktG) and Section 4.2.2 Clauses 4 and 5 of the German Corporate Governance Code (DCGK), such as the individual Management Board members' tasks, personal performance as well as the financial situation, performance and future prospects of va-Q-tec AG.

In March 2017, external compensation experts confirmed to the Supervisory Board the fundamental appropriateness of the Management Board compensation. The fixed compensation corresponds to the annual basic salary; in addition, both Management Board members made use of a company car. D&O insurance is in place for all va-Q-tec Group boards. The Management Board members themselves bear the cost of the 10% deductible.

In the past 2018 financial year, a new remuneration system was defined for the members of the Management Board, in which the long-term component of bonuses is to be anchored and the German Corporate Governance Code is to be taken into account to an even greater extent. This compensation scheme is valid for all financial years from 1 January 2018. The current Management Board contracts were adjusted accordingly as of the 2018 financial year. The new compensation scheme was also examined by external experts, and consequently complies with the requirements of the German Corporate Governance Codex. The Supervisory Board intends to submit the main features of the remuneration system for the Management Board to this year's Annual General Meeting to be voted upon. In developing the new system, the Supervisory Board took as its starting point the basic features of the previous remuneration system, which was still considered to be reasonable, and aligned it even more strongly to sustainable corporate development. Consequently, the annual variable remuneration is now divided into a short-term and a long-term variable remuneration component. For both, a bonus target amount is defined for 100% target achievement. Both components are either limited on the upside or can reduce to zero. The short-term variable compensation is based on three key figures, each of which is weighted 1/3: revenue, Group EBITDA and return on capital employed (ROCE). The Supervisory Board sets targets for each of these parameters, with the entry hurdle for receiving any short-term variable compensation at all being 80% of the respective target values. In the area of target achievement between 80% and 115%, certain factors are determined for the calculation of the bonus, whereby the maximum factor is always 1.3 and the respective remuneration component is thereby capped. The exception is the EBITDA component of short-term variable compensation, where the factor can increase to 1.5 under certain circumstances. The long-term variable remuneration is based on the performance of the company's share price between two comparison periods. Here, too, an entry hurdle applies in such a way that at least a positive price performance of 5% must have occurred. In addition, a cap applies if the share price performance exceeds 15%. Of any gross compensation received as long-term variable compensation, the Management Board member must invest at least 50% in the company's shares, which are subject to a four-year lock-up period. Remuneration amounts above the cap are not paid out but credited – again up to a certain maximum amount – to a virtual sustainability bonus account of the Management Board member and can be used within certain limits to offset stock market price increases in relevant comparison periods which are below 10% but above 5%. Portions of the long-term variable compensation resulting from such compensation are to be invested exclusively in shares of the company that are subject to the aforementioned vesting period.

The Supervisory Board approves the annual Group targets to measure the variable cash component. It also sets the targets.

The Management Board members' contracts include no separate payments for the instance of a termination of their contracts due to a change of control.

The total compensation of the Management Board amounted to kEUR 568 in the 2018 reporting year (previous year: kEUR 740). The basic compensation amounted to kEUR 440 (previous year: kEUR 593); this also includes payments for benefits in kind such as a company car. Variable cash compensation stood at a total of kEUR 112 (previous year: kEUR 126). Defined contribution pension commitments have existed for the Management Board members since 2014. To this end, kEUR 15 (previous year: kEUR 21) was paid into an external, congruently reinsured pension fund in the year under review. For this reason, no provisions for pensions have been formed on the balance sheet. Accordingly, fixed compensation including benefits in kind and pension fund contributions accounts for 80 % of total compensation (previous year: 83 %).

No loans or advances were granted to members of the Management Board.

kEUR	Management Board compensation 2018	Management Board compensation 2017
Fixed compensation	407	550
Ancillary payments	34	43
Short-term variable compensation	112	126
Defined contribution plans	15	21
Compensation, total	**568**	**740**

In accordance with the AGM resolution dated 31 May 2016, va-Q-tec discloses the total compensation of the Management Board, but not the individual shares for the individual members. This practice complies with Section 314 (1) No. 6, 286 (5) of the German Commercial Code (HGB).

