Brockhaus Technologies

(CDAX, Technology, BKHT GR)

WARBURG RESEARCH

Buy	
EUR **70.00**	
Price	EUR 25.30
Upside	**176.7 %**

Value Indicators:	EUR
SotP:	70.00

Warburg ESG Risk Score:	**n.a.**
ESG Score (MSCI based):	n.a.
Balance Sheet Score:	n.a.
Market Liquidity Score:	n.a.

Description:

Brockhaus invests into high tech German Mittelstand companies

Market Snapshot:	EUR m
Market cap:	262.8
No. of shares (m):	10.4
EV:	401.2
Freefloat MC:	203.9
Ø Trad. Vol. (30d):	67.13 th

Shareholders:	
Freefloat	77.6 %

Key Figures (WRe):	2021e
Beta:	1.7
Price / Book:	0.8 x
Equity Ratio:	68 %
Net Fin. Debt / EBITDA:	6.6 x
Net Debt / EBITDA:	6.6 x

Revealing a story of strong cash-generation; Initiation with Buy

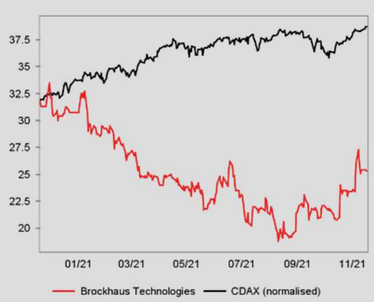
We initiate Brockhaus Technologies with a Buy recommendation and a PT that implies upside of more than 150%. The company acquires technology and innovation-driven German Mittelstand companies and supports their future development with its extensive network and expertise. In our view, the market strongly misprices Brockhaus mainly for the following two reasons:

- The superior cash generation of the Brockhaus portfolio is not recognized. We believe the market is assuming that Brockhaus needs to conduct larger capital increases to fund its current and future investments. While more equity could certainly accelerate M&A activity if opportunities arise, we estimate that by mid-2022, at the latest, it will have become apparent that Brockhaus can finance a smaller acquisition each year internally (an acquisition the size of Palas, for instance, which was an investment of EUR 35m) as cash is generated and increasing EBITDA allows for more debt.
- Valuation multiples imply that the market regards Brockhaus as similar to other listed German small-cap Mittelstand holdings. However, Brockhaus' portfolio companies show vastly superior growth and returns profiles with double-digit revenue CAGRs and EBITDA margins above 30%. As the focus is on asset-lean B2B business models, growth needs no external funding.

Currently, the end-markets in which Brockhaus' three portfolio companies are active are showing strong underlying trends and were even strengthened by the pandemic, in our view. This is very obvious with Palas and its focus on aerosols. However, IHSE too should see sustained strong demand from accelerated digitalization and increased demand for security and performance. Bikeleasing should benefit from the transformation of transport as part of the battle against climate change, especially under Germany's new government, but IHSE too, as regards autonomous driving and associated control centers.

For FY 22e we see sales growth of close to 30% (pro forma, assumes 12M-consolidation for all portfolio companies) and an adj. EBITDA margin of more than 35%. Bikeleasing should contribute the clear majority. Our forecasts are 29% ahead of consensus forecasts for sales and 17% for the adj. EBITDA. Note that we regard consensus to be distorted as some participants use pro forma figures while others exclude Bikeleasing.

We take a sum-of-the-parts approach to our valuation of Brockhaus and use DCF models for each of the three holdings, Palas, IHSE, and Bikeleasing. In our view, this provides transparency and puts the focus on the core characteristic of the portfolio, which is cash generation. Low liquidity and a brief public track record to date should rather be viewed as supportive of the buying opportunity as these will wane over time. We are reminded of the fairy tale: "cook little pot, cook" but the reward is cash rather than porridge.



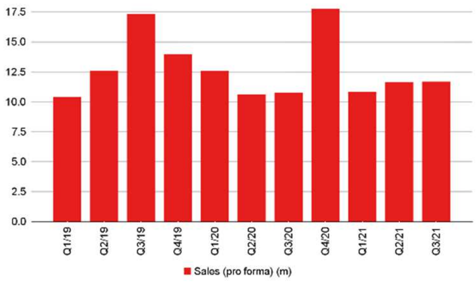
Rel. Performance vs CDAX:	
1 month:	16.0 %
6 months:	2.1 %
Year to date:	-32.7 %
Trailing 12 months:	-41.0 %

Company events:

FY End: 31.12. in EUR m	CAGR (20-23e)	2018	2019	2020	2021e	2022e	2023e
Sales (pro forma)	56.5 %	11.7	54.3	51.6	124.5	161.9	197.6
yoy		n.a.	n.a.	-5.0 %	141.4 %	30.1 %	22.0 %
Sales	56.5 %	1.1	16.6	51.6	63.2	161.9	197.6
Change Sales yoy		n.a.	1408.3 %	211.5 %	22.6 %	156.1 %	22.0 %
EBITDA (pro forma)	82.8 %	3.7	16.2	12.3	42.2	58.8	74.9
Margin (pro forma)		*31.9 %*	*29.8 %*	*23.8 %*	*33.9 %*	*36.3 %*	*37.9 %*
EBITDA	108.0 %	-1.3	1.3	8.3	15.8	58.8	74.9
Margin		*-119.7 %*	*7.7 %*	*16.2 %*	*24.9 %*	*36.3 %*	*37.9 %*
EBIT	-	-1.6	-2.3	-1.0	4.9	22.5	37.2
Margin		*-141.9 %*	*-13.7 %*	*-2.0 %*	*7.8 %*	*13.9 %*	*18.8 %*
Net income	-	-1.7	-3.8	-6.8	0.2	11.5	24.3
EPS	-	-0.66	-1.32	-0.81	0.02	1.05	2.22
FCFPS		-0.30	1.47	0.91	0.78	3.40	4.80
FCF / Market cap		n.a.	n.a.	3.0 %	2.9 %	13.4 %	19.0 %
EV / Sales		n.a.	n.a.	3.6 x	6.6 x	2.3 x	1.7 x
EV / EBITDA		n.a.	n.a.	22.6 x	26.4 x	6.4 x	4.4 x
EV / EBIT		n.a.	n.a.	n.a.	84.6 x	16.8 x	8.8 x
P / E		n.a.	n.a.	n.a.	n.a.	24.1 x	11.4 x
FCF Potential Yield		n.a.	n.a.	2.8 %	3.3 %	13.8 %	19.3 %
Net Debt		-14.6	44.8	-68.2	103.8	66.6	14.0
ROCE (NOPAT)		n.a.	n.a.	n.a.	0.6 %	3.7 %	6.6 %
Guidance:	Pro forma sales of EUR 125-135m and adj. EBITDA pro forma of EUR 42-46m						

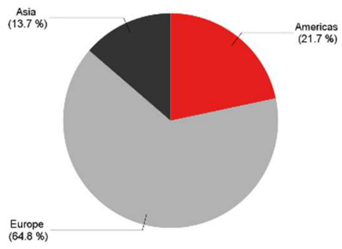
Analyst
Stefan Augustin
saugustin@warburg-research.com
+49 40 309537-168

Sales (pro forma) development
in EUR m



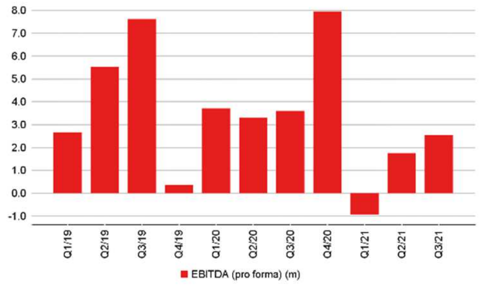
Source: Warburg Research

Sales by regions
2020; in %



Source: Warburg Research

adj. EBITDA (pro forma) development
in EUR m



Source: Warburg Research

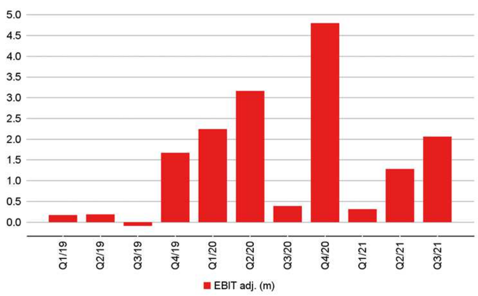
Company Background

- Founded in 2017 by CEO Marco Brockhaus and other team members as the successor to three private equity funds.
- In contrast to the limited life-time of a PE fund, the structure of a holding company precludes forced exits and management influence is increased.
- IPO in 2020
- Portfolio companies are managed by a lean holding with around 10 employees

Competitive Quality

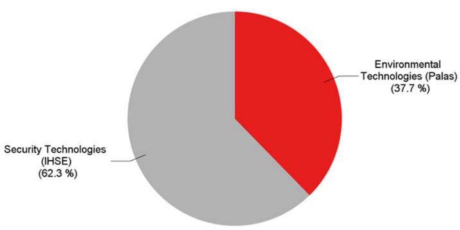
- Brockhaus has an extensive network and over 20 years of expertise in PE transactions to support portfolio companies to grow and expand into new markets
- Focus of investments is in scalable B2B business models in high-tech German Mittelstand companies that generate high margins and superior cash returns
- Typically, the companies invested in are not large enough to go to the capital market alone but are champions in their niches
- Brockhaus' investments represent a niche that asset managers have little or no access to.

adj. EBIT development
in EUR m



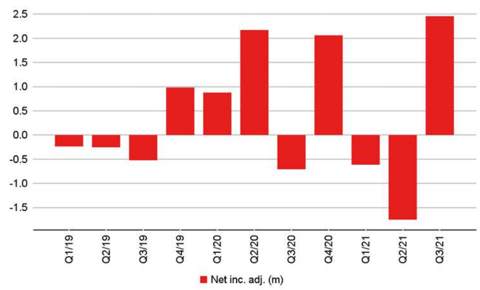
Source: Warburg Research

Sales by segments
2020; in %



Source: Warburg Research

adj. Net income development
in EUR m



Source: Warburg Research

Summary of Investment Case

Investment triggers

- In our view, the company's lack of M&A activity since the IPO has impacted the share price. While the deal with Bikeleasing brought the M&A dry-spell to an end, the size of the transaction made a capital increase seem necessary and, given the low liquidity of the stock, investors have been reluctant to invest ahead of the perceived possibility of a looming increase.
- We believe the assumption of an imminent capital increase to fund future investments is still limiting share prospects. However, we believe the market is strongly underestimating the cash generation of the current portfolio, which should become visible with FY 21e pro forma figures at the latest.
- By mid-2022 we expect it to become plainly visible that Brockhaus does not require external capital to fund the growth of its portfolio companies and that the portfolio companies' respective cash returns could be sufficient to allow for further investment without highly dilutive capital measures. We estimate an FCF of EUR 38m for FY 22e and an adj. EBITDA of EUR 57m leading to a simplified group net debt/adj. EBITDA well below 1.5x versus around 2.5x for FY 21e on a pro forma basis (consolidation for 12M for all portfolio companies) and 6.0x on a reported basis.
- Another trigger is the strong performance of Bikeleasing. Currently, IFRS-based information is limited. Once consolidation is finalized, it should become apparent that PPA-adjusted net margins should surpass 20% and that it is a strong contributor to cash generation.

Valuation

- We apply a DCF model to each of the three portfolio companies using their respective debt-levels. In our view, this is the best method to show the individual characteristics of each company and the long-term growth prospects. Given the unique technological positioning and niche status of the companies it is very difficult to nominate appropriate listed peers for comparison.
- To derive our long-term price target, we applied an SOP model using the portfolio company DCF values. Holding costs are taken into account by discounting them with the DCF WACC but applying a constant growth rate of 4%.
- Brockhaus' blueprint, Roper Technologies, trades at 30x EV/EBITDA compared to 5.6x for Brockhaus. The Brockhaus multiples are comparable to those of other German small-cap holding companies but the portfolio investments are on a higher level.

Growth

- The sales CAGR forecast 2020-2023 is 57.3%, which includes the acquisition of Bikeleasing. Over the same period, we expect adj. EBITDA to grow at a CAGR of 84%.

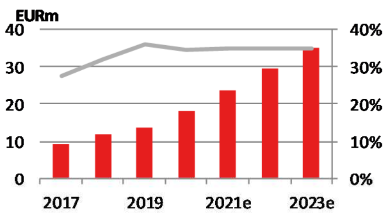
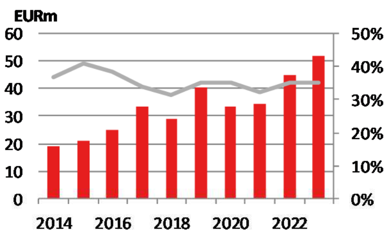
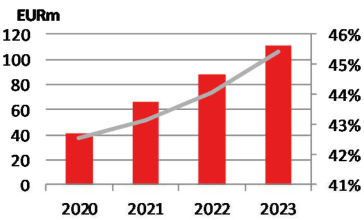
Competitive quality

- Brockhaus has a strong track record and an extensive network which gives it access to invest in companies which are not available on the public market.
- Palas and IHSE are niche players with proprietary technologies generating past revenue growth CAGR of >15% and sustainable adj. EBITDA margins above 30%. The growth is funded internally and the deleveraging shown since Q1 2020 has been significant with a reduction in their net debt of 25%
- Bikeleasing is a scalable B2B platform for digital processing of leasing and insurance services. From 2016 to 2020, the CAGR of leasing contracts was 124% and the company commands an adj. EBITDA margin >40%. Brockhaus purchased around 10x EV/EBITDA for FY21e based on our forecast.

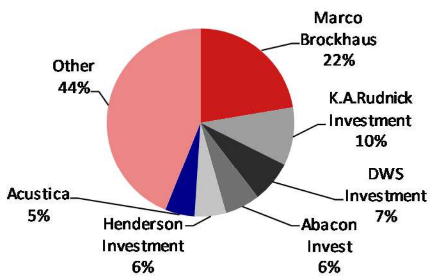
Warburg versus consensus

- Our FY 22e sales and adj. EBITDA estimates are 29% and 17% respectively ahead of consensus. Our FY 23e adj. EBITDA margin is around consensus. Consensus currently consists of two other research houses.
- Comparison of estimates is less meaningful due to the different timing of the consolidation of Bikeleasing, which has a significant impact.

Company Overview

	Palas	IHSE	Bikeleasing-Service
Subsidiaries	 Palas develops and manufactures equipment used to measure paticles in the air and has a number of active patents. It offers a wide range of products, including fine dust and nanoparticle measurement devices, aerosol spectrometers, generators and sensors, as well as associated systems and software solutions.	 IHSE GmbH is the global technology leader in the field of KVM (keyboard, video, mouse). IHSE technology enables high performance separation of workstations and their respective computers, reducing latency and ensuring safety in critical processes	 Bikeleasing offers B2B mobility solutions for companies to provide bicycles to their employees. Its digital platform connects 30k companies with 5k retailers and has the ability to digitally and effectively process insurance and leasing services.
Sales 2020 (EUR m) **% of total**	18,1	33,5	40,9
adj. EBITDA 2020 (EUR m)	6,3	11,8	17,4
adj. EBITDA Margin	*34,7%*	*35,1%*	*42,5%*
Market position	Europe #1 for annual tenders of certified fine dust measurement stations	Among top four globally	German #2
Competitors	Thermo Fisher, TSI	Adder, G&D, Think Logical	Jobrad (#1), Lease a bike, Eurorad, Businessbike Leasing
Technological edge / entry barrier	AI algorithm to measure different particals by light reflection in real time	Data encryption methodology	High performance software platform with scalable process and internal expertise on insurance and lease services
Selected customers	Municipalities, Industrial, Pharma	Government, Utilities, Airports, Broadcasting, Finance, Esports, Industrial, Medical	All companies offering employees benefits (by deferred compensation)
Sales and EBITDA margin estimate			

Management



Marco Brockhaus - CEO
Marco Brockhaus began his career in 1995 in Corporate Finance at Rothschild. With more than 20 years of experience in the private equity business, he has successfully managed three generations of funds with capital of around EUR 300 million with Brockhaus Private Equity GmbH.

Dr. Marcel Wilhelm - COO / Legal Counsil
Marcel Wilhelm is a lawyer specializing in corporate and tax law who graduated from the University of Passau and has been a member of the Munich Bar since 2001. In 2006, he received his doctorate in media law and policy. Prior to joining Brockhaus, Mr. Wilhelm led the international mandate team at Rödl & Partner Germany.

