CFA Institute Research Challenge

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Team HEC-ULiège

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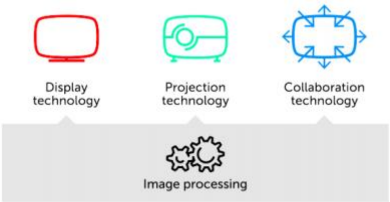
Recommendation: BUY
Current price (as of 31/12): 219€
Target price: 238.27€
Stock Exchange: Euronext Brussels
Ticker: BAR
Sector: Technology

The Rally is not Over

Figure 1: Barco's technology



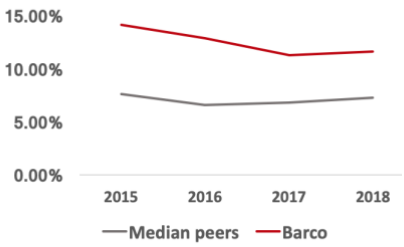
Source: Annual report, 2018

Figure 2: Valuation (31/12/19)

	Weight	Price (€)
DCF	80%	252.12
Relative valuation	20%	182.87
Target price		**238.27€**
Upside potential		**8.80%**

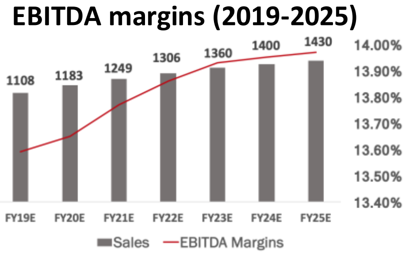
Source: Team analysis

Figure 3: Evolution of R&D to sales ratio (Barco vs. Peers)



Source: Team analysis

Figure 4: Forecasted sales & EBITDA margins (2019-2025)



Source: Team analysis

Figure 5: Key Financials

	FY17	FY18	FY19E	FY20E	FY21E
Sales (€m)	1,084	1,028	1,108	1,183	1,249
EBITDA (€m)	107.1	124.4	150.5	161.5	172
EPS	1.98	6.00	7.66	8.41	9.13

Source: Team analysis

Barco develops visualization and collaboration solutions for the Entertainment, Enterprise, and Healthcare markets worldwide *(Figure 1)*. Its key products in each segment are, respectively, projectors, wireless presentation systems (ClickShare), and medical displays (*Appendix 1.3*).

Investment Summary

We issue a **BUY** recommendation with a **target price** of 238.27€ per share representing a 8.80% **upside** from its December 31st closing price of 219€. Our valuation is based on an 80/20 mix of DCF and relative valuation EV/EBITDA and EV/EBIT multiple analysis *(Figure 2)*. Our recommendation is based on the following value drivers:

1) Barco is ready to capture growth In its three segments, Barco will experience sales growth. The core growth drivers are **(a)** the cinema projector replacement wave and increasing end-customer expectations in **Entertainment**, **(b)** the growing need for collaboration which will keep fueling demand for meeting room equipment in **Enterprise**, **(c)** the increasing number of hospitals in China and the global transition to digital surgery rooms in **Healthcare**. In the mid-term, technologies such as artificial intelligence (AI) and Internet of Things (IoT) offer great opportunities. Barco is already on the move, as demonstrated by the recent launch of Demetra, a dermatoscope using AI to help decision-making. Furthermore, the firm stated its ambition to expand the meeting room market with a new ClickShare product and provided some leads in a whitepaper (*Appendix 1.4)*. Since the impact of the launch of potentially disruptive products cannot be accurately assessed, we decided to remain conservative in our sales forecasts. However, we believe in Barco's ability to revolutionize the market as it has done before, and long-term prospects reinforce our investment decision.

2) Strong competitive position and innovation capabilities In the fast-evolving technological industry, there is a need for constant innovation in order to sustain market position and capture growth opportunities. With its R&D-to-sales ratio above peer level since 2015 (Barco 11.7% - Peers median 7.46%), Barco clearly confirms its strategy to lead by innovation, allowing it, for instance, to benefit from a first-mover advantage in the Meeting Room market with ClickShare *(Figure 3)*. The well-developed expertise in its technology has enabled Barco to have a leader position in many of its segments. This is confirmed by the many innovation awards that the company has received for each of its main products.

3) Fresh and efficient management In 2016, a new management team took control of the company and launched a program called "Focus to Perform". This plan aims to improve Barco's organizational structure and effectiveness through several initiatives including business portfolio rationalization and value engineering. As a result Barco has been able to significantly decrease its costs, delivering improved EBITDA margins. In view of the current and forecasted efficient NWC management and Barco's ability to generate strong cash flows from operations, we expect Barco to maintain its lower cost level and historically high EBITDA margins. Even though Barco's EBITDA margin for 2018 is still far below the median of the peers (Barco 12.1% - Peers 18.9%), we remained conservative and foresee a 14% sustained EBITDA margin in the long run *(Figure 4).*

Key Highlights

How will the excess cash be used? Barco has a significant cash reserve (€363m in 2018), which we expect to keep increasing due to strong cash generation and good working capital management. The excess cash is not distributed to shareholders, leading to a return on equity accounting for half of the return on invested capital in 2018 *(Figure 6)*. The management's

Figure 6: Key figures 2018

WACC ST	5.66%
WACC LT	5.26%
ROE	12%
ROIC	23%
Dividend per share	2.3€
Payout ratio	35%
EPS	6.03
Net debt to Equity	-0.51

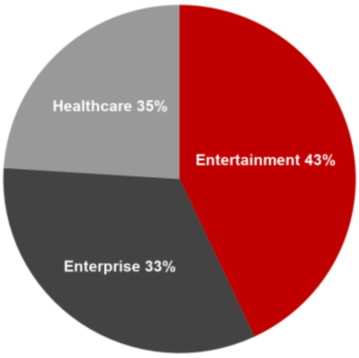
Source: Capital IQ & team analysis

Figure 7: Implied growth based on Gordon model

Share price (€) as of 23/12	219
Dividend (€) for 2020	2.42
Cost of equity	5.66%
Implied g	4.55%
Forecasted CAGR	4.7%

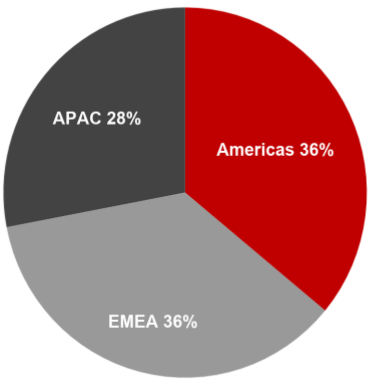
Source: Team analysis

Figure 9: Sales by segment (FY18)



Source: Annual report 2018

Figure 10: Sales by region (FY18)