Supervisory Board

The AGM sets Supervisory Board compensation. The compensation of the Supervisory Board of va-Q-tec AG is regulated in Section 14 of the bylaws of va-Q-tec AG.

With effect as of 1 July 2017, the compensation of the members of the Supervisory Board was re-regulated by way of AGM resolution of 19 June 2017, in order to ensure that the compensation complies with the recommendations of the German Corporate Governance Code: Each member of the Supervisory Board who is not the Supervisory Board Chair or Deputy Supervisory Board Chair receives monthly fixed compensation of EUR 1,200 ("fixed compensation"). The Supervisory Board Chair received twice the fixed compensation and the Deputy Supervisory Board Chair receives 1.5 times this amount. To the extent that he or she is not also the Supervisory Board Chair or Deputy Supervisory Board Chair, the Audit Committee Chair receives 1.5 times the fixed compensation. To the extent that he or she is not also the Supervisory Board Chair or Deputy Supervisory Board Chair, the chair of a Supervisory Board committee that is not the Audit Committee receives 1.25 times the fixed compensation. Each member of the Supervisory Board who is also a member of the committee or of several committees of the Supervisory Board receives a meeting fee equivalent EUR 1,500 per committee meeting, albeit to a maximum of six committee meetings per financial year. If a member of the Supervisory Board is the chair of several Supervisory Board committees, he or she receives only the compensation for one committee, and specifically for the committee where the highest compensation is paid to the Supervisory Board member.

The Supervisory Board received compensation of kEUR 157 for the 2018 reporting year (previous year: kEUR 159). This total includes the reimbursement of the outlays incurred by each Supervisory Board member as well as the VAT incurred on his or her compensation and reimbursement of outlays. The company bore the cost of the premium for the existing D&O insurance concluded for the Supervisory Board members in the 2018 financial year. By AGM resolution of 19 June 2017, a deductible for the Supervisory Board members to be borne personally in relation to the D&O insurance was implemented in an amount of kEUR 100 for each member. The Supervisory Board members themselves bear the cost of the 10 % deductible. Consultancy and other services in an amount of kEUR 31 (previous year: kEUR 27) were also compensated. These were rendered especially as part of real estate purchasing and renovations, as well as in connection with the financing measures of va-Q-tec AG.

Financial year 2018

kEUR	Compen-sation	Ex-penses	Con-sulting
Dr. Gerald Hommel	36	4	-
Winfried Klar	31	4	24
Uwe Andreas Krämer	14	-	-
Dr. Eberhard Kroth	20	2	7
Uwe Lamann	26	2	-
Dr. Barbara Ooms-Gnauck	16	2	-
Total	**143**	**14**	**31**

Financial year 2017

kEUR	Compen-sation	Ex-penses	Con-sulting
Dr. Gerald Hommel	33	3	-
Winfried Klar	27	9	14
Uwe Andreas Krämer	14	-	-
Dr. Eberhard Kroth	20	1	13
Uwe Lamann	21	2	-
Dr. Barbara Ooms-Gnauck	22	3	-
Total	**137**	**16**	**27**

2.6 TAKEOVER LAW DISCLOSURES AND NOTES PURSUANT TO SECTION 315A HGB

The following section presents the disclosures as of 31 December 2018 pursuant to Article 9 (1) lit. c) (ii) of the Council Regulation (EC) No. 2157/2001 on the Statute for a European company (SE) (SE-VO), Section 22 (6) of the Act to Implement Council Regulation (EC) No. 2157/2001 on the Statute for a European company (SE) (SEAG) in combination with Section 289a, Section 315a (1) of the German Commercial Code (HGB). Matters relating to Section 289a (1), Section 315a (1) HGB, which are not fulfilled at va-Q-tec AG, are not related. The following subsection provides an insight into the takeover law relationships as of the 31 December 2018 balance sheet date, and explains them in greater detail.