Source: Company data; Warburg Research

Competitive Quality

- Brockhaus has over 20 years of experience, a solid track record, and an extensive network to buy and foster German high-tech Mittelstand companies with leading market positions and superior growth and profitability profiles.
- Brockhaus' holdings, Palas and IHSE, are niche players with proprietary technologies generating revenue CAGR of >15% in the past and sustainable adj. EBITDA margins above 30%.
- Bikeleasing Service, purchase agreement signed in 2020, is a fast-growing B2B platform (+124% CAGR 2016-20) with EBITDA margins above 40%.

From PE fund in 2000 to listed holding in 2020

PE for German high-tech Mittelstand companies

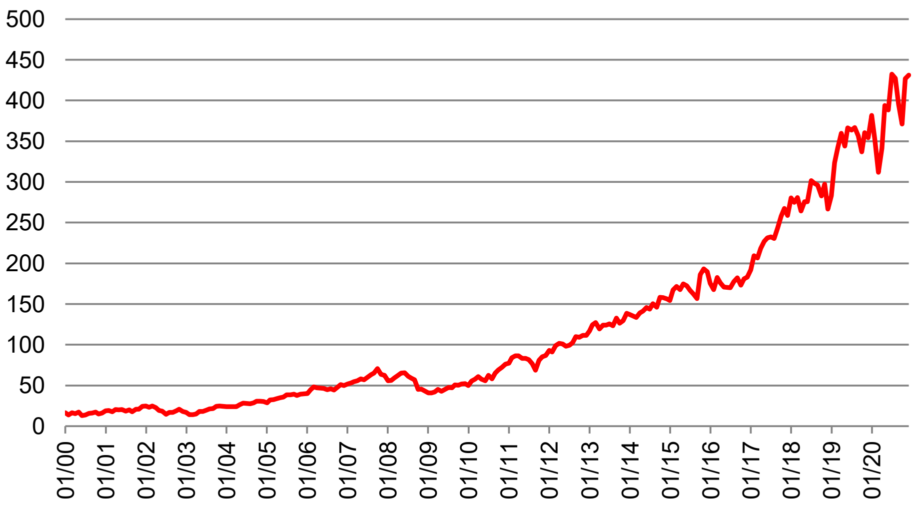
Brockhaus Technologies is an investor in fast-growing tech champions of the German Mittelstand. Back in 2000, Brockhaus Private Equity was founded by the eponymous Marco Brockhaus, who is the CEO of Brockhaus Technologies. In 2014, the third private equity fund was started. In 2017, Brockhaus Capital Management (BCM) was founded to enable a more flexible and longer investment period as well as to exert stronger influence over the companies, less limited by the legal constraints of the status of financial investor. In 2020, BCM went public and was renamed Brockhaus Technologies in 2021.

Striving for a stellar performance

Roper Technologies as the blueprint

US-based Roper Technologies is seen as a blueprint for Brockhaus Technologies. As an investment company, Roper acquires majority ownership in attractive technology companies. Roper's business model is unique. The focus is on coordinated systems software that enables tremendous growth in niche markets. By focusing on niche markets, competitive situations are avoided. Roper's strong operational capabilities enable the company to convert end-market potential into profitable growth and cash flow, creating value for investors. The company was founded by George D. Roper in 1981 and has put in a strong performance over the last two decades, showing a revenue CAGR of 11.7% and a CAGR of 14.9% for net earnings. The respective share-price development speaks for itself. Roper Technologies today runs a business with more than 50 portfolio companies, managed by a holding with 60 employees.

Roper Technologies share-price development (USD)



Source: Factset; Warburg Research

Proven track record 2000-2017

Since 2000 Brockhaus Private Equity managed three PE funds, with Mr. Brockhaus responsible for all three funds. He was joined by Dr. Marcel Wilhelm in 2006 or for Fund II and Harald Henning for Fund III. Fund I and II are now closed and Fund III is in the process of finalization with only one holding left. The performance of the funds has been positive with Fund I reaching an IRR of 23%, Fund II of 26% and Fund III 34% so far. This compares to an average IRR of closer to 10% for Europe over the past 20 years (Bain report 2020).

Brockhaus track record

	gross multiple	gross IRR
Brockhaus PE I	1.5x (ex VC 2.6x)	23% (ex VC 54%)
Brockhaus PE II	2.1x	26%
Brockhaus PE III	2.7X	33%

Source: company data Warburg Research

From PE fund to technology-holding investing in high performing German Mittelstand companies

The transformation from a private equity fund to the structure of a holding company brings some inherent changes and need to be explained. First, there is no end-of-life for the holding company and investments do not need to be terminated as the lifetime of a fund comes to an end. Second, the holding does not act as a financial investor but as a manager and hence can act faster or more decisively, as necessary. The flip-side of the coin is that all investments need to be majority investments to be absolutely on the safe side of the definition according to the German financial supervisory authority, BaFin. BaFin also requires that the investment be long term but a time span is not specified any further. It does not mean that Brockhaus needs to be invested forever in those companies as exits are a possibility.

Seeking high-margin, scalable, cash-generating companies

The main hunting ground for Brockhaus Technologies is smaller German companies with a unique positioning. Brockhaus defines several main sectors that it is targeting for investment but, regardless of the sector, businesses should show the following attributes:

a) Scalable business models

b) High margins and high growth rates

c) Sufficient cash generation to grow the business internally

This puts the focus on B2B businesses as high growth in B2C businesses often calls for high investment in marketing and periods with strong cash needs. This also precludes most venture or early-stage development cases as well as targets requiring larger investment in production to fuel growth or turnaround/restructuring cases.

The idea is that Brockhaus assists the portfolio companies in their next growth phase by giving them access to Brockhaus' broad network of experts and extensive know-how gained in past transactions. Portfolio companies are provided with an advisory board which supports the active management.

A typical company targeted for investment would be too small to seek an IPO alone but is faced with a hurdle like entering a new market or new region, new legislation or the like. Financing is less of an issue. The usual entry point is succession, wealth diversification or the need for additional expertise.

The selective approach to the investment process reduces the risk that portfolio companies need constant funding or that single portfolio companies need to be sold to finance the growth of the other companies.

In the initial phase, Brockhaus likely needs to tap the equity market to fund new investments as the cash-flow profile of the portfolio companies is not sufficient to fund its own growth and additional acquisitions. Further, acquisition loans need to be paid back before cash can be used to make new acqusitions. However, as we will show in more detail in the financials section, cash generation has been very strong since the Bikeleasing acquisition and we estimate that the group could deleverage by the end of FY 23e

Brockhaus has invested in three companies so far, two of which, Palas and IHSE, were investments finalized before the IPO. The last acquisition, Bikeleasing, is on the brink of finalization. In the following we look at the portfolio companies in more detail while we dive deeper into the financial and forecast methodology in the Growth/Financials section.

First investment with Covid blockbuster product

Palas - Keep on breathing

Palas is focused on the measurement of aerosols and particles in the air with a proprietary technology. During the Covid pandemic, Palas has positioned itself as a leader for aerosol measurement. There was strong interest in its test rigs for testing the effectiveness of respiratory masks with sales jumping from EUR 0.4m to EUR 5.3m from 2019 to 2020. Among the customers was the Federal Ministry of Health, which placed one of the first orders.

Superior measurement technology

Palas uses a light source and analyzes the reflections to measure the particles in the air-flow. It can measure the amounts and sizes of the particles in one measuring step and this is done digitally. The digital measurement also has the advantage of data accessibility in real time. The algorithm applied to the measuring is proprietary and there are barriers that prevent an easy replication by competitors.

Proprietary algorithm provides technological edge

The main method in the market to measure fine dust particles in the air is to filter the air flow and measure (by weight) the parts that come through the filter. This method can e.g. tell how many parts were smaller than 10pm (if this was the scale of the filter) but it cannot specify how many of these were 5pm and how many 4pm and 3pm. Several filters in a row could be installed with respective scale and weighing stations, but each step would only produce one reading. Nor is the weighing process able to show real-time data but past data over the collection period.

This technology is the basis for the product range and it is used for several purposes, for instance for the measurement of particles in a given environment or to measure the effectiveness (quality) of a filter by measuring the air that passed through it.

Products of Palas

Palas – overview of products

Source: Palas; Warburg Research

Fine-dust measurement is core, new Covid-related products on the rise

The main products of Palas are the test devices for fine-dust measurement. Since the EU's Right to Clean Air Act, municipalities have to measure their air quality and take appropriate action if certain thresholds are exceeded. Fine-dust test devices stood for 62% of sales in FY 19 but dropped by 20% to 38% share in FY 20 as a result of Covid-19. The demand increased for test rigs for filters. This product experienced a boom during Covid owing to the need to test face masks and the respective material for quality and effectiveness. The share of test rigs sales jumped from 3% of overall sales in FY 19 to 29% in FY 20, which marked a 10-fold increase. Other applications for the filters are in the chemical, healthcare or automotive industry. Tenders for fine dust measurement saw postponements during Covid.

The third pillar of sales are machines to generate aerosols, which are used in chemical, pharmaceutical and other industrial processes. This product represents around 20% of sales but will likely decrease in importance as it is a fairly stable business.

During Covid-19, Palas produced two additional new products, the AQ (Air Quality) guard and the Resp-Aer-Meter. The AQ guard measures the dust concentration of an indoor environment in the combination with the CO2 and the total volatile organic components. The product can determine and signal if the number of people in a room and the number of aerosol particles pose a possible threat e.g. from the virus particles in the air. It cannot detect the presence of a specific virus, e.g. Covid-19. The particles could be any kind of virus particle, like flu, whether contagious or dead matter. Nevertheless, it is a real time process and could be used in the future to monitor indoor risk. However, there are also possible uses on the industrial side or the outdoor version for companies to protect employees (e.g. fine dust at construction sites or mining).

The Resp-Aer-Meter is a tool to measure (in real time) the number of virus scale particles in human breath. It could therefore be used as a safeguard against super-spreaders at larger events. The product is in use at pilot customers.

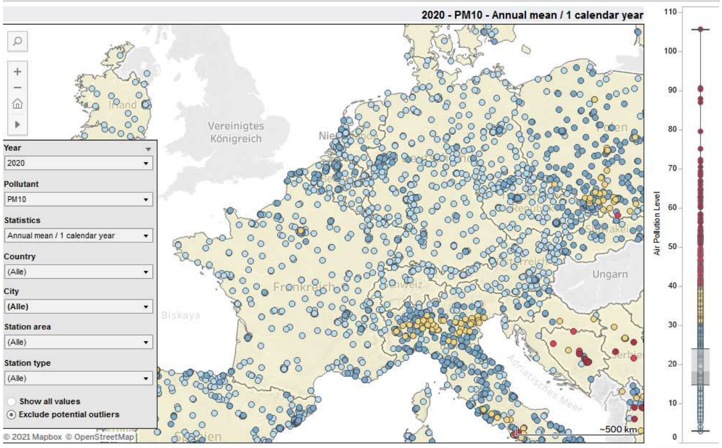
Market & competition

The EU's Right to Clean Air Act sets limits on the concentration of pollutants in the ambient air, for particulate matter among others (sizes PM 10 and PM 2.5). The European Air Quality Portal lists around 5000 stations in Europe and the number is slightly increasing due to the regulation to erect and measure air pollution in areas where the population exceeds 250k inhabitants. Measuring stations here need certification, which makes it a regulated market. However, this is also a niche market when it comes to the air quality (and measurement) market overall.

Certified fine-dust measurement station

Source: Palas, Warburg Research

European air-quality measurement network



Source:EEA, Warburg Research

Besides the certification market in the context of the observation of government regulations, there are many uses that do not need certification. The total market for air quality is far larger than the part that needs certification. The main difference is the allowance of error in the measurement process. In the uncertified market, the tolerance for is far higher than for the certified market. Palas is even far more specific and has a measurement inaccuracy of around 5%. Palas' products are very high-end and, as a result, far more expensive. Air quality monitors available on Amazon can easily be bought for less than EUR 100. Air quality control in the automotive industry for passenger car cabins is also a different market that does not compare to the specifics and capabilities of Palas. For some industrial applications, such as in the pharma industry however, certification is not needed but the demand for sensor quality and measuring tolerance is very high. For example, in China, the technology of Palas is not yet certified, but demand for the products is ramping up.

The main competitor to Palas for air control/measurement equipment is Thermo Fisher. Others include Teledyne (US), TSI (US), Durag (Germany) or Horiba (Japan). Horiba and Teledyne also act as OEM partners for Palas in the US and Asia. Note that Palas set up its own distribution for China which is showing great success by quadrupling sales in the country ytd.

Winning market share vs. Thermo Fischer in Europe

The products of Palas have a high price-tag but their capabilities are helping Palas gain market share over Thermo Fisher in Europe for certified fine-dust measurement as Thermo Fischer would have to supply two products, one for the PM10 measurement and one for PM 2.5, to do the same job. However, a single solution from Palas seems to be more economical than two items from Thermo Fischer, which makes us believe that Palas is able to win market share here.

With respect to regions, Asia, especially China, is an important market especially for fine-dust measurement. Palas expects the Chinese market is around ten times the size of the European market. In 2020, Palas founded a sales distribution in China and now works with its own team. Success is already visible as Asia was the strongest growing region in 9M 2021, as sales nearly doubled.

Going forward (we assume) that Palas will also tackle the US market in the same way in an effort to expand its foothold there as well.

Business model of Palas

Palas' income stream depends on the sale of the products. Service or spare parts business is comparatively low, as only the light source wears out over time, nor are there any consumables as Palas is not producing any filters or comparable items. There is a replacement cycle for the products but the products are very durable.

As Palas' products constantly collect digital datapoints, it could generate a data-pool, which is collected and is accessible remotely. In the future, this data-pool could be the basis for a software platform that is offered to clients. Exact uses for the data-pool still need to be developed but e.g. there could be the possibility to generate more options regarding traffic routing and get direct feedback about the success.

Markets for the AQ guard and the Res-Aer-Meter are just developing and Palas needs to educate the market about the possibilities, which are far-reaching in our view.

IHSE - safety and performance for mission-critical systems

Brockhaus was in the due diligence for a competitor of IHSE, when it decided to approach IHSE. It finally signed a deal with IHSE. IHSE became part of Fund III and moved into Brockhaus Technologies for a purchase price of EUR 110m.

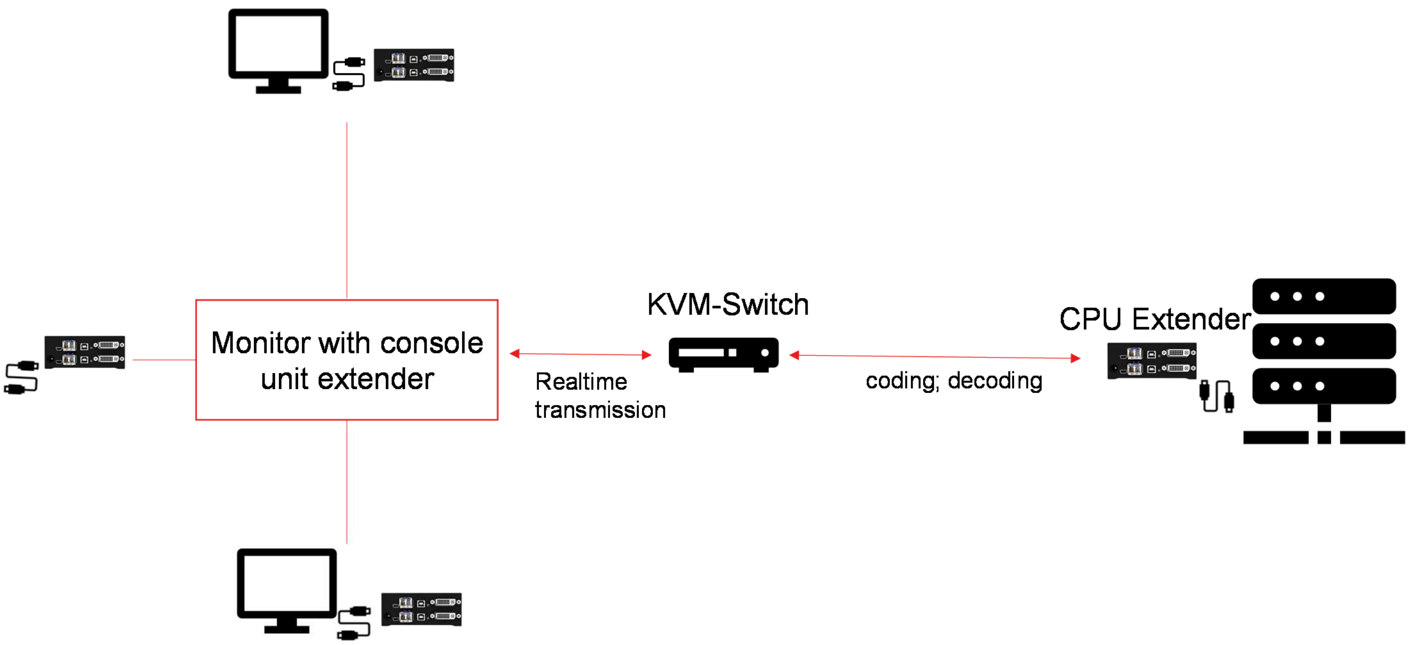
USP is data encrpyption

Encryption technology at its core

IHSE is active in the area of IT components for keyboards, video and mouse (KVM). Today, KVM switches can be used for parallel computer usage and IHSE technology enables high performance separation of workstations and their respective servers.