Source: Annual report 2018

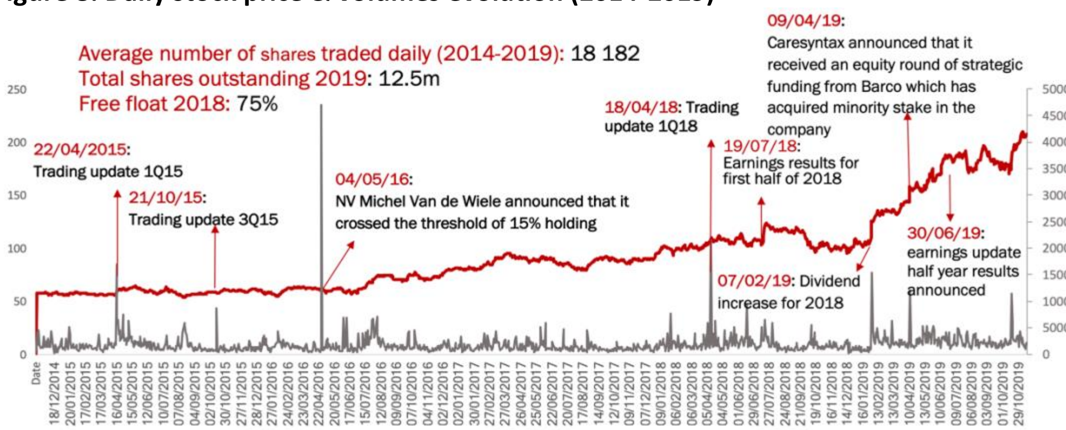
objective is to have **financial slack** to catch strategic opportunities, as confirmed by the setup of a M&A radar team in 2019. We identify two probable scenarios regarding the use of excess cash: **(a)** Barco seizes an opportunity and acquires a business which is in line with its strategy, as it has done historically (*Appendix 1.2*). In our financial analysis, on top of our forecasted CAGR of 4.7% (which is in line with the implied growth rate in *Figure 7*) we thus estimated 1.88% additional growth coming from acquisitions, which is not modelled in our valuation. **(b)** If the company does not make an acquisition in the next three years, the unused cash and the underlying opportunity cost will lower the share price. This would lead to a **leveraged recapitalization** program to buy back shares or distribute **exceptional dividends**. This brings a **volatility** risk, but will be beneficial for investors. **Both scenarios are positive and reinforce our BUY recommendation**.

Transition to new business-model Barco's strategy to move towards subscription-based offerings is part of a broader movement from hardware to software in the technology industry. SaaS offerings have many **operational benefits** as it **(a)** ensures recurring revenues and long-lasting customer relationships, **(b)** lowers the company's dependency on replacement cycles, and **(c)** allows a faster time to market (software innovations can be delivered almost directly). Moreover, they bring **opportunities** for data analytics as they allow the firm to gather data about the use of the product. Combined with artificial intelligence, all this data can be monetized and hence provides value in the long-run. As a result, we believe that the change in business model **will enhance Barco's overall competitive positioning** as it will allow it to better answer the needs of its customers.

Gaining a foothold in China Barco is not new to the Chinese market. It has in past years built its presence in China through several acquisitions and partnerships, either to address the local markets or to benefit from competitive supply *(Appendix 1.2)*. However, even though the company was successful in Cinema, it has struggled in Healthcare and missed growth opportunities. To address this and be seen as a local player, it developed its "In China for China" (ICFC) strategy and invested in local teams and factories. We are confident in the firm's ability to improve its position and capture growth in China but we remain careful as great risks come with these great opportunities. In addition to the risk of being unable to gain market shares, the political risk (e.g. expropriation) is a threat which we take into account in our DCF doomsday scenario.

Illiquidity to keep in mind: Despite a free float of 75% in 2018, the trading volume of Barco's stocks remains particularly low, amounting to an average of 18.182 shares traded daily. Subsequently, Barco's stock is illiquid and does not immediately integrate new information *(Figure 8)*.

Figure 8: Daily stock price & volumes evolution (2014-2019)



Source: Data from Yahoo Finance & Barco's press releases

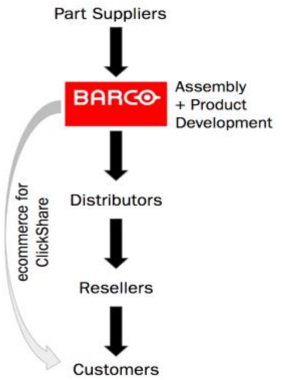
General Business Description

Barco is a global provider of imaging and collaboration solutions, with its headquarters based in Kortrijk, Belgium. Barco has a global footprint thanks to its manufacturing and R&D facilities in the Americas, EMEA, and APAC. In 2018, it employed 3,664 employees worldwide, especially in the manufacturing, research & development, and sales sectors (*Appendix 1.1*).

Figure 11: EBITDA margin and sales growth per segment (FY18)

Source: Annual report 2018

Figure 12: Barco's supply chain



Source: Team analysis

Figure 13: Barco's ESG score

E	S	G	Total
73	71	63	69

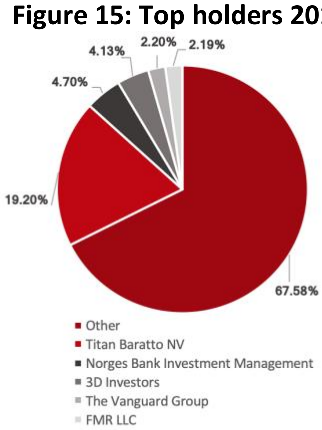
Source: Eikon

Figure 14: Peers' ESG scores

ESG Scores	2018	
NEC Corp	A	84
Qisda Corp	B+	72
Barco	B+	69
LogMeIn	B	64
Dolby	C+	46
Imax	C	36
Novanta	C	28

Source: Eikon

Figure 15: Top holders 2019



Source: Capital IQ

A diversified and international player: Barco is structured into three operational divisions: Entertainment (43% of sales), Enterprise (33%), and Healthcare (24%) *(Figure 9)*. In these three segments Barco relies on its expertise in imaging technology, allowing synergies with regard to research & development expenses. However, these three market segments are not subject to the same external forces and show different financial performances *(Figure 11)*, which justifies an analysis per segment. Barco is a global player, with EMEA and the Americas as the largest geographical segments (36%), followed by APAC (28%) *(Figure 10).*

A wide portfolio of solutions: Barco offers visualization solutions (hardware, software, and services) to its customers, which translates differently across the three business segments. In the Entertainment division, Barco offers a wide range of **projectors** and screen management systems to cinemas and other niche markets such as live-events, themed entertainment, and simulation (Venue & Hospitality sub-segment). In the Enterprise division, Barco provides companies with collaboration systems and video walls (displays) for meeting and control rooms. Its key product in this market is **ClickShare**, a wireless presentation system for meeting rooms. In the Healthcare segment, Barco mainly supplies diagnostic **displays** and operating room solutions (displays and digital integration platforms) to hospitals.