2.6.1Composition of the subscribed share capital

The share capital of va-Q-tec AG amounts to EUR 13,089,502.00, and is divided into 13,089,502 ordinary registered shares. The share capital is fully paid in. The shares carry the same rights and obligations. Each share grants one vote at the general meeting of shareholders. Exceptions to this include shares the company itself holds (treasury shares), from which no rights accrue to va-Q-tec AG, such as the right to vote at the general meeting of shareholders. As of the balance sheet date, va-Q-tec AG held 13,566 treasury shares (previous year: 13,566). For information about changes in the treasury share position, please refer to the notes to the consolidated financial statements in this annual report.

2.6.2 Restrictions affecting voting rights or the transfer of shares

Above and beyond the time-delimited lock-up regulations for the Management Board, which were agreed as part of the IPO, the Management Board is not aware of any restrictions affecting voting rights all the transfer of shares.

2.6.3 Interests in the share capital exceeding 10 % of the voting rights

Pursuant to the German Securities Trading Act (WpHG), all investors reaching, exceeding or falling short of voting rights thresholds pursuant to Section 21 WpHG through purchase, sale or in another manner are required to report such transactions to the respective company and to the German Federal Financial Supervisory Authority (BaFin). To this extent, the Management Board of va-Q-tec AG is aware of the following individuals and companies whose interests exceed 10 % of the voting rights:

Name	Country	No. of shares	Interest in the share capital
Dr. Joachim Kuhn	DE	1,978,667	15.12 %
Dr. Roland Caps	DE	1,581,433	12.08 %
TOTAL		**3,560,100**	**27.20 %**

Rules concerning the appointment and recall from office of Management Board members
Pursuant to Section 84 of the German Stock Corporation Act (AktG) and the bylaws of va-Q-tec AG, the Supervisory Board appoints the members of the Management Board. Pursuant to the company's bylaws, the Management Board consists of one or several individuals. The Supervisory Board determines the number of Management Board members. If the Management Board consists of several members, Management Board resolutions are passed with a simple voting majority. If the Supervisory Board has appointed a Management Board Chair and if the Management Board consists of at least three members the vote of the Management Board Chair is decisive given an equal number of votes on a resolution.

Rules concerning bylaw amendments
Amendments to the bylaws require an AGM resolution. AGM resolutions require a simple voting majority unless a greater majority is imperative by law.

Management Board authorizations relating to the issuing and repurchase of shares
va-Q-tec AG has both approved share capital and contingent share capital as follows:

Approved share capital
Based on an AGM resolution of 31 May 2016, the Management Board is authorized to increase the share capital, with Supervisory Board assent, once or on several occasions until 30 May 2021 against cash and/or non-cash capital contributions by a total of up to EUR 4,278,187, whereby shareholders' subscription rights can be excluded.

Contingent capital
Pursuant to Section 6.5 of the company's bylaws, the share capital is conditionally increased by EUR 1,000,000 through issuing up to 1,000,000 new ordinary registered shares (Contingent Capital 2016). The Contingent Capital 2016 serves exclusively to grant shares on the exercise of conversion and option rights.

Significant agreements in the case of a change of control due to a takeover offer and compensation agreements in the case of a takeover offer
No significant agreements on the part of the company exist that are subject to a change of control following a takeover offer.

2.7 CORPORATE GOVERNANCE STATEMENT

The company has published the corporate governance statement pursuant to Sections 289f and 315d of the German Commercial Code (HGB), including the statement relating to the German Corporate Governance Code pursuant to Section 161 of the German Stock Corporation Act (AktG), on its website at www.va-Q-tec.com within the Investor Relations area, under the link https://ir.va-q-tec.com/websites/vaqtec/German/530/erklaerungen-und-dokumente.html.