Here, the powerful computer is connected to the CPU extender, which takes care of decoding and encoding the data. This data is now transmitted by the switch in real time and allows access from any workstation. Finally, the extender is needed at the workstatio to decode the input signals from the switch to the server. Its products have the unique capability to reduce latency to a level close to the physical minimum and prevent loss of data during the transmission. Key element is an encryption protocol that secures data transfer between workstations which are physically distant to the server.

IHSE – product overview.



Source: Warburg Research

The technology comes into play in critical processes where the consequences of a loss of data are severe (e.g. air traffic control, nuclear power), in the need for absolute security (e.g. defense) or where performance is key (banking, gaming). One of the biggest end-markets of IHSE is broadcasting, where all of the above plays a role.

IHSE is not a producer of IT hardware in a broader sense, and hence it does not produce the keyboards, cables or other items of the periphery. Its main product is a KVM extender and a KVM switch and the core competence is the encryption of the data

Business model

The only source of income is the sale of the products, which are usually part of larger installation projects. As technicians need to be on the ground for the projects, pandemic-related travel restrictions were a significant headwind to project acquisition and project execution. Furthermore, as IHSE products are very durable, there are no sizable spare parts, consumables or service businesses.

In theory there is not even a replacement cycle for the equipment, however the constant change of data standards requires ever new encryption methodology. This is an R&D-intensive task and usually leads to new (or follow-up) investment. One example would be the switch in broadcasting from UHD to 4k, that subsequently brought a new project from a Chinese broadcaster.

Market & competition

A global EUR 160m niche but with vastly expanding possibilities

In a more basic form, one can compare the products of Cisco to those of IHSE, however, there is a difference in price and performance. Direct competitor to IHSE is US-based Thinklogical, which has a very strong inroad into the US military, Adder, which is a UK-based company as well as German-based Guntermann & Drunck. Together the four companies roughly represent the world market, which represents a sales volume of about EUR 150-160m sales. In Asia there is so far no Asian competitor with same high quality.

There are two possibilities to connect the KVM to the switch, by cable or by IP. Secure KVM over IP could be hacked but this is not possible for the hardwired solution, except phyically. Bear in mind that we are referring to the hacking of the KVM, and not e.g. the server, if that has internet connectivity. So far, IHSE has concentrated on hardwired solutions. But moving into secure KVM over IP is now done via the acquisition of kvm-tec.

If one thinks about possible uses for secure KVM equipment, these could be vast or remain limited to the niche. It depends on the customer’s willingness to pay extra for the performance and security in the data transmission. In general, we would assume that the use of IHSE components would roughly double the investment compared to using the components of a mass producer like Cisco. While flight control seems a logical use of secure high-performance KVM equipment, many Asian airports seem not to use the equipment of IHSE or its direct competitors. Possibly they go for lower security and performance levels.

In our view, IHSE has ample opportunity for future business growth. As automated driving and flying looks like a real possibility, even in the near future, when one thinks about semipublic areas, traffic control sounds like a natural fit. E-sports and its commercialization also looks like a very promising growth market. However, it is not only that the possible uses are there, IHSE needs to make the sales effort to educate customers about the advantages of the equipment. Asian airports would already represent a sizable market opportunity.

Due to the encryption and the comparably high R&D effort, we believe that the bell-weathers of the industry like Cisco are unlikely to move into this, currently very small, market niche.

Bikeleasing – the digital platform for social benefits

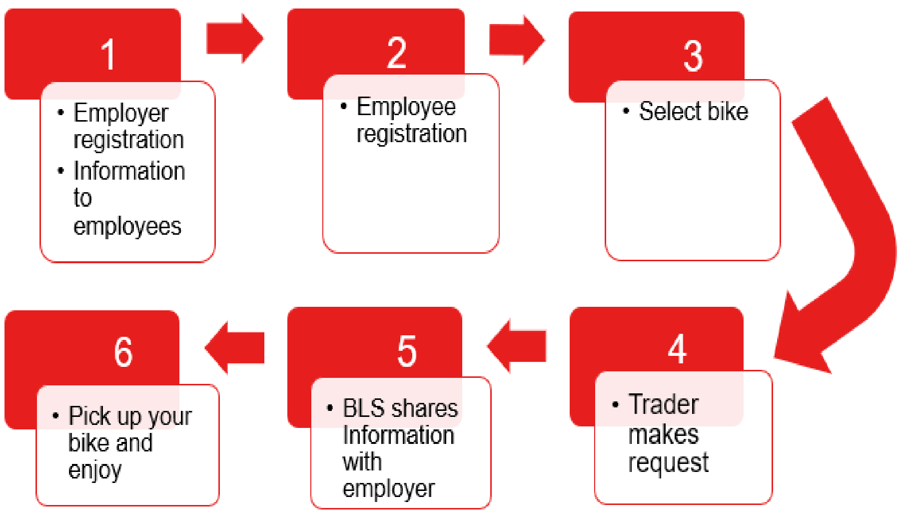
In June 2021 Brockhaus announced the purchase of its third portfolio company, Bikeleasing.

Bikeleasing was founded in 2015 and today works with around 30,000 companies and 5,000 bike retailers nationwide. Bikeleasing is a digital B2B platform for highly automated brokerage and management of leasing contracts. Bikeleasing differentiates itself from the competition by working exclusively with regional specialist dealers and refuses to cooperate with online market dealers. Bikeleasing received the ERGO Innovation Award 2018 and was awarded with an outstanding employer default insurance. In addition to this claim service, Bikeleasing also has comprehensive service offerings for employers, employees and dealers that can be handled completely digitally.

Win-win-win situation for employees, employers & retailers due to tax benefit

Bikeleasing offers B2B mobility solutions for companies to provide their employees with company bikes. The attractive aspect for companies is that the monthly leasing installments are deducted from the employee's gross salary (deferred compensation). Thanks to tax regulations, employees can save up to 40% of the purchase costs over a leasing contract compared to a conventional purchase. The graphic below shows the Bikeleasing sales sequence.

Bikeleasing (BLS) sales process



Source: Warburg Research

The costs for the employee for insurance and the leasing contract are more than compensated by the tax incentive for deferred compensation. The employer has not costs to use the Bikeleasing platform and its risks as s leasing taker are covered by insurance. The retailer benefits from the tax incentive for the employee as the average price of bikes bought via the platform are roughly 3x higher than those in the general market. The retailer also does not pay any fee to be connected to the Bikeleasing platform. Thus, the process is a cost-free way of offering employees benefits and a smart way to attract skilled human capital. Certainly, the employer could additionally fund the leasing, but it is not necessary.

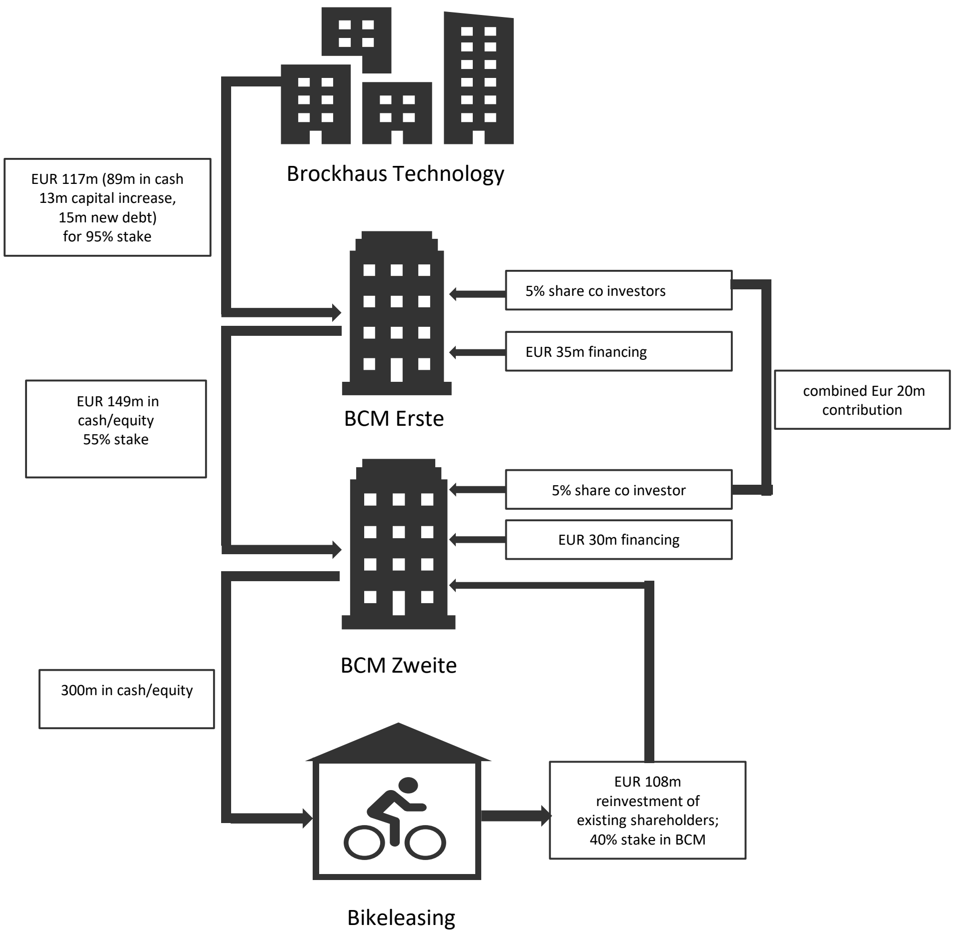
Larger capital increase avoided with complex transaction

Brockhaus signed an agreement to acquire a stake of up to 60% in Bikeleasing, which is valued at an enterprise value of EUR 300m. Bikeleasing's subsidiary Hoffmann Leasing sells of 90% of leasing contracts externally. The other 10% of leasing contracts stay on the balance sheet with lease receivables netted against lease liabilities. In turn, we do not assume a meaningful amount of debt as part of the enterprise value in the transaction. A locked-box interest is paid for the period from 1st January on.

Brockhaus Technology AG uses two ringfenced holdings (BCM Erste and BCM Zweite) to purchase 100% of Bikeleasing GmbH. In the first step, existing shareholders are bought out by BCM Zweite, which is leveraged by a EUR 30m acquisition loan. Thereafter, the existing shareholders reinvest in BCM Zweite. Effectively, the existing Bikeleasing shareholders receive EUR 300m in cash/shares and reinvest for a stake of 40% in BCM Zweite with an EV of EUR 270m (EUR 300m minus the loan of EUR 30m), which amounts to about EUR 108m. The remaining 60% is split between BCM Erste and co-investors as 55% and 5%.

BCM Erste, which is 95%-owned by Brockhaus and 5% by a co-investor, has a EUR 35m acquisition loan. Brockhaus uses around EUR 89m cash at hand as well as EUR 15m debt at the level of the holding and EUR 13m from a capital increase for a contribution in kind signed by the existing shareholders. This is issuance of 560,829 new shares, translating into a share price of EUR 23.18. Brockhaus said that all new shareholders, i.e. the existing Bikeleasing shareholders as well as the co-investors, purchase at the same share price. Additionally, there is locked-box interest on the purchase price of a high single-digit amount.

Bikeleasing transaction



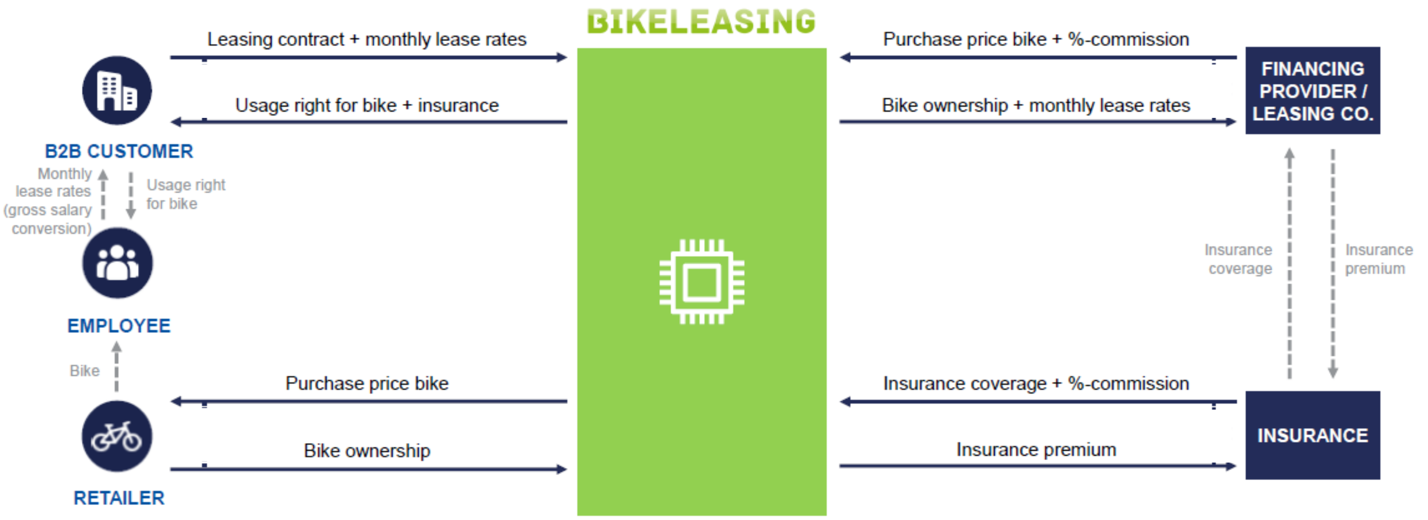
Source: Company data; Warburg Research

Bikeleasing bought an insurance broker (IRAGON in 2019) and a leasing company (Hoffmann Leasing in 2020). This was done for competitive reasons, and as part of the business combination of the managers and existing shareholders Bastian Krause and

Paul Sinizin. Hoffmann leasing was bought to strengthen Bikeleasings's negotiating position with the other leasing companies that get the other 50% of contracts. In the case of pressure on the commission side, Bikeleasing would be in the position to walk away and conduct the financing over its internal leasing business.

Bikeleasing business model – a cash-generating platform

Bikeleasing – platform



Source: Company data; Warburg Research

There are four different revenue/income streams for Bikeleasing.

Signing of lease-contract leads to commission-based profit generation

1. Commission from sale of insurance (which is mandatory) and leasing. The payment is generated at the beginning of the contract. Typical annual insurance fees are around 3% of the bike price. Typcial commissions for these type of insurance is 10% of the annual payments. This applies to 100% of bikes leased. Leasing commission: For 50% of the contracts, Bikeleasing directly passes the leasing contract on to a partner (e.g. Volksbank Leasing) and, similar to the insurance commission, receives commission for generating the leasing contract.
2. Own leasing refinanced: Bikeleasing sells the leasing receivables to financing entities (Volksbanken, Meag, Ergo). No risk remains at Bikeleasing. There is a discount to the face value of payments over the 36 months. In total, Bikeleasing gets the price of the bike from the financing entity plus the margin of the leasing, less the discount that is given to the financing entities. This is for 90% of the 50% of leasing contracts taken onto its own books, i.e. 45%.
3. Own leasing own book. For around 10% (own) contracts, Bikeleasing does not sell off the leasing contract but finances it itself. This is for clients that have a poor credit rating but are valuable customers for Bikeleasing, such as a start-up company that is in the business of delivery by bike. It could be loss-making and therefore have a bad credit rating which is a negative factor for leasing, but potentially a very valuable customer in the long term. Here, Bikeleasing books the lease receivables on the asset side and respective lease financing as a liability. Cash recognition comes with lease payments.
4. Residual value gain. At the end of the 36 months of the leasing contract the residual value of the bike is 10% of the initial selling price. The owner may buy the bike for a value of 18%. If declined, the selling bike shop may purchase the bike for 15% of the value. The delta is profit for Bikeleasing and is gained at the

end of the 36-month leasing contract. This applies to 100% of bikes leased but only when the bike shop purchases the bike can the respective profit be claimed due to the input tax deduction of corporates. If a private person purchases the bike, the hidden reserve is harmful to taxes and as Bikeleasing covers the burden this effectively negates the gain at Bikeleasing level.