A developed network: Barco procures components from different suppliers depending on the segment and works with a large network of distributors and resellers to bring its solutions to the market *(Figure 12).* It has developed a 'Partner Program', which allows the building and control of a solid network. The company has been relying on acquisitions, joint ventures, and strategic partnerships in order to strengthen some of its technological capabilities and/or address defined markets, especially in China *(Appendix 1.2).*

Four strategic priorities to enable bright outcomes:

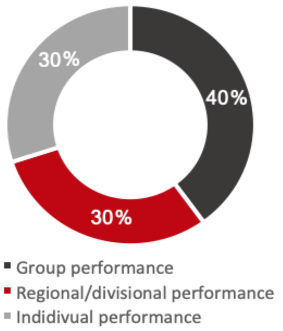
Lead by innovation To remain a leading player in the fast-evolving technological sector, Barco continuously develops innovative solutions and business models to deliver customer value. This is confirmed by the recent launch of innovative products in each segment: the Series 4 projector for Entertainment, Unisee for Enterprise, and Demetra for Healthcare are the main innovations (*Appendix 1.3*), both in terms of technology and business models (service-based).

The 'Focus to Perform' program, introduced in 2016, involves three main areas: making choices and streamlining the business portfolio, focusing on R&D and operational efficiency (value engineering and cost efficiencies), and commercial excellence (sales team and channel expansion). This program has resulted in a significant increase in gross profit margins and further development of commercial capabilities in China (in particular in the Healthcare division).

Offer outcome-based solutions As Barco's motto is "*enabling bright outcomes*", the company has stated its ambition to monetize its installed base by providing its customers with outcome-based solutions (instead of just hardware products). As a result, Barco has introduced several subscription-based solutions since 2017 in its three business segments: UniSee and Demetra *(Appendix 1.3)* have been launched as SaaS-based solutions (in Enterprise and Healthcare), while a 'Laser as a Service' solution has been developed in Cinema, allowing exhibitors to replace their projection equipment through an 'opex' business model. The mid-term objective is to build capabilities to capture the lifecycle opportunity: Barco's large installed base and its mission-critical technology are a good foundation for the company to be able to change its business model towards subscription-based solutions. In the long-run, this new business model will generate **recurring revenues** and develop long-term customer relationships. Customers get access to the products as well as updates and support in exchange for monthly fees: if they are satisfied with the product, they won't consider going to the competition. This partly offsets price pressure and **increases customer captivity**, which is a considerable advantage in competitive markets.

In China for China strategy: Barco has developed a strategy to capture **growth opportunities** in China. Growth prospects are very promising across their segments, except for Cinema, which has led Barco to reduce its stake in Barco CFG Joint Venture. A special focus has been made on the healthcare segment, with the opening of a new R&D and production site in Suzhou and the expansion of the sales team to reinforce bonds with Chinese hospitals. The objective is to be seen as a local player and be able to compete in this growing market.

Figure 16: Base for short term incentives



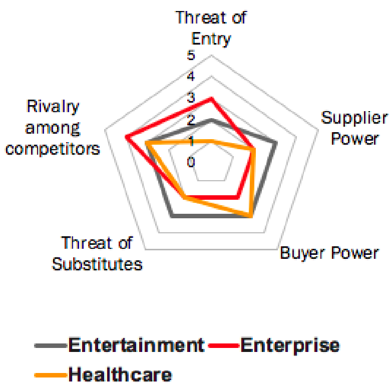
Source: Barco's 2017 annual report

Figure 17: Barco's key markets and competitors

Entertainment	
Cinema projection	**V&H (video walls, projectors)**
Christie NEC Sony	Christie NEC Leyard/Planar Samsung Panasonic
Enterprise	
Wireless presentation (Meeting room)	**Video walls (Control room)**
Mersive Crestron Blackbox	Leyard/Planar Christie Mitsubishi
Healthcare	
Diagnostic imaging	**Hybrid surgery room**
Eizo Beacon D-View	Eizo NDS Sony

Source: Barco's investor relations presentation & team research

Figure 18: Porter analysis per segment (Appendix 2.1)



Source: Team analysis

Environmental Social & Governance

An average ESG player *(Figures 13 and 14)*: Barco's **sustainability strategy** is well defined and developed in three pillars: planet, people, and community. We can see in *Appendix 1.5* that Barco's ESG score climbed from 53 in 2015 to 69 in 2018.

For the **planet pillar**, three main objectives were set in 2015 for the target year 2020: reducing the carbon footprint of the company's own operations by 20%, reducing the footprint of the company's products by 25%, and having all products launched with an eco-score of A or higher (not yet measured). The company is well on track to achieve its goals (*Appendix 1.5)*. The image of the company is improved by this strategy. Barco aims to be ready to face future challenges such as fiscal changes related to global warming and ecology in general. The focus on energy efficiency should lead to cost improvements, alongside the logistics efforts. Transportation costs are partially reduced by the opening of new facilities in China and the US. For the **people pillar**, we noted a rise in turnover outflow that could lead to productivity losses. Concerning diversity, we can see that women are slowly gaining power in Barco's management. Still, the rate of 16.6% of women in the management in 2018 *(Appendix 1.5)* is lower than the 28% EU average (Source: catalyst.org). Barco's **community engagement** (investment in social projects) is low compared to its sales (102,000€ in 2018) but the company supports several social actions (e.g. donating old computers, and therapy sessions for sick children). Barco ensures that its values are respected throughout the value chain by making its suppliers adhere to the RBA code of conduct. Barco faced its last serious controversy in 2014 when the former director of Barco China, Johan Philtjens, found himself accused of smuggling by the Chinese authorities. After 6 months without authorization to leave Chinese's territory, he was finally authorized to come back to Belgium.

For the **Governance** aspect, Barco has been partially owned by the private equity firm **"3D Investors"** since 2013 (4%) which acts as an active shareholder by influencing their portfolio companies with a long-term focus. Both 3D Investors and Michel Van de Wiele NV sit on the board of Barco. Michel Van de Wiele is controlled by Titan Baratto NV whose owner is Charles Beauduin, Barco's board chairman *(Figure 15)*. Barco's main shareholders are mostly spread across Europe and the US.

In 2016, the former CEO ceded his place to Jan De Witte, and a new CFO and HR Chief joined the management team. The **new management team** also launched the 'Focus to Perform' program which has been successful so far.

The management, which is separated in three branches related to each segment *(Appendix 1.5)*, receives **variable compensation** and bonuses according to the performance of the company, which also includes **stock options.** The base for the short term incentives for 2017 can be seen in *Figure 16.* The variable payment was based on EBITDA, cash flows, sales & orders, and individual targets. However, the dilution risk is low as only a small amount of stock options are distributed (0.08% of the capital in 2018).