Competitive edge

In our view, there is one main item that gives Bikeleasing an edge over its competitors and that is its highly digitalized and scalable platform. Its app and software solution have the capability to connect the B2B customer, the employee, the retailer, insurance and leasing company in a simple manner. Bikeleasing is additionally able to digitally process the leasing contract, insurance contract, and financing. This ensures handling and scalability of individual contracts.

Scalability of digital platform enables handling of more corporates

This ability offers a further competitive advantage. Once the process has been set up with the human resource department, there is a hurdle to changing the supplier as the set-up process would need to be repeated and HR retrained. Employers with large bike fleets do tender regularly but this is not the case for smaller companies. For larger bike fleets, standardization does work well as this is an alternative way to achieve scale. Often, competitors go for the larger bike fleets with standardized products but the processes are less flexible. Bikeleasing, in contrast, went with its flexible platform for smaller companies. This resulted in a very stable and sticky client relationship. Bikeleasing's management claims that none of its customers has voluntary left so far. Nor does the client base conduct regular tenders, which improves the pricing for Bikeleasing.

Owing to the flexibility of Bikeleasing's platform, the market leader in volume in Germany, Jobrad, actually passed on customers to Bikeleasing as it was not able to handle the demand.

The expansion roadmap

In the first phase of growth, Bikeleasing puts the focus on onboarding as many corporate customers as possible. As the relationship is very stable this is a move to occupy future market potential. The logical step thereafter is to increase the number of employees that take up the bike leasing offer provided to them by their employer, the Bikeleasing customer. Roughly one employee in seven avails of the opportunity to lease a bike. In parallel, Bikeleasing works on further enhancing the automation processes to reduce costs.

From bike to benefit

Deferred compensation schemes are country-specific with local jurisdictions and tax rules but many countries are now using this scheme (e.g. UK, Austria (very close to German regulation), France, as well as the Benelux and Scandinavian countries), which provides the basis for Bikeleasing's business model. For internationalization, Bikeleasing's product needs to be adapted to local regulations and new sales structures set up. The first step has been taken with the move to Austria. The leading Austrian insurance company, Merkurversicherungen, acts as a selling agent. Merkurversicherung acts as a prolongation to Ergo Versicherungen which is already a strategic partner of Bikeleasing and Bikeleasing is already one of the largest provider of insurance premia to the machine insurance segment of Ergo.

The platform of Bikeleasing does not need to be limited to bikes. Some customers are actively approaching Bikeleasing to add other assets like phones, tablets or PCs to the platform. This provides the potential to upscale to a social benefits platform.

Likelihood of larger business risks is remote

The largest risk to the business model of Bikeleasing clearly stems from an end to the deferred compensation scheme as the profitability of the business model is based on tax deduction. However, the likelihood of a termination of the deferred compensation scheme looks remote to us. Germany has long been using this scheme for corporate pensions or other retirement benefits. A change in this scheme would thus have a huge impact on the overall economy.

Risk of an end to deferred compensation schemes is remote

On the contrary, we would rather expect Germany's new government to promote the use of bikes for environmental reasons and offer even stronger support for such schemes. As the same regulation used for bikes is used for cars, there might be a change or split in the rate that is currently used to calculate employee tax benefits, which stands at 0.25%. However, even if this were lifted e.g. to 1% to penalize cars, and bikes were hit as collateral, this would result in a 3%-drop in savings compared to the current potential of up to 37%. Demand should hardly be impacted by this.

Nor should there be any problem with the residual values of the bikes. Unlike cars, bikes are depreciated to the level of 10% which, in our view, is substantially below the current market value for used bikes. Over the years, the stronger penetration of leasing bikes could eventually have an impact on used-bike pricing and while this needs to be observed, it would take time for an impact to materialize given the duration of the leasing contract and the current penetration.

The around 5% of own financed leasing contracts, which we would estimate to have a total of around EUR 35m end of FY 21e, should not represent a substantial risk to the company. Employee risk is insured and the remaining risk is that the company goes into insolvency. Either the employee continues to fund privately, finds a new employer or the bike is returned to Bikeleasing. In light of the huge network of bike-shops and conservative residual value calculation we view the threat of losses on returned bikes as small.

Growth/Financials

- For the period 2020-2023e we estimate a pro forma sales CAGR of 57%.
- Proportionately greater growth is assumed for adj. EBITDA and we are projecting a margin of 38% for FY 23e.
- Thanks to the strong cash generation we estimate a decrease in net debt from slightly above EUR 100m at year-end FY 21e to EUR 20m by the end of FY 23e.

After the first nine months of 2021, Brockhaus revenues were up by 0.8% yoy and the adj. EBITDA margin reached 14.9% versus 20.5% the year before. For Q3 alone, the results look better, showing c.9% yoy-growth in sales and an adj. EBITDA margin of c.22%, mainly driven by more positive development at IHSE again. However, in the forecast section, we want to concentrate on how we construct the forecasts. We discuss each company, Palas, IHSE and Bikeleasing, separately.

Palas – accelerated growth of new products

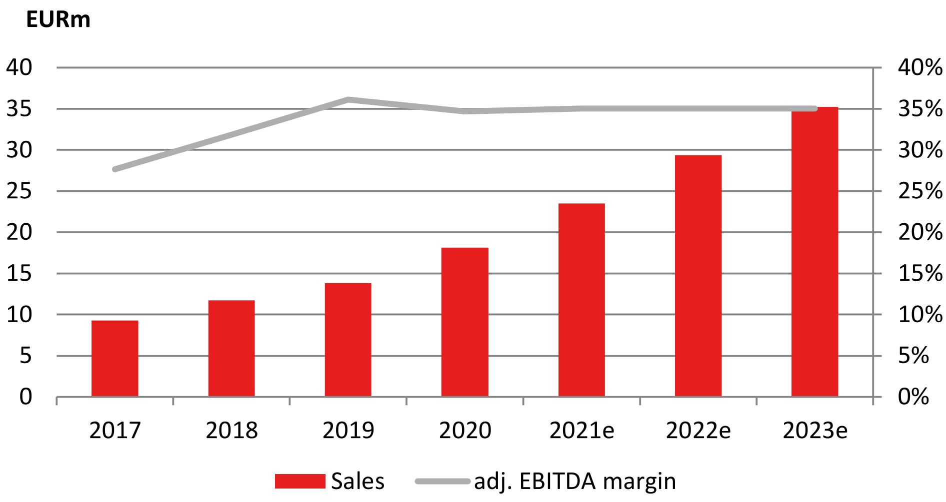
Sales CAGR 20-23e 22%
FY 23e adj. EBITDA margin 35%

For the period 2017-2020, thus including the first year of the Covid pandemic, Palas showed an impressive sales CAGR of 25% with EBITDA margins above 30% except for the first year. Going forward, we expect the business of fine-dust measurement stations to rebound from the subdued levels of 2020, while the new products should gain traction and the company's distribution efforts in Asia are set to pay off. Recall that China's market for fine-dust measurement is estimated by Palas to be roughly 10x that of Europe. US certification should also contribute positively to the sales development.

We assume Palas will grow by 35% in FY 21e. This compares to +64% after H1 but the comparison base becomes more challenging in H2 and especially in Q4. However, the last quarter is typically strong for Palas. Brockhaus mentioned that a considerable amount of equipment is currently being shipped to China with no sales recognition in Q3 but in Q4. For FY 22e we assume growth of 25% as we still expect some catch-up for European fine-dust measurement equipment. Thereafter, we apply a growth rate of 20%, roughly split into around 10% for new products and another 10% for regional expansion, market growth and market-share gains for the old products.

Despite the strong growth, we expect Palas to be able to maintain an adj. EBITDA margin of 35%. There could be some mix effects caused by regional sales mix changes or product type but we rather expect these to level out overall.

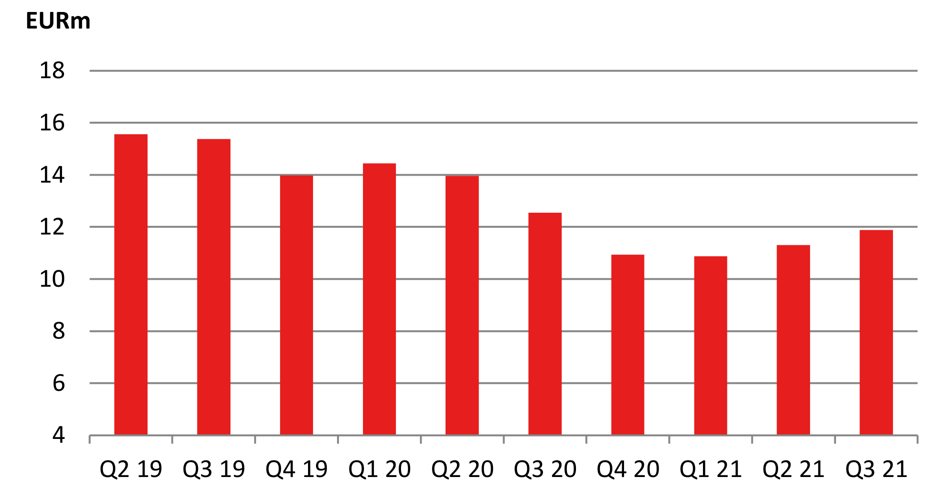
Forecast Palas



Source: Company data, Warburg Research

The business is highly cash-generative as can be seen in the sizable reduction in net debt over the last eight quarters. As a result, Palas is able not only to fund its own structural growth but to deleverage, even though the company also invested in securing parts for its production and working capital increased yoy in H1. Also keep in mind the Q3 21 volume on the way to China.

Net debt development Palas



Source: Company data, Warburg Research

IHSE shows impressive CAGR of 16% in 5-yr period pre-Covid

In the past, IHSE generated an impressive sales CAGR of 16% for the period 2014-2019. This was organic growth and basically reflects the market growth for IHSE's products as well as its ability to expand the use of its products or access new markets. The project-type character of the business also became apparent in past growth patterns, which means that growth-rate distribution can be uneven.

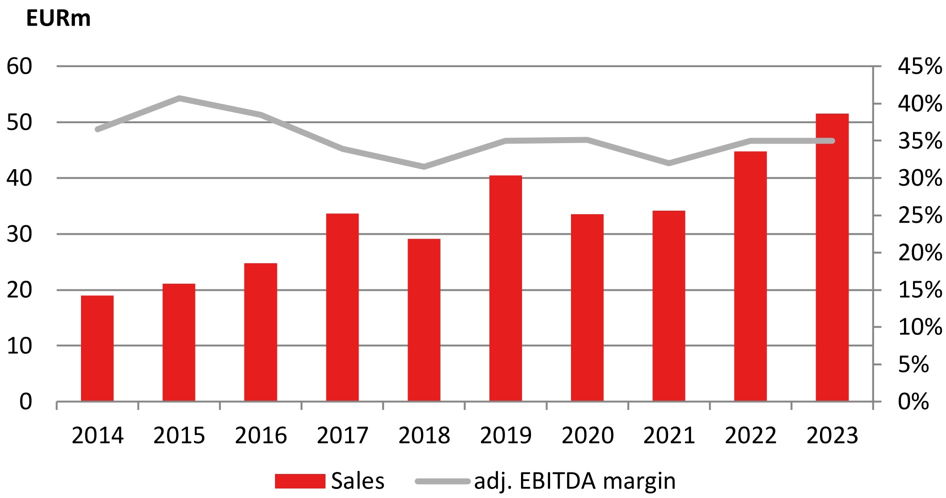
Sales CAGR 20-23e 15%
FY 23e adj. EBITDA margin 35%

We expect more growth in H2 21e as the order intake increased by 19.5% after 9M resulting in an order book that is 97% higher than last year. Q3 showed a growth rate of

14% yoy after a steep drop of 41% in Q1 and a trailing of 3% in Q2. Travel restrictions have been the main hurdle as IHSE engineers are needed on site and we will be monitoring this development going forward.

In November, IHSE announced the acquisition of German-based kvm-tec which provides products and solutions for KVM over IP. This is a complementary product range for IHSE, which can contribute with its more international set-up. kvm-tec had sales of around EUR 3.3m in 2020 and a small profit contribution. Brockhaus sees high synergy potential on both sides as the company now has a more complete product offering and can further expand into the non-critical KVM market.

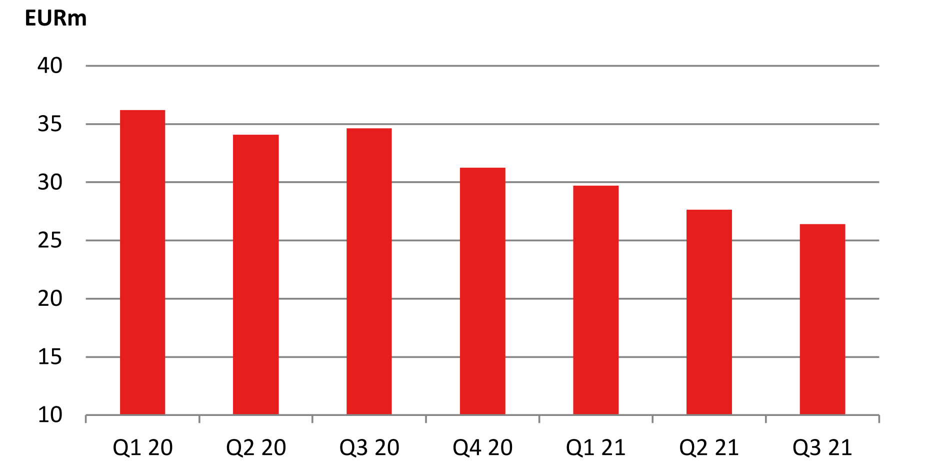
Forecast IHSE



Source: Company data; Warburg Research

IHSE's cash-flow development is very impressive as the company has managed to cut its net debt by 30% since Q1 20. Unfortunately, we lack a record of quarterly development for a longer period of time but in 2018, IHSE was able to almost entirely internally finance EUR 6m for its new headquarters and production site.

Net debt development IHSE



Source: Company data; Warburg Research

Bikeleasing - the scalable business model

Sales CAGR 20-23e 39%
FY 23e adj. EBITDA margin 45%

Unfortunately, a longer history is not available for Bikeleasing to derive past growth rates and compare them to our forecast with respect to revenue generation. As the company was founded in 2015, 2016 sales were only minor. For FY 19, local Gaap revenues of the Bikeleasing GmbH were EUR 101m, which corresponds to 32k lease contracts and leads to a price per bike of EUR 3,150. This delivers only on datapoint of limited quality for the Bikeleasing group. However, we can track the number of leasing contracts the company has signed in the past for which the growth rate shows an astonishing 124% CAGR from 2016 to 2020 and more than ten-fold if we use our FY 21e forecast and take 2017 as a starting point.

We have outlined the income streams of Bikeleasing and under the assumption that there would be no major shifts in composition, we conclude that a forecast based on the number of leasing contracts and the average price per bike leased should give us a sound basis for a revenue forecast.

Onboarding potential now 10k new corporates p.a.

We expect the number of leasing contracts for bikes to continue to grow. Bikeleasing continues to expand the number of onboarded companies and hence the number of employees eligible to lease a bike. The sales force showed that it is able to increase the number of companies by 10,000 per year and the current number of ~30,000 companies makes a slight beat likely for 2021e. This would lead to customer growth rates of around 35% in FY 22e, around 25% in FY 23e and close to 20% in FY 24e. Market potential should be sufficient as, according to the company, less than 30% of employees are currently availing of the option to lease a bike.

If we look at the ratio of total employees of Bikeleasing customers with the option to lease a bike compared to the total of lease contracts, it shows that the penetration is around one lease contract per seven employees at the end of 2020 and the ratio remained roughly stable after H1 2021. By 9M 21 Bikeleasing has access to now 1.6m employees. In our view, there is scope to increase the penetration of leasing contracts further.

For FY 22e we also need to take two things into consideration. First, supply-chain constraints are delaying the delivery of bikes and hence the ability of employees to enter a leasing contract. This should ease in the second half of the year. While this is a headwind, the change in the tariff for civil servants to be eligible for deferred compensation increases the number of employees that can be targeted in the short term by 1.3m. This is close to the total amount of employees at all of Bikeleasing's customers, which are now 1.6m.

Bikeleasing started to internationalize in 2021 by entering the Austrian market. Over time, we expect there will be more to come as most countries in Europe are working with the concept of deferred compensation.

For the average price of bikes leased, we are working with inflation of 2% p.a. As well as the effect of rising raw material prices, this is supported by a mix-effect as e-bikes continue to be the best-selling segment in the bike market and are at the upper end of the pricing range. With an average price of EUR 3,500 per lease contract, we are however already pretty advanced and would not overestimate the effect at this point. Note that historic values are Warburg Research estimates and that our forecast at this point does not include the likely expansion of the platform to other products in the future.

Forecast Bikeleasing – leasing contracts and avg. price

(EURm)	2016	2017	2018	2019	2020	2021e	2022e	2023e
# leasing contracts	2,4	8,9	15,5	33	64	104,6	136	170
avg price	2,5	3	3	3,25	3,50	3,50	3,54	3,57
Gross contract volume	6	27	47	107	224	366	481	607
yoy		345%	74%	131%	109%	63%	31%	26%

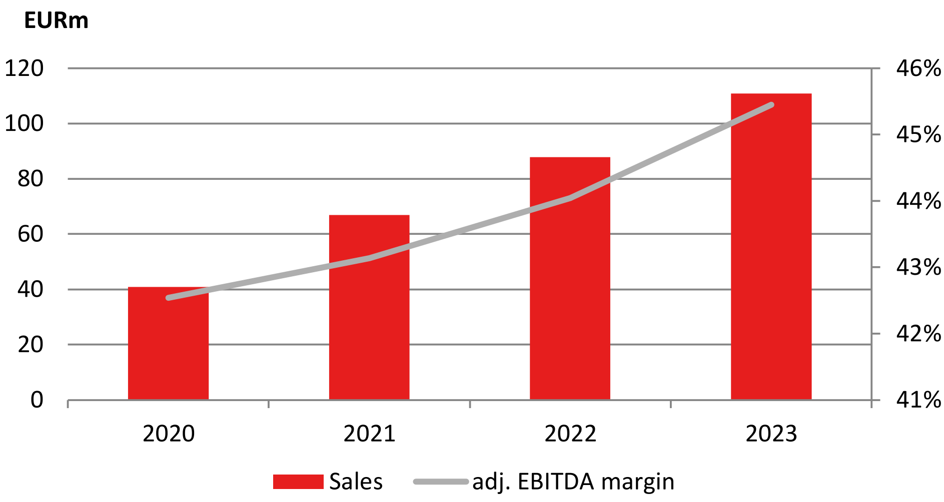
Source: Company data, Warburg Research

From the gross contract volume, we derive the sales volume of Bikeleasing by using the ratio that can be calculated from the 2020 gross contract volume and IFRS sales volume of EUR 40.9m, which is 0.183x. Our reasoning is that partner contracts and the distribution of own leasing and sold leasing contracts will remain unchanged going forward. Using this methodology, we forecast a sales CAGR for Bikeleasing of 36% for the period 2020-2023, reaching a level of EUR 109m in FY 23e.

In FY 20, Bikeleasing achieved an EBITDA of 17.4m which represents an EBITDA margin of 43%. We assume this profitability will remain stable going forward as it reflects payments and commission from the leased contracts. In our view, there should be some potential to even increase this margin going forward with a) the increase in residual value reserves and b) economies of scale. A threat could be the change of pricing in contracts with partners. As Bikeleasing also has the option of processing the contracts internally with its own leasing or its own insurance, we believe it is in a strong negotiating position.

Returned bikes are depreciated to a residual value of 10% over the time of the leasing contract and either offered for a value of 18% to the employee or, if declined, to the retailer for a value of 15%. If the employee buys the bike, the tax benefit that occurred over the time of lease contract is reversed which has a negative effect on Bikeleasing that basically leads to no gain. The retailer enjoys input tax reduction, which means that Bikeleasing can book the difference between the residual value and the selling price as a gain without a negative tax effect. We assume that the majority of employees will buy the bike at the end of the leasing contract but calculate the gain for 15% of the bikes, slightly increasing going forward. The effect becomes more pronounced over time due to the increased number of bikes returned. Conservatively we otherwise work with constant operating leverage and thus scale effects would provide an additional buffer. For FY 23e we estimate an EBITDA margin of 45.4%.

Forecast Bikeleasing – sales and EBITDA margin



Source: Company data, Warburg Research

With operating leases only being residuals from stopped legacy business, 90% of the leasing contracts that are not refinanced by Bikeleasing should be financing leases. No productive assets are needed to run the business and thus there should only be limited depreciation. Furthermore, interest income and interest expenses from refinancing should also level out, if not generate a positive interest result. As a result, the net profitability of Bikeleasing should be around 28% according to our calculation and fully cash-effective.

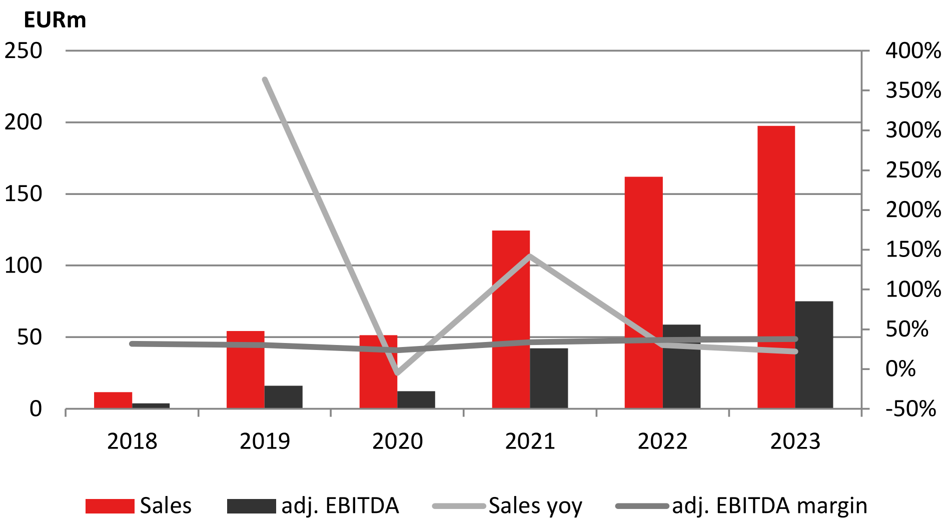
Based on our estimates, Bikeleasing should be able to fully pay down the EUR 65m purchase loans as soon as by FY 23e.

Group forecast - growth and margins drive cash generation

Holding costs seem to fluctuate between the level of EUR 0.8m to 1.5m per quarter depending on the scope of due diligence work and external support.

In our view, our group forecast for sales and EBITDA on a pro forma basis or treating the portfolio companies as if they were consolidated for the full year, gives a better perspective on the actual organic growth rates. For FY 21e, our estimates for sales of EUR 125m and an adj. EBITDA of EUR 42.1m are, conservatively, at the lower end of the guided company ranges for sales of EUR 125-135m and adj. EBITDA of EUR 42-46m. This is to reflect the uncertainties as regards the supply chain and travel as a fourth wave of Covid swells in Germany.

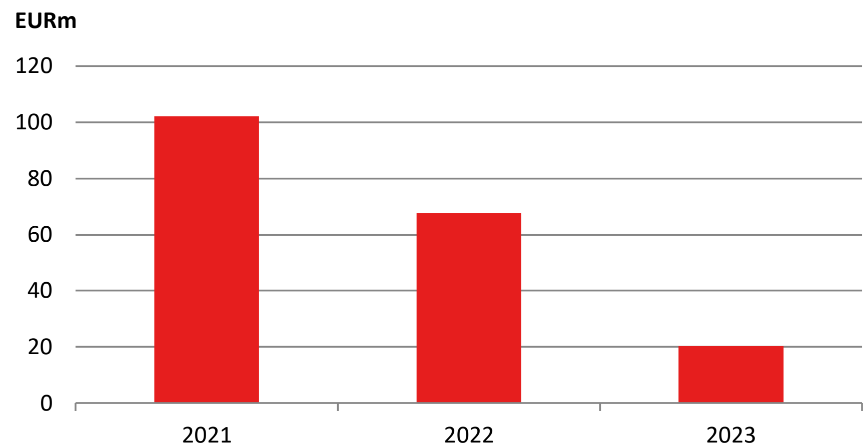
Brockhaus Technologies group estimates (pro forma)



Source: Company data, Warburg Research

While leverage looks extreme at group level in FY 21e if looking at reported figures with a net debt/EBITDA (reported) of around 6x. However, on the pro forma basis (full consolidation of Bikeleasing for the FY) this should remain below the level of 2.5x and for FY 22e we estimate the deleveraging potential of the group at around EUR 34m and EUR 47m for FY 23e, bringing the estimated net debt to EUR 20m.

Massive deleverage potential – net debt development



Source: Warburg Research

Full profit & loss statement

in EUR m	2018	2019	2020	2021e	2022e	2023e
Sales	**1.1**	**16.6**	**51.6**	**63.2**	**161.9**	**197.6**
Sales (pro froma)	**11,7**	**54,3**	**51,6**	**124,5**	**161,9**	**197,6**
Sales Palas (pro forma)	**11,7**	**13,8**	**18,1**	**23,5**	**29,4**	**35,2**
Sales IHSE (pro forma)	**29,1**	**40,5**	**33,5**	**34,2**	**44,8**	**51,5**
Sales Bikeleasing (pro forma)	**0,0**	**0,0**	**40,9**	**66,8**	**87,8**	**110,8**
Increase / decrease in inventory	-0.1	0.2	-0.1	0.0	0.0	0.0
Own work capitalised	0.0	0.8	0.9	0.0	0.0	0.0
Total sales	**1.1**	**17.5**	**52.3**	**63.2**	**161.9**	**197.6**
Material Expenses	0.2	4.3	13.8	16.8	35.6	37.5
Gross profit	**0.8**	**13.2**	**38.6**	**46.5**	**126.3**	**160.0**
Personnel expenses	0.7	6.8	19.5	21.5	47.0	55.3
Other operating income	0.3	0.4	1.5	1.3	1.6	2.0
Other operating expenses	1.6	5.6	12.0	10.5	22.2	31.8
Unfrequent items	0.0	0.0	-0.1	0.0	0.0	0.0
EBITDA	**-1.3**	**1.3**	**8.3**	**15.8**	**58.8**	**74.9**
EBITDA (pro forma)	**3,7**	**16,2**	**12,3**	**42,2**	**58,8**	**74,9**
EBITDA Palas (pro forma)	**3,7**	**5,0**	**6,3**	**8,2**	**10,3**	**12,3**
EBITDA IHSE (pro forma)	**9,2**	**14,2**	**11,8**	**10,9**	**15,7**	**18,0**
EBITDA Bikeleasing (pro forma)	**0,0**	**0,0**	**17,4**	**28,8**	**38,7**	**50,4**
EBITDA Holding (pro forma)	**0,0**	**-3,0**	**-5,8**	**-5,8**	**-5,8**	**-5,8**
Depreciation of fixed assets	0.0	0.8	1.7	1.6	3.1	3.8
EBITA	**-1.3**	**0.4**	**6.7**	**14.2**	**55.7**	**71.2**
Amortisation of intangible fixed assets	0.2	2.7	7.7	9.3	33.2	34.0
Impairment charges and amortisation of goodwill	0.0	0.0	0.0	0.0	0.0	0.0
EBIT	**-1.6**	**-2.3**	**-1.0**	**4.9**	**22.5**	**37.2**
Interest income	0.0	0.1	0.1	0.0	0.0	0.0
Interest expenses	0.0	1.2	3.9	4.3	6.5	3.5
Financial result	0.0	-1.1	-3.8	-4.3	-6.5	-3.5
Recurring pretax income from cont. operations	**-1.6**	**-3.4**	**-4.8**	**0.6**	**16.0**	**33.7**
Extraordinary income/loss	0.0	0.0	0.0	0.0	0.0	0.0
EBT	**-1.6**	**-3.4**	**-4.8**	**0.6**	**16.0**	**33.7**
Taxes total	0.1	0.4	1.9	0.4	4.5	9.4
Net income from continuing operations	**-1.7**	**-3.8**	**-6.8**	**0.2**	**11.5**	**24.3**
Income from discontinued operations (net of tax)	0.0	0.0	0.0	0.0	0.0	0.0
Net income before minorities	**-1.7**	**-3.8**	**-6.8**	**0.2**	**11.5**	**24.3**
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0
Net income	**-1.7**	**-3.8**	**-6.8**	**0.2**	**11.5**	**24.3**

Source: Warburg Research

Profit & loss ratios

in % of Sales	2018	2019	2020	2021e	2022e	2023e
Sales	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Sales (pro froma)	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Sales Palas (pro forma)	**100,0%**	**25,5%**	**35,1%**	**18,9%**	**18,1%**	**17,8%**
Sales IHSE (pro forma)	**248,7%**	**74,5%**	**65,0%**	**27,4%**	**27,7%**	**26,1%**
Sales Bikeleasing (pro forma)	**0,0%**	**0,0%**	**79,3%**	**53,7%**	**54,2%**	**56,1%**
Total sales	**95.8%**	**105.9%**	**101.5%**	**100.0%**	**100.0%**	**100.0%**
Material Expenses	20.0%	26.0%	26.7%	26.5%	22.0%	19.0%
Gross profit	**75.8%**	**80.0%**	**74.7%**	**73.5%**	**78.0%**	**81.0%**
Personnel expenses	68.1%	41.1%	37.9%	34.0%	29.0%	28.0%
Other operating income	24.0%	2.4%	2.9%	2.0%	1.0%	1.0%
Other operating expenses	150.0%	33.6%	23.3%	16.6%	13.7%	16.1%
Unfrequent items	-1.3%	0.0%	-0.3%	0.0%	0.0%	0.0%
EBITDA	**-119.7%**	**7.7%**	**16.2%**	**24.9%**	**36.3%**	**37.9%**
EBITDA (pro forma)		**29,8%**	**23,8%**	**33,9%**	**36,3%**	**37,9%**
EBITDA Palas (pro forma)	**31,9%**	**36,1%**	**34,7%**	**35,0%**	**35,0%**	**35,0%**
EBITDA IHSE (pro forma)	**31,5%**	**35,0%**	**35,1%**	**32,0%**	**35,0%**	**35,0%**
EBITDA Bikeleasing (pro forma)			**42,5%**	**43,1%**	**44,0%**	**45,4%**
Depreciation of fixed assets	2.6%	5.0%	3.2%	2.5%	1.9%	1.9%
EBITA	**-122.2%**	**2.7%**	**12.9%**	**22.4%**	**34.4%**	**36.0%**
Amortisation of intangible fixed assets	19.7%	16.4%	14.9%	14.7%	20.5%	17.2%
Impairment charges and amortisation of goodwill	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EBIT	**-141.9%**	**-13.7%**	**-2.0%**	**7.8%**	**13.9%**	**18.8%**
Interest income	0.0%	0.3%	0.2%	0.0%	0.0%	0.0%
Interest expenses	4.3%	7.1%	7.5%	6.8%	4.0%	1.8%
Financial result	-4.3%	-6.8%	-7.4%	-6.8%	-4.0%	-1.8%
Recurring pretax income from cont. operations	**-146.2%**	**-20.5%**	**-9.4%**	**1.0%**	**9.9%**	**17.1%**
Extraordinary income/loss	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EBT	**-146.2%**	**-20.5%**	**-9.4%**	**1.0%**	**9.9%**	**17.1%**
Taxes total	5.4%	2.6%	3.7%	0.6%	2.8%	4.8%
Net income from continuing operations	**-151.5%**	**-23.1%**	**-13.1%**	**0.4%**	**7.1%**	**12.3%**
Income from discontinued operations (net of tax)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Net income before minorities	**-151.5%**	**-23.1%**	**-13.1%**	**0.4%**	**7.1%**	**12.3%**
Minority interest	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Net income	**-151.5%**	**-23.1%**	**-13.1%**	**0.4%**	**7.1%**	**12.3%**

Source: Warburg Research

Cash flow statement and ratios

in EUR m	2018	2019	2020	2021e	2022e	2023e
Net income	-1.7	-3.8	-6.8	0.2	11.5	24.3
Depreciation of fixed assets	0.0	3.5	9.4	1.6	3.1	3.8
Amortisation of goodwill	0.0	0.0	0.0	0.0	0.0	0.0
Amortisation of intangible assets	0.2	2.7	7.7	9.3	33.2	34.0
Increase/decrease in long-term provisions	0.0	0.1	0.0	0.0	0.0	0.0
Other costs affecting income / expenses	0.1	0.0	-0.4	0.0	0.0	0.0
Cash Flow	**-1.4**	**2.6**	**10.0**	**11.1**	**47.8**	**62.0**
Increase / decrease in inventory	0.5	0.5	-1.1	0.7	-7.2	-3.6
Increase / decrease in accounts receivable	0.0	0.0	0.0	-1.7	-6.6	-3.4
Increase / decrease in accounts payable	0.1	1.2	-0.2	0.3	5.3	3.7
Increase / decrease in other working capital positions	0.0	0.0	0.0	0.0	0.7	-3.0
Increase / decrease in working capital	0.6	1.7	-1.3	-0.6	-7.8	-6.3
Cash flow from operating activities	**-0.7**	**4.3**	**8.7**	**10.4**	**40.0**	**55.7**
CAPEX	0.0	0.0	-1.0	-2.4	-2.8	-3.2
Payments for acquisitions	0.0	0.0	0.0	-315.6	0.0	0.0
Financial investments	0.0	0.0	0.0	0.0	0.0	0.0
Income from asset disposals	-26.0	0.1	0.0	0.0	0.0	0.0
Cash flow from investing activities	**-26.0**	**0.1**	**-1.0**	**-318.0**	**-2.8**	**-3.2**
Change in financial liabilities	12.7	17.2	0.0	70.0	-25.0	-40.0
Dividends paid	0.0	0.0	0.0	0.0	0.0	0.0
Purchase of own shares	0.0	0.0	0.0	0.0	0.0	0.0
Capital measures	0.0	56.5	112.7	127.0	0.0	0.0
Others	0.0	-2.2	-10.4	8.5	0.0	0.0
Cash flow from financing activities	**12.7**	**71.5**	**102.3**	**205.5**	**-25.0**	**-40.0**
Change in liquid funds	-14.0	75.9	110.0	-102.0	12.2	12.5
Effects of exchange rate changes on cash	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**
Liquid assets at end of period	**-11.5**	**107.5**	**127.3**	**21.5**	**33.8**	**46.3**
Cash Flow						
Free Cash Flow	-0.7	4.3	7.6	8.3	38.3	53.2
Free Cash Flow / Sales	-68.2%	25.8%	14.8%	12.5%	23.2%	26.5%
Free Cash Flow Potential	-1.4	0.8	6.4	16.5	55.0	166.2
Adj. Free Cash Flow / Sales	-132.5%	-23.4%	-13.3%	15.8%	27.5%	29.3%
Free Cash Flow / Net Profit	0.5	-1.1	-1.1	6.9	3.2	2.1

Source: Warburg Research

Valuation

- To derive our PT, we use an SOP model based on individual DCF models for the portfolio companies. Even using high discount rates and normalized tax rates, the potential to the share price is well above 100%.
- Currently Brockhaus is valued like other German holding companies but it trades at a massive discount to its self-declared blueprint, Roper Technologies.
- A cross-check by applying our FCF Value Potential model to group figures indicates a valuation similar to our SOP model.