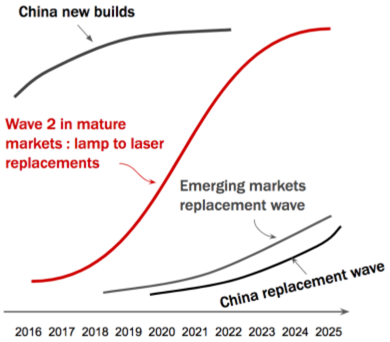
Industry Overview and Competitive Positioning

Industry Overview

Barco is active in several markets with different characteristics and players, which justifies an industry analysis per segment *(Appendix 2.1 & Figure 17).*

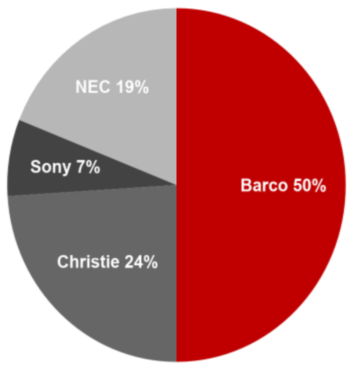
In **Entertainment**, the global **cinema projection market** was valued at €400 million and is expected to keep growing, fueled by the cinema industry growth, i.e., **4% CAGR**. In developed markets, the cinema industry is mature and the demand for projectors is driven by replacements and increasing customer expectations, requiring high-quality screens and premium experiences. The global installed base is estimated at 180,000 projectors, a large part of which is to be replaced (source: Futuresource). In emerging markets, the number of screens is still growing and drives the demand for cinema projectors. In the mid-term, the cinema projection market faces the threat of substitution by LED-screens, a disruptive but still in-development technology. In the **V&H segment**, growth prospects and drivers across the sub-segments are relatively similar to those of the Cinema segment (i.e., increasing experience expectations). The **Entertainment industry** is highly cyclical by nature and key players must keep up with technological innovations even when demand is lower. High quality and low cost

Figure 19: Replacement wave



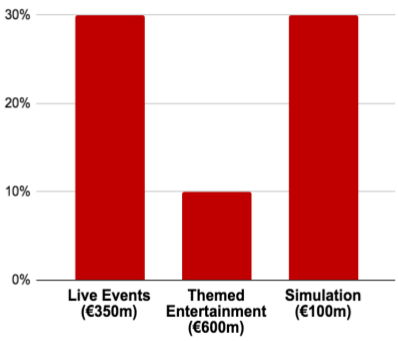
Source: Barco, team research

Figure 20: Cinema projection market shares, 2018



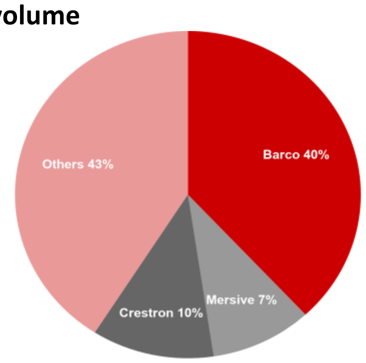
Source: Barco, team research

Figure 21: V&H Barco's market shares (and TAM), 2018



Source: Barco, team research

Figure 22: WPS market shares by volume



Source: Barco, team research

of ownership are key factors to exhibitors since the equipment is mission critical. Laser projection will be the leading technology for the upcoming replacement wave *(Figure 19)*. It is more expensive than lamp-based projectors but guarantees a longer lifespan.

In **Enterprise**, the **wireless presentation systems** (WPS) and **video wall** markets represent the majority of Barco's sales. Both markets are growing, but show very different characteristics. The **WPS market** has shown strong growth in the past few years and is expected to further grow in the mid-term horizon at a 16% CAGR (Source: Futuresource). The global number of meeting rooms is increasing, driven by the growing need for collaboration and co-creation in the workplace. Further growth opportunities lie in the adjacent Education market, with the shift to active and remote learning fueling the demand for presentation and collaboration systems. The **video wall market** for control rooms also shows a growth opportunity, after experiencing a year-over-year rise of 14% (Source: Futuresource). This market is characterized by the coexistence of three display technologies (RPC, LCD, and LED). The development of LED and the replacement of the large RPC installed base are expected to drive growth in the market, while LCD is expected to remain the most widely-adopted technology in the mid-term horizon (as it offers the greatest trade-off between performance and cost of ownership).

The **Healthcare** industry is defensive and characterized by heavy regulation and a strong need for quality products. Market experience and customer relationships are key, as trust is a determinant factor in the choice of technology. Because of budget restrictions in the healthcare industry, the total cost of ownership is also important. Nonetheless, price pressure on the market is moderate since hospitals buy the best available equipment in order to provide quality care for patients. The **diagnostic market** is a mature market in developed regions but is still growing in emerging countries, which equates to an expected global **5% CAGR** over the 19-25 horizon (source: Market Research Future). The hybrid surgery room market is rapidly growing, driven by the growth of minimally invasive surgery, and is expected to show a **12% CAGR** (source: Healthcare Intelligence Markets) over the same horizon. Both markets will benefit from the increasing demand for diagnostics and surgery, driven by an aging population in developed markets and the growing number of hospitals in Asia. This will increase the hospitals' need for efficiency and quality products, and therefore demand for high-end technology. Moreover, the digital transformation in healthcare (AI and IoT) will create huge opportunities for healthcare technology providers *(Appendix 2.2)*.

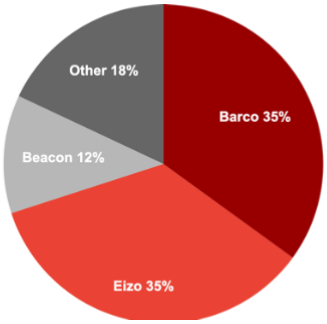
Competitive Positioning

In every segment, Barco's established expertise and quality of equipment have fostered long-term relationships with customers.

Entertainment: Barco is the global market leader in the **cinema projection market**. There is a high degree of concentration in this market as it is dominated by four well-established players *(Figure 20)*. Competitive rivalry is moderate, with a strong focus on R&D to offer quality products in line with technological evolution. Entry barriers are high because of the developed expertise and intellectual capital of the key players, although companies in adjacent markets represent a threat with regard to disruptive products (*Appendix 2.1)*. Barco's competitive advantage builds on its long-term relationships with customers and the reputed quality of its product, which has enabled it to develop an installed base of 90,000 projectors. With its Cinionic joint venture, Barco has recently struck several deals with exhibitors for large roll-outs of laser projectors, which confirms the shift towards laser technology and that Cinionic is positioned to capture the replacement wave opportunity. In the **V&H segment,** Barco is present in three sub-segments (Figure 21), each of them being rather concentrated. In 2017 the company launched its flagship UDX projector: it was well received by the market and should enhance Barco's position in V&H, which has weakened in the past few years.

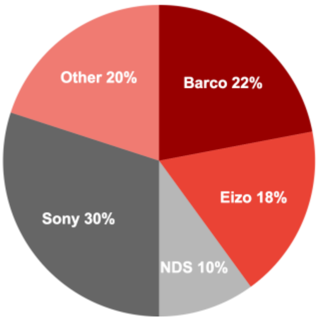
Enterprise: Barco is the global leader in **WPS** with its ClickShare product. The competitive landscape remains fragmented, as 43% of market shares by volume are held by 'others', i.e., small and regional players *(Figure 22).* The rivalry among competitors is quite high because of the wide range of similar products on the market and low technological barriers to entry. Moreover, UC&C companies integrating wireless screen sharing as secondary features represent another source of competition. Barco nonetheless holds a strong position in the market with its flagship product, thanks to its wide portfolio (addressing different needs) and its **first-mover position** in the market, which allowed it to build a **strong distribution network**. The product itself has been a huge success as it solved technical issues related to the use of

Figure 23: Diagnostic segment market shares



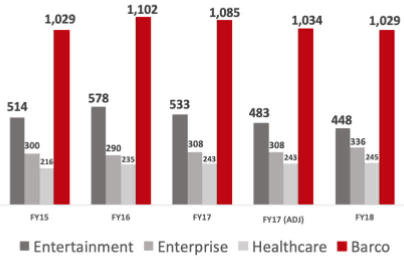
Source: Barco, team research

Figure 24: Surgical segment market shares



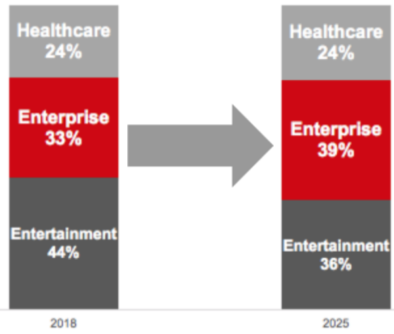
Source: Barco, team research

Figure 25: Historical sales (€m)



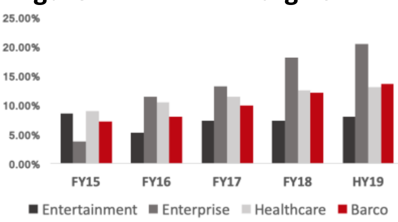
Source: Capital IQ

Figure 26: Current and forecasted sales split



Source: Team valuation

Figure 27: EBITDA margins



Source: Team analysis

meeting room equipment; its ease-of-use, agnosticity (USB), and security (ISO 27001) are valued by customers, allowing Barco to set fairly high prices and to offer very interesting margins to its distributors and resellers. Finally, ClickShare is patented and the company closely monitors patent infringement by competitors. In the **video wall** market, Barco has an installed base of 15,000 RPC video walls. In both RPC and LCD video wall markets, Barco has a good position in EMEA and in the Americas (for LCD, 18% in both regions) but has difficulty in gaining a foothold in Asia. Since growth is driven by the Chinese market (especially the LED market), Barco's geographical mix is a competitive disadvantage. The market is becoming more concentrated, as demonstrated by the recent acquisition of Planar and Eyevis by Leyard, which is the market leader. Barco's strategic partnership with Unilumin (*Appendix 1.2*) was concluded to capture opportunities in the LED market. Barco's latest LCD video wall, Unisee, is said to be revolutionary and there is a high likelihood that it will help Barco to reposition on the market.

Healthcare: Barco's **strong expertise in high-end displays and proven clinical outcomes** (i.e., increased detection rates) allows it to be the first supplier of **diagnostic** displays in EMEA and the Americas (with 53% and 66% of the market, respectively). In these markets, it benefits from its strong reputation in the healthcare industry and its long-term customer relationships. This is not the case in APAC, as Barco has difficulties capturing shares in this region, demonstrated by its 5% market share in 2018 (source: Barco). The **diagnostic display** market is concentrated and dominated by Barco and Eizo, the remaining 30% of the market being shared among smaller players *(Figure 23).* The market is stable and barriers to entry are very high because of strong brand loyalty and high required expertise. Furthermore, the industry players are protected by certifications which are needed to supply healthcare equipment *(Appendix 2.1).* In addition to selling displays to hospitals, Barco also supplies market leaders in the medical imaging market with lower pricing power and therefore thinner margins. Barco has a 22% share of the **surgical** market, which is more fragmented but is starting to consolidate as key players are gaining market shares over small players *(Figure 24)*. The rivalry is higher than in the diagnostic market, especially for the software aspect of surgery room solutions, as barriers to entry are lower and the technology is evolving rapidly.

Financial Analysis

Revenue growth and margins

Barco's topline has remained flat, while their focus on improving operational performance has led to an increasing EBITDA margin *(Appendix 3.1)*. As the three segments are managed independently and show different dynamics (in terms of growth and margin prospects), we performed an analysis and a forecast per segment. Barco has secured over 11% of sales in R&D and benefits from **significant synergies** across its segments (use of imaging and collaboration technology). We expect R&D expenses to stabilize at 11.7% of sales over the forecast period. We are less optimistic than the management and forecast EBITDA margins to remain in a 13-14% range over the forecast period.

Enterprise segment driving company performance: Barco has achieved significant growth in the meeting room segment (14% CAGR 14-18), thanks to its strong position with ClickShare in a fast-growing market. This has been partially offset by declining revenues in control rooms in 2016 and 2017, but sales recovered in 2018 (+9%) following a restructuring of the division *(Figure 25).* In this segment, Barco was able to significantly decrease its COGS (from 60.6% of sales in 2015 to 44.9% in 2018), thanks to the scale effect of ClickShare and low supplier power. On the other hand, sales and marketing expenses have been increasing because of the developed pull marketing strategy for ClickShare (which stands out from Barco's typical products by being a mass product). As a result, EBITDA margins have been increasing and the segment currently contributes half of the group's EBITDA, confirming Barco's high dependence on ClickShare *(Figure 27).* We expect sustained revenue growth thanks to the company's good position on both markets but no further COGS reduction *(Appendix 3.9 & 3.10)*, as we believe the current level has reached its lower limit. Furthermore, we expect increasing SG&A to sustain its position in this highly competitive market and support the move towards SaaS-based offers. Consequently, we expect margins to reach 19.5% in 2019 before slightly decreasing over time, and anticipate the Enterprise segment to account for a growing share of revenues *(Figure 26)*.

Figure 28: Solvency ratios

	FY15	FY16	FY17	FY18
Total debt/ Equity	0.15	0.15	0.10	0.06
Interest coverage ratio	2.88	13.02	27.97	57.32

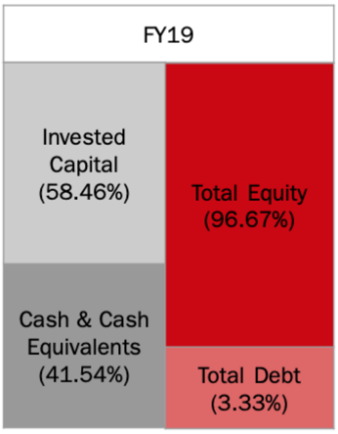
Source: Team analysis

Figure 29: ROE decomposition

	FY15	FY16	FY17	FY18
ROE	**3%**	**2%**	**4%**	**12%**
NOPAT/ IC	1%	8%	13%	23%
IC/E	0.60	0.58	0.67	0.49

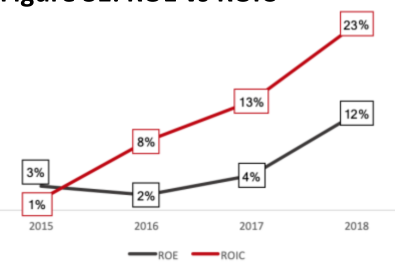
Source: Team analysis

Figure 30: BS investor



Source: Team analysis

Figure 31: ROE vs ROIC



Source: Team analysis

Figure 32:

	FY15	FY16	FY17	FY18
Payout ratio	111%	190%	94%	35%
Retained earnings (€m)	470	452	457	501
Dividend yield	1.9%	1.6%	2.1%	1.5%

Source: Capital IQ & Factset

Entertainment, Barco's former cash cow: Sales have been declining in both Cinema and V&H segments. Until 2016, cinema growth was mainly driven by China. As a result, negative growth in the maturing Chinese market led to declining sales in Cinema *(Figure 25)*. Value engineering initiatives as part of the 'Focus to Perform' program have enabled cost reduction (69.5% in 2016 to 64.4% in 2018). We expect a return to growth as we consider Barco to be well-positioned to capture the replacement wave in mature markets and answer increasing customer expectations thanks to its latest projector. We also expect further cost reduction in Entertainment thanks to the optimized assembly process of this projector and a marginal increase of SG&A as Barco will benefit from its large installed base. We forecast slightly increasing EBITDA margins and a decreasing contribution to Barco's total revenue *(Figure 27)*.

A slow-moving Healthcare segment: After experiencing strong growth in 2015 and 2016, sales have been flattening, essentially due to the company's struggle to capture market shares in the growing APAC market *(Figure 25)*. In the segment, value engineering has been part of the process for longer due to higher price pressure, resulting in steady cost reduction (62.7% of sales in 2015 to 58% in 2018). We expect sales growth to pick up as the 'In China for China' strategy pays off, and a slight cost reduction as software becomes increasingly significant in products. We expect slightly increasing SG&A to support the ICFC strategy and the move toward SaaS-based products. We expect a steady increase in EBITDA margins *(Figure 27)*.

Capital Structure The debt to equity ratio of Barco was 0.06 in 2018 *(Appendix 3.4)* reflecting Barco's objective to be debt-free. The long term debt is mostly used to hedge long-term receivables *(Appendix 3.2)*. Given the cash position of 2019 is €62.6m (net of marketable securities), the net debt is negative *(Figure 30)*. The **interest coverage ratio** has increased over time *(Figure 28)* as the interest expenses to be paid decreased each year and the EBIT[1] skyrocketed (10-fold increase from 2015 to 2016 and 2-fold increase the next year). Although this capital structure allows financial flexibility regarding investments (e.g. use of cash for acquisitions or capex), it brings risks of unused cash as there is no pressure to repay debt. However, after the transition cycle towards the SaaS-business model, we expect Barco to adopt its peers' capital structure (D/E ratio of 31.3%), as we expect the firm to generate sufficient operating profit to benefit from the tax shield.

Profitability The profitability of Barco has been increasing since 2015. Still, Barco's **return on invested capital (ROIC, 23% in 2018)** has been half of its **return on equity (ROE, 12% in 2018)** *(Figure 31)*. A decomposition of the ROE reveals that Barco does not invest all the shareholders' money as shown by the ratio of invested capital over equity, which is below 1 *(Figure 29)*. Moreover, the payout ratio has been decreasing since 2016 *(Figure 32)*, although it remains above the peer median (Barco 35% - peer median 12%). The increase in retained earnings confirms that Barco does not distribute its surplus income to its shareholders, suggesting an objective to achieve additional growth. However, this cash is currently unused, which represents an opportunity cost for investors. We believe this excess cash will be utilized, with several alternatives.

Liquidity: Both the quick and current ratios have remained above 1 over the past years, confirming Barco's strong financial health *(Figure 33)*. This is partly explained by efficient management of the working capital (WC) and by the fact that Barco does not use short term debt to finance its growth. The firm generates huge amounts of cash from its operations and currently has enough cash on hand to cover all its short term liabilities.

Operating cycle: Barco has an efficient cash conversion cycle (CCC)[2] ratio compared to its peers *(Appendix 3.5)*. This low ratio is mostly achieved thanks to advances received from customers who have to pay 30% of the total invoice before delivery and thus contribute to the financing of the working capital. We compared the adjusted FY17 (without CFG) with FY18 *(Appendix 3.4)*: both DSO and DIO ratios have declined, reflecting the focus on operational efficiency (*Figure 34*). The operating cycle increased in that period, due to lower advances received from customers (increasing DOO). To reflect an operational perspective of the NWC, we removed all non-recurring elements, which led to a higher level of working capital *(Appendix 3.6)*. We therefore observe a positive investment in WC from 2017 and we expect

1 As Barco offers payment conditions to its clients, interest income was included in the EBIT

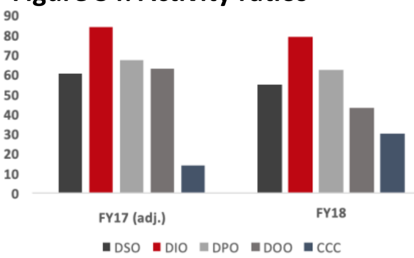
2 We adjusted the CCC by subtracting "days outstanding others WC" (DOO), computed with the other working capital containing mainly prepaid expenses, advances received from customers, tax payables, employee benefits liabilities, accrued charges, and deferred income (Appendix 3.2)

Figure 33: Liquidity ratios

	FY15	FY16	FY17	FY18
Current Ratio	1.7x	1.7x	1.8x	2.2x
Quick Ratio	1.3x	1.3x	1.1x	1.7x
Cash ratio	0.8x	0.8x	0.6x	1.1x
CCC	22	5	8	30

Source: Team analysis

Figure 34: Activity ratios



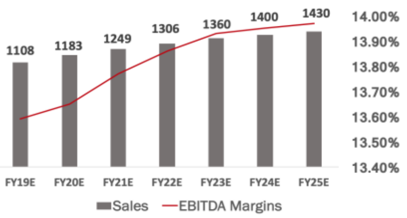
Source: Team analysis

Figure 35: Additional growth

Net change in cash (FY19E) in €m	62.6
EV/Sales market	3x
Implied Sales	20.86
Barco's Sales (FY19E) in €m	1108
Additional growth	1.88%

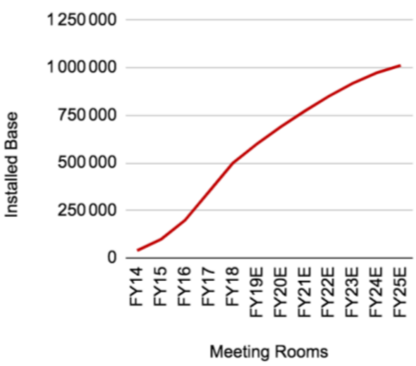
Source: Team analysis

Figure 36: Revenue (€m) and EBITDA margins (%)