No comparison to other German holding companies

Comparing Brockhaus to other holding companies

Brockhaus Technologies views US-based Roper Technologies as its blueprint and if we look at Roper's past performance showing a 10-year sales CAGR of 10.5% FY13-23e and an EBITDA margin of close to 40%, that compares well with our modeling for Brockhaus as well as the company's ambitions.

However, the market is not willing to grant Brockhaus the same valuation multiples as Roper probably due to the absence of a public track record as well as its size. The perception that Brockhaus needs to tap the capital market to make future acquisitions is also a burden in our view.

However, Brockhaus' trading is comparable to other German holding companies that also invest in the German Mittelstand, like Indus or Gesco. Deutsche Beteiligungs Gesellschaft, which invests in listed companies, shows comparable multiples but is not comparable when it comes to the business model. The difference to Roper, however, is striking.

Peergroup multiples Brockhaus vs. German holding companies and Roper Technologies

Company	LC	Price	MC	EV	P / E			EV / Sales			EV / EBITDA			EV / EBIT		
		in LC	in LC m	in LC m	21e	22e	23e	21e	22e	23e	21e	22e	23e	21e	22e	23e
GESCO AG	EUR	23.50	254.7	317.4	12.2 x	10.8 x	9.3 x	0.7 x	0.6 x	0.6 x	5.8 x	5.3 x	4.8 x	8.8 x	7.7 x	6.8 x
INDUS Holding AG	EUR	34.35	923.9	1,473.0	14.3 x	10.8 x	9.6 x	0.9 x	0.8 x	0.8 x	7.4 x	6.3 x	5.8 x	12.5 x	9.7 x	8.6 x
Deutsche Beteiligungs AG	EUR	40.15	755.0	572.2	4.2 x	9.7 x	7.1x	2.6 x	5.7 x	4.1x	3.2 x	8.7 x	5.6 x	3.1x	8.1x	5.5 x
Roper Technologies, Inc.	USD	487.73	51,448.2	60,017.4	34.5 x	31.7 x	29.7 x	10.4 x	9.8 x	9.3 x	27.2 x	25.4 x	23.8 x	38.3 x	35.1x	32.1x
Average					16.3 x	15.7 x	13.9 x	3.6 x	4.2 x	3.7 x	10.9 x	11.4 x	10.0 x	15.7 x	15.1x	13.3 x
Median					13.2 x	10.8 x	9.4 x	1.7 x	3.3 x	2.5 x	6.6 x	7.5 x	5.7 x	10.6 x	8.9 x	7.7 x
Brockhaus Technologies AG	**EUR**	**25.40**	**263.8**	**345.9**	**22.7 x**	**7.6 x**	**6.1 x**	**3.6 x**	**2.3 x**	**2.0 x**	**12.4 x**	**6.6 x**	**5.6 x**	**16.3 x**	**8.1 x**	**6.8 x**
Valuation difference to Median					-42%	43%	54%	-52%	44%	26%	-47%	14%	2%	-35%	9%	14%

Source:Factset; Warburg Research

Less comparable to Brockhaus is the long-term performance of the other German holding companies as GESCO and INDUS show 10y (FY 13-23e) sales CAGRs of around 7%, which is not a bad performance but well below that of Roper or the CAGRs currently available for Palas, IHSE or Bikeleasing. The same applies to profitability as EBITDA margins at GESCO and INDUS have ranged between 10% and 13% over the past years, which are around 20% lower and outline the massive difference in cash generation.

DCF to reflect the long-term growth potential

Opting for a DCF-based SOP model

Given the strong growth rates of Brockhaus' portfolio holdings and the available data, we decided to model each of these separately using a DCF model. This provides greater transparency to our valuation approach than trying to find publicly-traded companies that roughly resemble the business models.

Conservatively we use a normalized tax rate for the single DCFs which means that we do not take the tax shield of PPA depreciation into account. We use high betas to reflect that the companies are not listed, to consider the lack of some data in the segment reporting and a complex ownership structure, which is usual for private equity, but makes it more difficult to spot valuation sensitive items (golden shares, betterment certificates…). According to the company, it does not have such items.

DCF model Palas

	Detailed forecast period			Transitional period										Term. Value
Figures in EUR m	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	2032e	2033e	
Sales	23	29	35	39	43	47	52	57	61	66	70	74	76	
Sales change	*29.7 %*	*25.0 %*	*20.0 %*	*10.0 %*	*10.0 %*	*10.0 %*	*10.0 %*	*10.0 %*	*7.5 %*	*7.5 %*	*7.5 %*	*5.0 %*	*2.5 %*	*2.5 %*
EBIT	8	10	12	14	15	16	18	20	21	23	25	26	27	
EBIT-margin	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	
Tax rate (EBT)	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	
NOPAT	6	7	9	10	11	12	13	14	15	17	18	19	19	
Depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	
in % of Sales	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	
Change in provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	
Change in liquidity from														
- Working Capital	1	2	2	1	1	1	1	1	1	1	1	1	0	
- Capex	0	1	1	1	1	1	1	1	1	1	1	1	2	
Capex in % of Sales	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	
Free Cash Flow (WACC-model)	4	5	7	8	9	10	11	12	13	14	15	16	17	
PV of FCF	4	5	5	6	6	6	6	6	6	6	6	6	5	53
share of PVs	11.2 %			47.0 %										41.8 %

Model parameter

Derivation of WACC:		Derivation of Beta:	
Debt ratio	15.0 %	Financial Strength	1.00
Cost of debt	6.0 %	Liquidity	3.00
Market return	7.0 %	Cyclicality	1.00
Risk free rate	1.5 %	Transparency	1.50
Risk premium	5.5 %	Others	2.00
Cost of equity	10.9 %		
WACC	**9.87 %**	**Beta**	**1.70**

Valuation (m)

Present values until 2033e	74		
Terminal Value	53		
Financial liabilities	16		
Pension liabilities	0		
Hybrid capital	0		
Minority interest	0		
Market val. of investments	0		
Liquidity	5	No. of shares (m)	1.0
Equity Value	**115**	**Value per share (EUR)**	**115.42**

Sensitivity Value per share (EUR)

		Terminal Growth						
Beta	(WACC)	1.75 %	2.00 %	2.25 %	**2.50 %**	2.75 %	3.00 %	3.25 %
2.34	(12.9 %)	76.71	77.29	77.90	78.54	79.21	79.91	80.65
2.13	(11.9 %)	85.78	86.57	87.39	88.26	89.17	90.14	91.17
1.91	(10.9 %)	96.82	97.90	99.04	100.25	101.54	102.90	104.35
1.70	(9.9 %)	110.55	112.07	113.69	**115.42**	117.28	119.27	121.41
1.49	(8.9 %)	128.06	130.29	132.67	135.25	138.04	141.06	144.36
1.27	(7.9 %)	151.21	154.59	158.28	162.30	166.72	171.59	176.99
1.06	(6.9 %)	183.26	188.72	194.76	201.49	209.04	217.57	227.27

		Delta EBIT-margin						
Beta	(WACC)	-1.50 pp	-1.00 pp	-0.50 pp	**0.0**	0.50 pp	1.00 pp	1.50 pp
2.34	(12.9 %)	73.41	75.12	76.83	78.54	80.25	81.96	83.67
2.13	(11.9 %)	82.53	84.44	86.35	88.26	90.17	92.08	93.99
1.91	(10.9 %)	93.77	95.93	98.09	100.25	102.41	104.57	106.73
1.70	(9.9 %)	107.99	110.47	112.95	**115.42**	117.90	120.38	122.86
1.49	(8.9 %)	126.55	129.45	132.35	135.25	138.15	141.05	143.95
1.27	(7.9 %)	151.86	155.34	158.82	162.30	165.78	169.26	172.74
1.06	(6.9 %)	188.49	192.83	197.16	201.49	205.83	210.16	214.49

- Financial liabilities are based on FY 20 segment debt
- High BETA is used as the company is unlisted, segment reporting omits full balance sheet and PE structure. WACC is calculated with a equity target rate of 85%.
- We use a normalized tax rate and do not take the tax shield from PPA into effect

DCF model IHSE

Figures in EUR m	Detailed forecast period			Transitional period										Term. Value
	2021e	**2022e**	**2023e**	**2024e**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2031e**	**2032e**	**2033e**	
Sales	34	45	52	57	62	69	75	83	89	96	103	108	111	
Sales change	*1.8 %*	*31.1 %*	*15.0 %*	*10.0 %*	*10.0 %*	*10.0 %*	*10.0 %*	*10.0 %*	*7.5 %*	*7.5 %*	*7.5 %*	*5.0 %*	*2.5 %*	*2.5 %*
EBIT	11	16	18	20	22	24	26	29	31	34	36	38	39	
EBIT-margin	*32.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	*35.0 %*	
Tax rate (EBT)	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	
NOPAT	8	11	13	14	16	17	19	21	22	24	26	27	28	
Depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	
in % of Sales	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	
Change in provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	
Change in liquidity from														
- Working Capital	0	4	2	2	2	2	2	3	2	2	2	2	1	
- Capex	1	1	1	1	1	1	2	2	2	2	2	2	2	
Capex in % of Sales	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	*2.0 %*	
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	
Free Cash Flow (WACC-model)	7	7	10	11	13	14	15	17	19	20	21	23	25	
PV of FCF	7	6	8	9	9	9	9	9	9	8	8	8	8	93
share of PVs	10.6 %			42.5 %										46.9 %

Model parameter

Derivation of WACC:		Derivation of Beta:	
Debt ratio	15.0 %	Financial Strength	1.00
Cost of debt	6.0 %	Liquidity	3.00
Market return	7.0 %	Cyclicality	1.00
Risk free rate	1.5 %	Transparency	1.50
Risk premium	5.5 %	Others	2.00
Cost of equity	10.9 %		
WACC	**9.87 %**	**Beta**	**1.70**

Valuation (m)

Present values until 2033e	105		
Terminal Value	93		
Financial liabilities	41		
Pension liabilities	0		
Hybrid capital	0		
Minority interest	0		
Market val. of investments	0		
Liquidity	9	No. of shares (m)	1.0
Equity Value	**167**	**Value per share (EUR)**	**166.96**

Sensitivity Value per share (EUR)

		Terminal Growth						
Beta	(WACC)	1.75 %	2.00 %	2.25 %	**2.50 %**	2.75 %	3.00 %	3.25 %
2.34	(12.9 %)	102.57	103.59	104.66	105.79	106.97	108.21	109.51
2.13	(11.9 %)	117.39	118.77	120.22	121.75	123.36	125.06	126.87
1.91	(10.9 %)	135.57	137.47	139.48	141.61	143.87	146.27	148.84
1.70	(9.9 %)	158.37	161.05	163.91	**166.96**	170.23	173.73	177.50
1.49	(8.9 %)	187.74	191.65	195.86	200.40	205.31	210.63	216.44
1.27	(7.9 %)	226.89	232.84	239.33	246.42	254.20	262.78	272.30
1.06	(6.9 %)	281.57	291.18	301.82	313.68	326.98	342.00	359.09

		Delta EBIT-margin						
Beta	(WACC)	-1.50 pp	-1.00 pp	-0.50 pp	**0.0**	0.50 pp	1.00 pp	1.50 pp
2.34	(12.9 %)	98.22	100.74	103.26	105.79	108.31	110.83	113.36
2.13	(11.9 %)	113.29	116.11	118.93	121.75	124.57	127.39	130.21
1.91	(10.9 %)	132.04	135.23	138.42	141.61	144.80	147.99	151.18
1.70	(9.9 %)	155.98	159.64	163.30	**166.96**	170.63	174.29	177.95
1.49	(8.9 %)	187.53	191.82	196.11	200.40	204.68	208.97	213.26
1.27	(7.9 %)	230.96	236.11	241.27	246.42	251.57	256.73	261.88
1.06	(6.9 %)	294.41	300.83	307.26	313.68	320.10	326.52	332.95

- Financial liabilities are based on FY 20 segment debt
- High BETA is used as the company is unlisted, segment reporting omits full balance sheet and PE structure. WACC is calculated with a equity target rate of 85%.
- We use a normalized tax rate and do not take the tax shield from PPA into effect

DCF model Bikeleasing

	Detailed forecast period			Transitional period										Term. Value
Figures in EUR m	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	2032e	2033e	
Sales	67	88	111	134	159	183	205	226	245	260	271	277	282	
Sales change	*63.4 %*	*31.3 %*	*26.3 %*	*21.2 %*	*18.2 %*	*15.2 %*	*12.2 %*	*10.2 %*	*8.2 %*	*6.2 %*	*4.2 %*	*2.2 %*	*2.0 %*	*2.0 %*
EBIT	29	39	50	61	72	83	93	103	111	118	123	126	128	
EBIT-margin	*43.1%*	*44.0 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	*45.4 %*	
Tax rate (EBT)	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	*28.0 %*	
NOPAT	21	28	36	44	52	60	67	74	80	85	89	91	92	
Depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	
in % of Sales	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	*0.0 %*	
Change in provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	
Change in liquidity from														
- Working Capital	3	2	2	2	2	2	2	2	2	2	1	1	1	
- Capex	1	1	1	1	2	2	2	2	2	3	3	3	3	
Capex in % of Sales	*1.6 %*	*1.4 %*	*1.1%*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	*1.0 %*	
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	
Free Cash Flow (WACC-model)	17	25	33	40	48	56	63	70	76	81	85	87	89	
PV of FCF	17	22	27	30	33	34	35	36	35	34	33	31	29	324
share of PVs	9.2 %			45.9 %										45.0 %

Model parameter

Derivation of WACC:		Derivation of Beta:	
Debt ratio	15.0 %	Financial Strength	1.00
Cost of debt	6.0 %	Liquidity	3.00
Market return	7.0 %	Cyclicality	1.00
Risk free rate	1.5 %	Transparency	1.50
Risk premium	5.5 %	Others	2.00
Cost of equity	10.9 %		
WACC	**9.87 %**	**Beta**	**1.70**

Valuation (m)

Present values until 2033e	396		
Terminal Value	324		
Financial liabilities	65		
Pension liabilities	0		
Hybrid capital	0		
Minority interest	0		
Market val. of investments	0		
Liquidity	1	No. of shares (m)	1.0
Equity Value	**656**	**Value per share (EUR)**	**656.01**

Sensitivity Value per share (EUR)

		Terminal Growth						
Beta	(WACC)	1.25 %	1.50 %	1.75 %	**2.00 %**	2.25 %	2.50 %	2.75 %
1.91	(10.9 %)	547.26	553.59	560.27	567.33	574.80	582.71	591.11
1.81	(10.4 %)	585.29	592.75	600.63	608.99	617.86	627.29	637.35
1.75	(10.1%)	605.96	614.06	622.65	631.77	641.46	651.79	662.83
1.70	(9.9 %)	627.85	636.67	646.04	**656.01**	666.63	677.97	690.11
1.65	(9.6 %)	651.07	660.70	670.95	681.86	693.52	706.00	719.38
1.59	(9.4 %)	675.75	686.28	697.51	709.49	722.31	736.07	750.87
1.49	(8.9 %)	730.07	742.74	756.29	770.83	786.47	803.34	821.59

Delta EBITDA-margin						
-1.50 pp	-1.00 pp	-0.50 pp	**0.0**	0.50 pp	1.00 pp	1.50 pp
543.91	551.72	559.53	567.33	575.14	582.94	590.75
583.99	592.32	600.65	608.99	617.32	625.65	633.99
605.90	614.52	623.14	631.77	640.39	649.01	657.63
629.22	638.15	647.08	**656.01**	664.94	673.87	682.80
654.09	663.34	672.60	681.86	691.12	700.38	709.64
680.66	690.27	699.88	709.49	719.10	728.71	738.32
739.65	750.05	760.44	770.83	781.23	791.62	802.01

- We assume Bikeleasing debt free as of the purchase. Acquisition loans are attributed.
- We net debt from finance lease versus receivables from finance lease, which should be higher in value than the debt
- Finance lease does not lead to depreciation and hence we make no adjustment to the EBITDA estimates for Bikeleasing
- High BETA is used as the company is unlisted, segment reporting omits full balance sheet and PE structure. WACC is calculated with a equity target rate of 85%.
- We use a normalized tax rate and do not take the tax shield from PPA into effect

The calculated equity values of the portfolio companies are multiplied by the respective share of Brockhaus technologies.