Source: Capital IQ

Figure 37: Meeting Rooms installed base



Source: Team analysis

Figure 38: Short-term WACC

$ST\ WACC = Cost\ of\ Equity = rf + \beta\ (ERP) + SP$

rf	1.00%
Beta	0.86

this trend to be sustained in the future as Barco is moving to a subscription-based business model. We expect an increasing DSO ratio and a decreasing DOO due to a decrease in prepayments *(Appendix 3.7)*. As a result, we foresee an **increase in the operating cycle** but state no concern as Barco generates sufficient cash to cover the investment in working capital *(Appendix 3.3).*

Excess cash Despite the fact that the change of business model will require higher investments in NWC, we expect Barco to keep generating cash (€60-70 million per year) which will be added to the actual €363 million cash reserve *(Appendix 3.3)*. Barco has built a M&A radar to detect investment opportunities to capture additional external growth. Assuming an acquisition multiple EV/sales ratio of 3×, this would lead to additional sales growth of 1.88% *(Figure 35)*. If the management is unable to find an interesting deal within 3 years, we expect them to either distribute an exceptional dividend or to enter a share buyback program. The company entering a leveraged recapitalization program is a probable scenario, which supports our assumption that a debt-free capital structure will not be sustained in the long-term.

Capex Capital expenditures have been increasing, the latest investments being the factory in Taiwan and the headquarters in Kortrijk. We expect the capex over sales ratio to slightly increase in upcoming years, driven by investments in China to support the firm's strategy. Barco's capex ratio was below the peer median in 2018 (3.31%) and we expect it to reach 2.75% in 2025 *(Appendix 3.8).*

Valuation

Unlevered free cash flows: The unlevered free cash flows are forecasted over a 7-year forecast horizon *(Appendix 4.1)*. Growth coming from disruptive products in the technology sector takes a long time to be integrated into sales. Additionally, we wanted to forecast the change of business model (SaaS) over a longer period. We expect abnormal growth in the next 7 years from all segments (*Figure 36)* but mainly Enterprise (Meeting Rooms) and Healthcare (Surgical) segments. Because segments have different growth perspectives, we forecasted sales and margins separately. We used a tax rate of 20%, taking into account the income tax expenses paid over past years.

Sales: To forecast sales in **Entertainment**, we assume **(a)** the number of cinema screens worldwide to grow at 2.58% CAGR and 10% of screens to be replaced each year, **(b)** the V&H total addressable market to grow with the global entertainment market, i.e., 4% CAGR (Source: Statista). For the **Enterprise** segment, we expect a slower but solid growth rate (7.76% CAGR) of meeting rooms equipped with ClickShare by Barco as market potential will be reached (*Figure 37)* in the forecast period. For control rooms, we forecast a capture of market shares in the growing LCD and LED markets (1.55% and 6.5% CAGR) thanks to replacement deals coming from its installed base and the UniSee product for which we foresee success in 2020. In **Healthcare**, we assume the Diagnostic addressable market to grow at 5.33%, driven by APAC and Barco's objective to expand its market with Demetra (skin imaging). In Surgical, we expect a growing number of **(a)** new surgery rooms to be equipped by Barco in China (6.9% CAGR), and **(b)** transitions from analog to digital surgery rooms realized with Barco in EMEA and the Americas (3.7% CAGR). All our assumptions are detailed in *Appendix 4.2.*

WACC: We estimate a short-term (ST) WACC, taking into account Barco's current capital structure, and a long-term (LT) WACC because, in the long run, we think Barco will converge toward peer capital structure as mentioned in the financial analysis. The ST WACC is 5.66% *(Figure 38)* where equity accounts for 100% of the capital structure (net debt is negative). We use a normalized interest rate of 1% which corresponds to a real rate of 0% and European inflation of 1% where the majority of Barco's investors are located. Our beta of 0.86 corresponds to the median of the unlevered 5-year monthly betas of companies in our extended peer group retrieved from Capital IQ *(Appendix 4.3)*. This has been preferred over the company regression-based beta given the low liquidity of Barco shares. Our equity risk premium of 4% is based on the CFA Institute range of 3.5-4.00% (Global Markets, November 2017). As Barco is a mid-cap, we added a size premium of 1.2% (Ibbotson Database January 2019, fourth decile). The LT WACC is based on the same assumptions as the ST cost of equity with a levered beta of 1.08 and an estimated cost of debt of 1.54% (Damodaran based on interest coverage ratio) *(Figure 39).*

ERP	4.00%
Size premium	1.20%
WACC	**5.66%**

Source: Team analysis

Figure 39: Long-term WACC

$$LT\ WACC = w_E \times CE + w_D \times CD \times (1 - T_c)$$

CE	6.52%	CD	1.54%
W_E	76.15%	W_D	23.85%
		Tax Rate	20%
WACC			**5.26%**

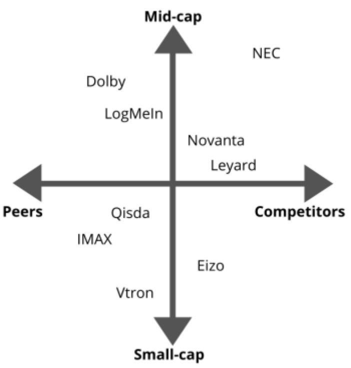
Source: Team analysis

Figure 40: DCF

EV	**2930.44**
Net Debt	–300.1
Equity Value	**3230.54**
#Shares	12.5
Share Price	**258.44**

Source: Team analysis

Figure 41:



Source: Team research

Figure 42: Relative valuation

(€m)	Entertainment	Enterprise	Health care
EV estimate	475.6	991.3	518.6
Net debt	–300.1		
Equity value estimate	2285.81		
Share price	**182.87**		

Source: Team analysis

DCF: We used a long term growth rate for the stable period of 1.9% *(Appendix 4.4)*. This rate is the expected inflation weighted according to Barco's sales split by region. We base our long term growth rate on inflation. In the long run, we think that sales will be impacted by price increases as markets will be mature and saturated after our 7-year forecast period. We discount our forecast period cash flows at the ST WACC. The last cash flow is a perpetuity calculated using the LT WACC and discounted using the ST WACC. We end up with a share price of 258.44€ (upside of 18.01%) *(Figure 40)*.

Sensitivity analysis: Barco's share price has been computed for several long term growth rates and LT WACCs *(Appendix 4.5)*. Even in the worst case, we end up –1.42% below the Dec. 31st price.

Scenario analysis: In our DCF **blue sky scenario** *(Appendix 4.6)*, we forecast additional growth every year due to favorable conditions in China and a successful launch of the new ClickShare. Barco is able to further decrease its COGS while containing the increase in SG&A leading to higher EBITDA margins and FCFF ending at 288.61€ per share (upside of 31.79%). In our DCF **doomsday scenario** *(Appendix 4.7)* we account for China's political risk, knowing that we computed simple WACCs without a country risk premium. The political risk contains devaluation of currency, taxes on the repatriation of CF, expropriation, and problems with sales forces locally. We forecast slower growth due to a possible expropriation risk in China, which is the worst case scenario (Source: Credendo). In this case, we forecast sales from China to reach zero from 2020 onwards, reflected by a 30% decrease in sales growth each year. Additionally, COGS will increase due to the company's inability to further negotiate contract agreements with key suppliers. This gives a share price of 165.07€ (downside of 24.62%).