To take the holding into account, we use our FY 21e adj. EBITDA forecast and a single-stage DCF. To reflect the likelihood of inflation going forward, we calculate a growth rate of 4% p.a. We acknowledge that this is the usual treatment of a holding in a sum-of-the-parts, as a holding is there to manage the businesses, with the effect that the holding simply involves costs which are not attributed to divisions or segments. At Brockhaus Technologies the holding includes the network that enables the company to generate deals, which could be viewed as a value in itself. However, while we think this value should be revealed over time with a longer public track record, we rather treat this cautiously as a hidden reserve.

We sum up the values and take any remaining debt at holding level into account which is the EUR 15m for the Bikeleasing purchase. There is a minor consolidation effect with respect to holding debt (FY 20e EUR -3m) but, conservatively, we do not consider the effect.

Brockhaus Technologies - SOP model

(EURm)	2021	WACC -1%	WACC +1%
Equity value Palas (DCF)	115	138	99
Share Brockhaus	70%	70%	70%
	81	97	69
Equity value IHSE (DCF)	167	205	139
Share Brockhaus	100%	100%	100%
	167	205	139
Equity value Bikeleasing (DCF)	656	694	623
Share Brockhaus	52%	52%	52%
	343	362	325
FY 21e adj. EBITDA Holding	-6	-6	-6
Discount factor	6%	5%	7%
Value holding	-119	-150	-99
Sum of the Parts	785	846	733
Less net debt holding	15	15	15
Equity value Brockhaus Technologies	**769,7**	**830,6**	**717,7**
Number of shares	10,95	10,95	10,95
Value per share	**70,31**	**75,88**	**65,56**

Source: Company data, Warburg Research

As the WACC we use to discount is close to 10%, we outline the effect if it is reduced by 100 bps either way. Note that the Holding has a dampening effect in both directions.

Our SOP value stands at EUR 70.31 and the model clearly shows the impact if a single company deviates from the forecast path. Going forward, Brockhaus will acquire more companies which will make our valuation approach less feasible over time. However, we expect that, by that time, the company's multiple will have moved closer to that of Roper Technologies and we assume a peer comparison will be possible by then.

Finally, we cross-check our findings using the FCF Value Potential and, using FY 23e output, this moves well into the direction of our SOP approach.

Free Cash Flow Value Potential

Warburg Research's valuation tool "FCF Value Potential" reflects the ability of the company to generate sustainable free cash flows. It is based on the "FCF potential" - a FCF "ex growth" figure - which assumes unchanged working capital and pure maintenance capex. A value indication is derived via the perpetuity of a given year’s “FCF potential” with consideration of the weighted costs of capital. The fluctuating value indications over time add a timing element to the DCF model (our preferred valuation tool).

	in EUR m	2018	2019	2020	2021e	2022e	2023e
	Net Income before minorities	-1.7	-3.8	-6.8	0.2	11.5	24.3
+	Depreciation + Amortisation	0.2	3.5	9.4	10.8	36.3	37.7
-	Net Interest Income	0.0	-1.1	-3.8	-4.3	-6.5	-3.5
-	Maintenance Capex	0.0	0.0	1.1	1.8	2.1	2.4
+	Other	0.0	0.0	0.0	0.0	0.0	0.0
=	**Free Cash Flow Potential**	**-1.4**	**0.8**	**5.3**	**13.6**	**52.2**	**63.1**
	FCF Potential Yield (on market EV)	n/a	n/a	2.8 %	3.3 %	13.8 %	19.3 %
	WACC	9.85 %	9.85 %	9.85 %	9.85 %	9.85 %	9.85 %
=	**Enterprise Value (EV)**	**n.a.**	**n.a.**	**187.9**	**415.4**	**378.7**	**326.8**
=	**Fair Enterprise Value**	**n.a.**	**8.4**	**53.9**	**138.0**	**530.3**	**640.5**
-	Net Debt (Cash)	-68.2	-68.2	-68.2	103.8	66.6	14.0
-	Pension Liabilities	0.0	0.0	0.0	0.0	0.0	0.0
-	Other	0.0	0.0	0.0	0.0	0.0	0.0
-	Market value of minorities	0.0	0.0	0.0	34.6	35.2	35.8
+	Market value of investments	0.0	0.0	0.0	0.0	0.0	0.0
=	**Fair Market Capitalisation**	**n.a.**	**76.7**	**122.1**	**n.a.**	**428.6**	**590.7**
	Number of shares, average	2.5	2.9	8.3	10.4	10.9	10.9
=	**Fair value per share (EUR)**	**n.a.**	**26.39**	**14.64**	**n.a.**	**39.15**	**53.96**
	premium (-) / discount (+) in %					54.7 %	113.3 %

Sensitivity Fair value per Share (EUR)

		2018	2019	2020	2021e	2022e	2023e
	12.85 %	n.a.	7.16	10.50	n.a.	29.22	42.29
	11.85 %	n.a.	7.21	10.83	n.a.	32.50	46.26
	10.85 %	n.a.	7.27	11.23	n.a.	36.40	50.96
WACC	**9.85 %**	**n.a.**	**7.35**	**11.71**	**n.a.**	**41.08**	**56.62**
	8.85 %	n.a.	7.44	12.29	1.45	46.82	63.56
	7.85 %	n.a.	7.56	13.02	3.33	54.03	72.26
	6.85 %	n.a.	7.70	13.97	5.75	63.34	83.50

- …

Sum of the parts

(EURm)	2021	WACC -1%	WACC +1%
Equity value Palas (DCF)	115	138	99
Share Brockhaus	70%	70%	70%
	81	97	69
Equity value IHSE (DCF)	167	205	139
Share Brockhaus	100%	100%	100%
	167	205	139
Equity value Bikeleasing (DCF)	656	694	623
Share Brockhaus	52%	52%	52%
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FY 21e adj. EBITDA Holding	-6	-6	-6
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Value holding	-119	-150	-99
Sum of the Parts	785	846	733
Less net debt holding	15	15	15
Equity value Brockhaus Technologies	**769,7**	**830,6**	**717,7**
Number of shares	10,95	10,95	10,95
Value per share	**70,31**	**75,88**	**65,56**

- Palas, IHSE and Bikeleasing valued by separate DCF models
- Debt at portfolio company level is included in DCF model. Remaining debt at holding level is subtracted separately.
- Holding cost are discounted in a single stage model with same WACC as portfolio companies.
- Holding cost are expected to be subject to inflation of 4% p.a. subtracted from the discount rate.
- Deal generating capabiltiy of holding is a hidden reserve and not valued currently

Valuation

	2018	2019	2020	2021e	2022e	2023e
Price / Book	n.a.	n.a.	1.1 x	0.8 x	0.8 x	0.7 x
Book value per share ex intangibles	46.59	-41.67	6.81	-8.44	-4.47	0.58
EV / Sales	n.a.	n.a.	3.6 x	6.6 x	2.3 x	1.7 x
EV / EBITDA	n.a.	n.a.	22.6 x	26.4 x	6.4 x	4.4 x
EV / EBIT	n.a.	n.a.	n.a.	84.6 x	16.8 x	8.8 x
EV / EBIT adj.*	n.a.	n.a.	17.7 x	25.9 x	7.2 x	4.9 x
P / FCF	n.a.	n.a.	33.6 x	32.5 x	7.4 x	5.3 x
P / E	n.a.	n.a.	n.a.	n.a.	24.1 x	11.4 x
P / E adj.*	n.a.	n.a.	57.9 x	22.4 x	8.4 x	6.0 x
Dividend Yield	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
FCF Potential Yield (on market EV)	n.a.	n.a.	2.8 %	3.3 %	13.8 %	19.3 %

*Adjustments made for: -

Company Specific Items

	2018	2019	2020	2021e	2022e	2023e
Sales (pro forma)	11.7	54.3	51.6	124.5	161.9	197.6
yoy	n.a.	n.a.	-5.0 %	141.4 %	30.1 %	22.0 %
EBITDA (pro forma)	3.7	16.2	12.3	42.2	58.8	74.9
Margin (pro forma)	31.9 %	29.8 %	23.8 %	33.9 %	36.3 %	37.9 %

Consolidated profit & loss

In EUR m	2018	2019	2020	2021e	2022e	2023e
Sales	**1.1**	**16.6**	**51.6**	**63.2**	**161.9**	**197.6**
Change Sales yoy	n.a.	1408.3 %	211.5 %	22.6 %	156.1 %	22.0 %
Increase / decrease in inventory	-0.1	0.2	-0.1	0.0	0.0	0.0
Own work capitalised	0.0	0.8	0.9	0.0	0.0	0.0
Total Sales	**1.1**	**17.5**	**52.3**	**63.2**	**161.9**	**197.6**
Material expenses	0.2	4.3	13.8	16.8	35.6	37.5
Gross profit	**0.8**	**13.2**	**38.6**	**46.5**	**126.3**	**160.0**
Gross profit margin	*75.8 %*	*80.0 %*	*74.7 %*	*73.5 %*	*78.0 %*	*81.0 %*
Personnel expenses	0.7	6.8	19.5	21.5	47.0	55.3
Other operating income	0.3	0.4	1.5	1.3	1.6	2.0
Other operating expenses	1.6	5.6	12.0	10.5	22.2	31.8
Unfrequent items	0.0	0.0	-0.1	0.0	0.0	0.0
EBITDA	**-1.3**	**1.3**	**8.3**	**15.8**	**58.8**	**74.9**
Margin	*-119.7 %*	*7.7 %*	*16.2 %*	*24.9 %*	*36.3 %*	*37.9 %*
Depreciation of fixed assets	0.0	0.8	1.7	1.6	3.1	3.8
EBITA	**-1.3**	**0.4**	**6.7**	**14.2**	**55.7**	**71.2**
Amortisation of intangible assets	0.2	2.7	7.7	9.3	33.2	34.0
Goodwill amortisation	0.0	0.0	0.0	0.0	0.0	0.0
EBIT	**-1.6**	**-2.3**	**-1.0**	**4.9**	**22.5**	**37.2**
Margin	*-141.9 %*	*-13.7 %*	*-2.0 %*	*7.8 %*	*13.9 %*	*18.8 %*
EBIT adj.	**-1.6**	**1.9**	**10.6**	**16.0**	**52.5**	**67.2**
Interest income	0.0	0.1	0.1	0.0	0.0	0.0
Interest expenses	0.0	1.2	3.9	4.3	6.5	3.5
Other financial income (loss)	0.0	0.0	0.0	0.0	0.0	0.0
EBT	**-1.6**	**-3.4**	**-4.8**	**0.6**	**16.0**	**33.7**
Margin	*-146.2 %*	*-20.5 %*	*-9.4 %*	*1.0 %*	*9.9 %*	*17.1 %*
Total taxes	0.1	0.4	1.9	0.4	4.5	9.4
Net income from continuing operations	**-1.7**	**-3.8**	**-6.8**	**0.2**	**11.5**	**24.3**
Income from discontinued operations (net of tax)	0.0	0.0	0.0	0.0	0.0	0.0
Net income before minorities	**-1.7**	**-3.8**	**-6.8**	**0.2**	**11.5**	**24.3**
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0
Net income	**-1.7**	**-3.8**	**-6.8**	**0.2**	**11.5**	**24.3**
Margin	*-151.5 %*	*-23.1 %*	*-13.1 %*	*0.4 %*	*7.1 %*	*12.3 %*
Number of shares, average	2.5	2.9	8.3	10.4	10.9	10.9
EPS	**-0.66**	**-1.32**	**-0.81**	**0.02**	**1.05**	**2.22**
EPS adj.	-0.66	-0.01	0.53	1.13	3.02	4.19

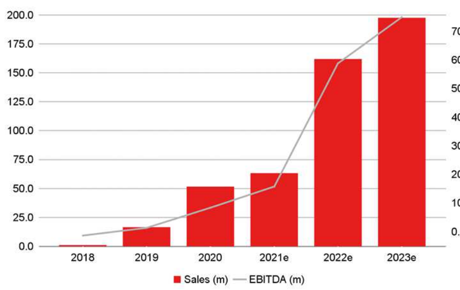
*Adjustments made for:

Guidance: Pro forma sales of EUR 125-135m and adj. EBITDA pro forma of EUR 42-46m

Financial Ratios

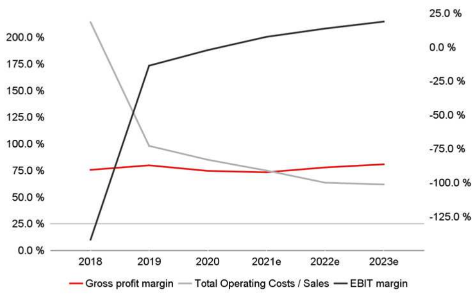
	2018	2019	2020	2021e	2022e	2023e
Total Operating Costs / Sales	214.2 %	98.2 %	85.0 %	75.1 %	63.7 %	62.1 %
Operating Leverage	n.a.	0.0 x	-0.3 x	n.a.	2.3 x	3.0 x
EBITDA / Interest expenses	n.m.	1.1 x	2.1 x	3.7 x	9.0 x	21.4 x
Tax rate (EBT)	-3.7 %	-12.9 %	-39.7 %	63.1 %	28.0 %	28.0 %
Dividend Payout Ratio	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Sales per Employee	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Sales, EBITDA
in EUR m



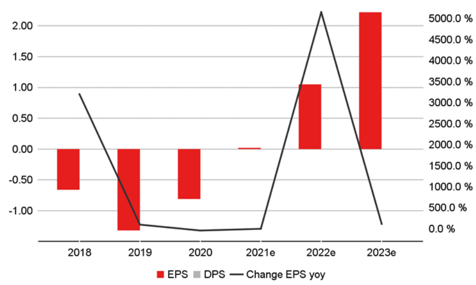
Source: Warburg Research

Operating Performance
in %



Source: Warburg Research

Performance per Share



Source: Warburg Research

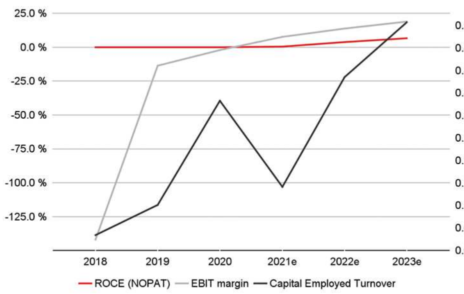
Consolidated balance sheet

In EUR m	2018	2019	2020	2021e	2022e	2023e
Assets						
Goodwill and other intangible assets	0.0	160.6	152.7	436.4	403.1	369.2
thereof other intangible assets	0.0	0.0	53.7	194.0	160.8	126.8
thereof Goodwill	0.0	91.4	91.4	241.4	241.4	241.4
Property, plant and equipment	0.8	11.3	11.7	28.5	28.2	27.6
Financial assets	0.0	0.0	0.0	0.0	0.0	0.0
Other long-term assets	32.2	1.0	0.6	0.6	0.6	0.6
Fixed assets	**33.0**	**172.9**	**165.0**	**465.4**	**431.9**	**397.4**
Inventories	4.3	10.7	9.7	9.0	16.2	19.8
Accounts receivable	1.4	5.9	7.2	8.9	15.5	18.9
Liquid assets	31.6	17.2	123.5	21.5	33.8	46.3
Other short-term assets	0.1	1.1	0.9	0.9	0.9	0.9
Current assets	**37.3**	**34.8**	**141.4**	**40.3**	**66.4**	**85.9**
Total Assets	**70.3**	**207.7**	**306.4**	**505.8**	**498.3**	**483.3**
Liabilities and shareholders' equity						
Subscribed capital	4.2	6.6	10.4	10.4	10.4	10.4
Capital reserve	42.1	118.7	227.7	227.7	227.7	227.7
Retained earnings	-2.6	0.0	0.0	0.2	11.7	36.0
Other equity components	3.0	-6.5	-14.6	105.7	104.4	101.5
Shareholders' equity	46.6	118.9	223.4	344.0	354.2	375.5
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0
Total equity	**46.6**	**118.9**	**223.4**	**344.0**	**354.2**	**375.6**
Provisions	0.3	0.6	2.2	10.7	12.7	12.7
thereof provisions for pensions and similar obligations	0.0	0.0	0.0	0.0	0.0	0.0
Financial liabilities (total)	17.0	62.0	55.3	125.3	100.3	60.3
Short-term financial liabilities	1.0	5.4	6.1	86.1	61.1	21.1
Accounts payable	2.8	2.5	1.5	1.8	7.1	10.8
Other liabilities	3.7	23.8	24.0	24.0	24.0	24.0
Liabilities	**23.8**	**88.8**	**83.0**	**161.8**	**144.1**	**107.8**
Total liabilities and shareholders' equity	**70.3**	**207.7**	**306.4**	**505.8**	**498.3**	**483.3**

Financial Ratios

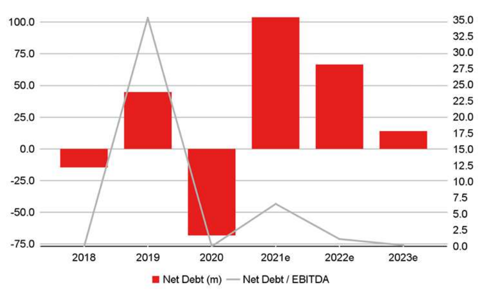
	2018	2019	2020	2021e	2022e	2023e
Efficiency of Capital Employment						
Operating Assets Turnover	0.3 x	0.7 x	1.9 x	1.4 x	3.1 x	3.6 x
Capital Employed Turnover	0.0 x	0.1 x	0.3 x	0.1 x	0.4 x	0.5 x
ROA	-5.0 %	-2.2 %	-4.1 %	0.1 %	2.7 %	6.1 %
Return on Capital						
ROCE (NOPAT)	n.a.	n.a.	n.a.	0.6 %	3.7 %	6.6 %
ROE	-6.8 %	-4.6 %	-3.9 %	0.1 %	3.3 %	6.7 %
Adj. ROE	-6.8 %	0.0 %	2.6 %	4.1 %	9.5 %	12.6 %
Balance sheet quality						
Net Debt	-14.6	44.8	-68.2	103.8	66.6	14.0
Net Financial Debt	-14.6	44.8	-68.2	103.8	66.6	14.0
Net Gearing	-31.3 %	37.7 %	-30.5 %	30.2 %	18.8 %	3.7 %
Net Fin. Debt / EBITDA	n.a.	3534.5 %	n.a.	658.7 %	113.2 %	18.8 %
Book Value / Share	46.6	118.9	21.5	31.4	32.4	34.3
Book value per share ex intangibles	46.6	-41.7	6.8	-8.4	-4.5	0.6

ROCE Development



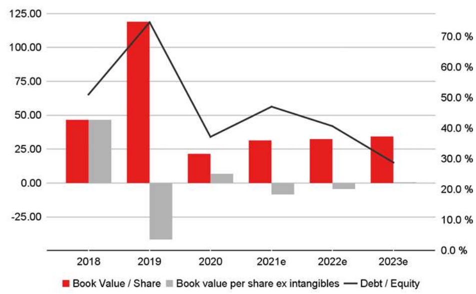
Source: Warburg Research

Net debt
in EUR m



Source: Warburg Research

Book Value per Share
in EUR



Source: Warburg Research

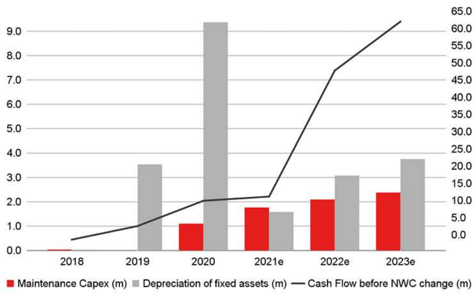
Consolidated cash flow statement

In EUR m	2018	2019	2020	2021e	2022e	2023e
Net income	-1.7	-3.8	-6.8	0.2	11.5	24.3
Depreciation of fixed assets	0.0	3.5	9.4	1.6	3.1	3.8
Amortisation of goodwill	0.0	0.0	0.0	0.0	0.0	0.0
Amortisation of intangible assets	0.2	2.7	7.7	9.3	33.2	34.0
Increase/decrease in long-term provisions	0.0	0.1	0.0	0.0	0.0	0.0
Other non-cash income and expenses	0.1	0.0	-0.4	0.0	0.0	0.0
Cash Flow before NWC change	**-1.4**	**2.6**	**10.0**	**11.1**	**47.8**	**62.0**
Increase / decrease in inventory	0.5	0.5	-1.1	0.7	-7.2	-3.6
Increase / decrease in accounts receivable	0.0	0.0	0.0	-1.7	-6.6	-3.4
Increase / decrease in accounts payable	0.1	1.2	-0.2	0.3	5.3	3.7
Increase / decrease in other working capital positions	0.0	0.0	0.0	0.0	0.7	-3.0
Increase / decrease in working capital (total)	0.6	1.7	-1.3	-0.6	-7.8	-6.3
Net cash provided by operating activities [1]	**-0.7**	**4.3**	**8.7**	**10.4**	**40.0**	**55.7**
Investments in intangible assets	0.0	0.0	-0.1	0.0	0.0	0.0
Investments in property, plant and equipment	0.0	0.0	-1.0	-2.4	-2.8	-3.2
Payments for acquisitions	0.0	0.0	0.0	-315.6	0.0	0.0
Financial investments	0.0	0.0	0.0	0.0	0.0	0.0
Income from asset disposals	-26.0	0.1	0.0	0.0	0.0	0.0
Net cash provided by investing activities [2]	**-26.0**	**0.1**	**-1.0**	**-318.0**	**-2.8**	**-3.2**
Change in financial liabilities	12.7	17.2	0.0	70.0	-25.0	-40.0
Dividends paid	0.0	0.0	0.0	0.0	0.0	0.0
Purchase of own shares	0.0	0.0	0.0	0.0	0.0	0.0
Capital measures	0.0	56.5	112.7	127.0	0.0	0.0
Other	0.0	-2.2	-10.4	8.5	0.0	0.0
Net cash provided by financing activities [3]	**12.7**	**71.5**	**102.3**	**205.5**	**-25.0**	**-40.0**
Change in liquid funds [1]+[2]+[3]	**-14.0**	**75.9**	**110.0**	**-102.0**	**12.2**	**12.5**
Effects of exchange-rate changes on cash	0.0	0.0	0.2	0.0	0.0	0.0
Cash and cash equivalent at end of period	-11.5	107.5	127.3	21.5	33.8	46.3

Financial Ratios

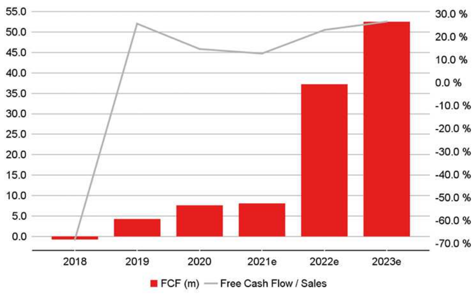
	2018	2019	2020	2021e	2022e	2023e
Cash Flow						
FCF	-0.7	4.3	7.6	8.1	37.2	52.5
Free Cash Flow / Sales	-68.2 %	25.8 %	14.8 %	12.8 %	23.0 %	26.6 %
Free Cash Flow Potential	-1.4	0.8	5.3	13.6	52.2	63.1
Free Cash Flow / Net Profit	45.0 %	-111.6 %	-112.7 %	3451.8 %	323.7 %	216.3 %
Interest Received / Avg. Cash	0.0 %	0.2 %	0.1 %	0.0 %	0.0 %	0.0 %
Interest Paid / Avg. Debt	0.5 %	3.0 %	6.6 %	4.7 %	5.8 %	4.4 %
Management of Funds						
Investment ratio	0.0 %	0.0 %	2.0 %	3.7 %	1.7 %	1.6 %
Maint. Capex / Sales	3.2 %	0.0 %	2.1 %	2.8 %	1.3 %	1.2 %
Capex / Dep	0.0 %	0.0 %	11.2 %	21.7 %	7.7 %	8.4 %
Avg. Working Capital / Sales	129.3 %	51.1 %	28.6 %	25.0 %	12.6 %	13.3 %
Trade Debtors / Trade Creditors	48.8 %	238.8 %	486.2 %	494.4 %	218.3 %	175.0 %
Inventory Turnover	0.1 x	0.4 x	1.4 x	1.9 x	2.2 x	1.9 x
Receivables collection period (days)	458	129	51	51	35	35
Payables payment period (days)	4,677	208	39	39	73	105
Cash conversion cycle (Days)	2,883	827	269	208	128	122

CAPEX and Cash Flow
in EUR m



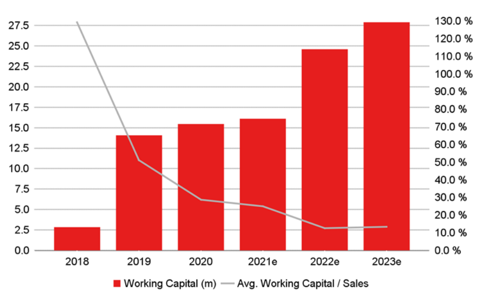
Source: Warburg Research

Free Cash Flow Generation



Source: Warburg Research

Working Capital



Source: Warburg Research

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Company	Disclosure	Link to the historical price targets and rating changes (last 12 months)
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-B-	**Buy:**	The price of the analysed financial instrument is expected to rise over the next 12 months.
-H-	**Hold:**	The price of the analysed financial instrument is expected to remain mostly flat over the next 12 months.
-S-	**Sell:**	The price of the analysed financial instrument is expected to fall over the next 12 months.
"-"	**Rating suspended:**	The available information currently does not permit an evaluation of the company.

WARBURG RESEARCH GMBH – ANALYSED RESEARCH UNIVERSE BY RATING

Rating	Number of stocks	% of Universe
Buy	153	71
Hold	56	26
Sell	5	2
Rating suspended	3	1
Total	**217**	**100**

WARBURG RESEARCH GMBH – ANALYSED RESEARCH UNIVERSE BY RATING …

… taking into account only those companies which were provided with major investment services in the last twelve months.

Rating	Number of stocks	% of Universe
Buy	48	83
Hold	8	14
Sell	0	0
Rating suspended	2	3
Total	**58**	**100**

PRICE AND RATING HISTORY BROCKHAUS TECHNOLOGIES AS OF 18.11.2021

Markings in the chart show rating changes by Warburg Research GmbH in the last 12 months. Every marking details the date and closing price on the day of the rating change.

EQUITIES

Matthias Rode Head of Equities	+49 40 3282-2678 mrode@mmwarburg.com		

RESEARCH

Michael Heider Head of Research	+49 40 309537-280 mheider@warburg-research.com	**Thilo Kleibauer** Retail, Consumer Goods	+49 40 309537-257 tkleibauer@warburg-research.com
Henner Rüschmeier Head of Research	+49 40 309537-270 hrueschmeier@warburg-research.com	**Eggert Kuls** Engineering	+49 40 309537-256 ekuls@warburg-research.com
Stefan Augustin Cap. Goods, Engineering	+49 40 309537-168 saugustin@warburg-research.com	**Andreas Pläsier** Banks, Financial Services	+49 40 309537-246 aplaesier@warburg-research.com
Jan Bauer Renewables	+49 40 309537-155 jbauer@warburg-research.com	**Malte Schaumann** Technology	+49 40 309537-170 mschaumann@warburg-research.com
Jonas Blum Telco, Media, Construction	+49 40 309537-240 jblum@warburg-research.com	**Oliver Schwarz** Chemicals, Agriculture	+49 40 309537-250 oschwarz@warburg-research.com
Christian Cohrs Industrials & Transportation	+49 40 309537-175 ccohrs@warburg-research.com	**Simon Stippig** Real Estate	+49 40 309537-265 sstippig@warburg-research.com
Dr. Christian Ehmann BioTech, Life Science	+49 40 309537-167 cehmann@warburg-research.com	**Cansu Tatar** Cap. Goods, Engineering	+49 40 309537-248 ctatar@warburg-research.com
Felix Ellmann Software, IT	+49 40 309537-120 fellmann@warburg-research.com	**Marc-René Tonn** Automobiles, Car Suppliers	+49 40 309537-259 mtonn@warburg-research.com
Jörg Philipp Frey Retail, Consumer Goods	+49 40 309537-258 jfrey@warburg-research.com	**Robert-Jan van der Horst** Technology	+49 40 309537-290 rvanderhorst@warburg-research.com
Marius Fuhrberg Financial Services	+49 40 309537-185 mfuhrberg@warburg-research.com	**Andreas Wolf** Software, IT	+49 40 309537-140 awolf@warburg-research.com
Mustafa Hidir Automobiles, Car Suppliers	+49 40 309537-230 mhidir@warburg-research.com		
Philipp Kaiser Real Estate	+49 40 309537-260 pkaiser@warburg-research.com		

INSTITUTIONAL EQUITY SALES

Marc Niemann Head of Equity Sales, Germany	+49 40 3282-2660 mniemann@mmwarburg.com	**Maximilian Martin** Austria, Poland	+49 69 5050-7413 mmartin@mmwarburg.com
Klaus Schilling Head of Equity Sales, Germany	+49 69 5050-7400 kschilling@mmwarburg.com	**Christopher Seedorf** Switzerland	+49 40 3282-2695 cseedorf@mmwarburg.com
Tim Beckmann United Kingdom	+49 40 3282-2665 tbeckmann@mmwarburg.com		
Lea Bogdanova United Kingdom, Ireland	+49 69 5050-7411 lbogdanova@mmwarburg.com		
Jens Buchmüller Scandinavia, Austria	+49 69 5050-7415 jbuchmueller@mmwarburg.com		
Alexander Eschweiler Germany, Luxembourg	+49 40 3282-2669 aeschweiler@mmwarburg.com	**Sophie Hauer** Roadshow/Marketing	+49 69 5050-7417 shauer@mmwarburg.com
Matthias Fritsch United Kingdom	+49 40 3282-2696 mfritsch@mmwarburg.com	**Juliane Niemann** Roadshow/Marketing	+49 40 3282-2694 jniemann@mmwarburg.com

SALES TRADING

Oliver Merckel Head of Sales Trading	+49 40 3282-2634 omerckel@mmwarburg.com	**Marcel Magiera** Sales Trading	+49 40 3282-2662 mmagiera@mmwarburg.com
Elyaz Dust Sales Trading	+49 40 3282-2702 edust@mmwarburg.com	**Bastian Quast** Sales Trading	+49 40 3282-2701 bquast@mmwarburg.com
Michael Ilgenstein Sales Trading	+49 40 3282-2700 milgenstein@mmwarburg.com	**Jörg Treptow** Sales Trading	+49 40 3282-2658 jtreptow@mmwarburg.com

MACRO RESEARCH

Carsten Klude Macro Research	+49 40 3282-2572 cklude@mmwarburg.com	**Dr. Christian Jasperneite** Investment Strategy	+49 40 3282-2439 cjasperneite@mmwarburg.com

Our research can be found under:

Warburg Research	research.mmwarburg.com/en/index.html	Refinitiv	www.refinitiv.com
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For access please contact:

Andrea Schaper Sales Assistance	+49 40 3282-2632 aschaper@mmwarburg.com	**Kerstin Muthig** Sales Assistance	+49 40 3282-2703 kmuthig@mmwarburg.com