Relative valuation: Nine comparables were chosen to perform Barco's valuation. The main requirements consist in being active in the technological industry, more precisely in the electronic component sector, with a comparable size (small & mid-market cap; *Figure 41*), operating worldwide, and whose revenues and operating profit come mainly from solutions similar to those of Barco in at least one of its segments. To take into account the different growth and margin drivers between segments, we made a peer analysis per segment *(Appendix 4.8)* and performed a relative valuation using a sum of the parts. We based our sum of the parts relative valuation on the average of EV/EBITDA and EV/EBIT multiples to account for potential differences in production models among its peers *(Figure 42, Appendix 4.9 and 4.10)*. Note that we exclude the EV/sales multiple from our relative valuation because the current value of the multiple of 3× reflects very high growth prospects (e.g. fintech industry) whereas we consider that Barco is a mature company not only focused on pure tech segments. We exclude the PE ratio as the peers sharply differ from Barco in terms of capital structure.

Comparable transaction analysis (CTA): To complement our results, we performed a CTA using an average 13.9× EBITDA multiple, which is in the range of our relative valuation EV/EBITDA multiple. We end up with a CTA price of 190.15€ *(Appendix 4.11)*. However, we attribute a 0% weight because the multiple used contains an acquisition premium that does not give a trustworthy fair value.

Target price: We assign 80% weight to the base case DCF and 10% each to the doomsday and blue sky cases, based on our own assumptions of the likelihood of these scenarios *(Figure 43)*. We end up with a final DCF price of 252.12€. We have strong confidence in our DCF, to which we assign a weight of 80%. The relative valuation is given a weight of 20% to better reflect the peer valuation level and market assessment of Barco's price *(Figure 44)*. However, we attribute less weight to the relative valuation due to certain differences with peers in terms of exposure to the industry (i.e., different levels of diversification). The target price gives a 8.80% upside from its December 31st closing price of 219€.

Monte Carlo valuation: To reinforce our valuation, we performed a Monte Carlo simulation to understand the sensitivity of our model to variations in EBITDA margins and long term growth rate. This gives us a 73% probability to be above the target price *(Appendix 4.12)*.

Investment Risks

Market risk 1 (MR1) - Foreign exchange risk: Barco faces exposure to the Yuan currency due to its Chinese activities. Barco's Yuan revenues are higher than its Yuan costs which causes a Yuan surplus to convert to €. Barco launched a hedging program for this currency but also

Figure 43: Final DCF

	Price (€)	Weight
Base case	254.44	80%
Blue sky	288.61	10%
Doomsday	165.07	10%
DCF fair price	**252.12**	

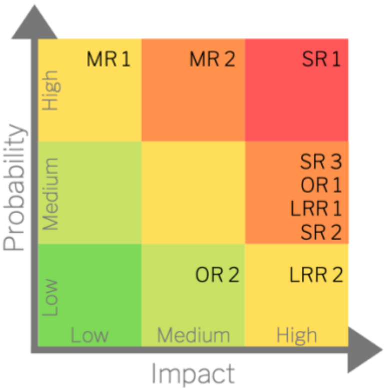
Source: Team valuation

Figure 44: Target price

	Price (€)	Weight
DCF	252.12	80%
Relative valuation	182.87	20%
Target price (€)	**238.27**	

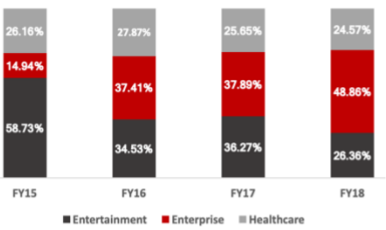
Source: Team valuation

Figure 45: Risk matrix



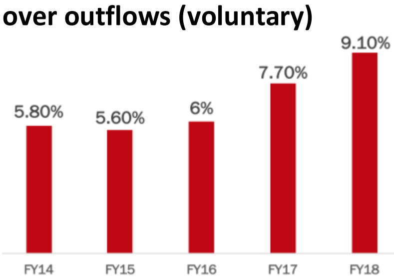
Source: Team analysis

Figure 46: Segment contribution to EBITDA



Source: Team analysis, Barco

Figure 47: Employee turnover over outflows (voluntary)



Source: Barco's 2018 annual report

for USD and Taiwanese dollars (**Prob.** high - **Impact** low).

Market risk 2 (MR2) – Market Saturation: The cinema and diagnostic segments are mature markets and products have a long lifespan, making the company dependent on the replacement wave. As a result, sales growth in these segments could be difficult to sustain, impacting negatively the overall company's growth. However, the shift towards subscription-based models in all segments is likely to reduce this dependence on replacements (**Prob.** high - **Impact** medium).

Operational risk 1 (OR1) - Dependence on ClickShare: ClickShare contributes approximately 20% of Barco's sales and 50% of the EBITDA *(Figure 46)*. With the increasing competition and variety of technologies on the market, customers could shift towards other wireless collaboration technologies. Barco is thus launching an evolved ClickShare product in February 2020 which, according to them, will revolutionize the meeting experience. A potential risk could be the inability to renew the ISO 27001 certification which makes ClickShare the most secure device on the market (3 year length). Cyber risks should also be considered, however Barco has recently upgraded ClickShare's software because of security issues discovered through ethical hacking (**Prob.** medium - **Impact** high).

Operational risk 2 (OR2) - Lack of talented staff: Barco has increased difficulty in finding and retaining talent (increasing employee turnover; *Figure 47*). The company deeply relies on the R&D department, which accounts for 24% of its staff *(Appendix 1.1)*. If this department is affected, this could directly affect the business' ability to deliver innovation, which is critical to sustaining market shares. Moreover, the sales team will have to adapt to the change of business model as selling hardware or SaaS products requires different approaches (**Prob.** low - **Impact** medium).

Strategic risk 1 (SR1) - Lack of M&A opportunities & leveraged recapitalization: Barco has a significant cash reserve kept for potential M&A deals. If the cash remains unused, shareholders could decide to disinvest which would lower the stock price significantly. Barco could borrow money to distribute an exceptional dividend to reassure shareholders and compensate for their opportunity cost (leverage recapitalization). Another possibility (although unlikely) is a takeover of Barco by another firm. In both cases there is a risk of high volatility for the stock (**Prob.** high - **Impact** high).

Strategic risk 2 (SR2) - Inability to penetrate the Chinese market: Despite its efforts to develop an ICFC strategy, Barco may fail to be seen as a Chinese player. Furthermore, insufficient or inadequate partnerships could hinder the penetration of the Chinese market. The inability to capture growth from the Chinese market would have a significant impact on the company's sales (**Prob.** medium - **Impact** high) .

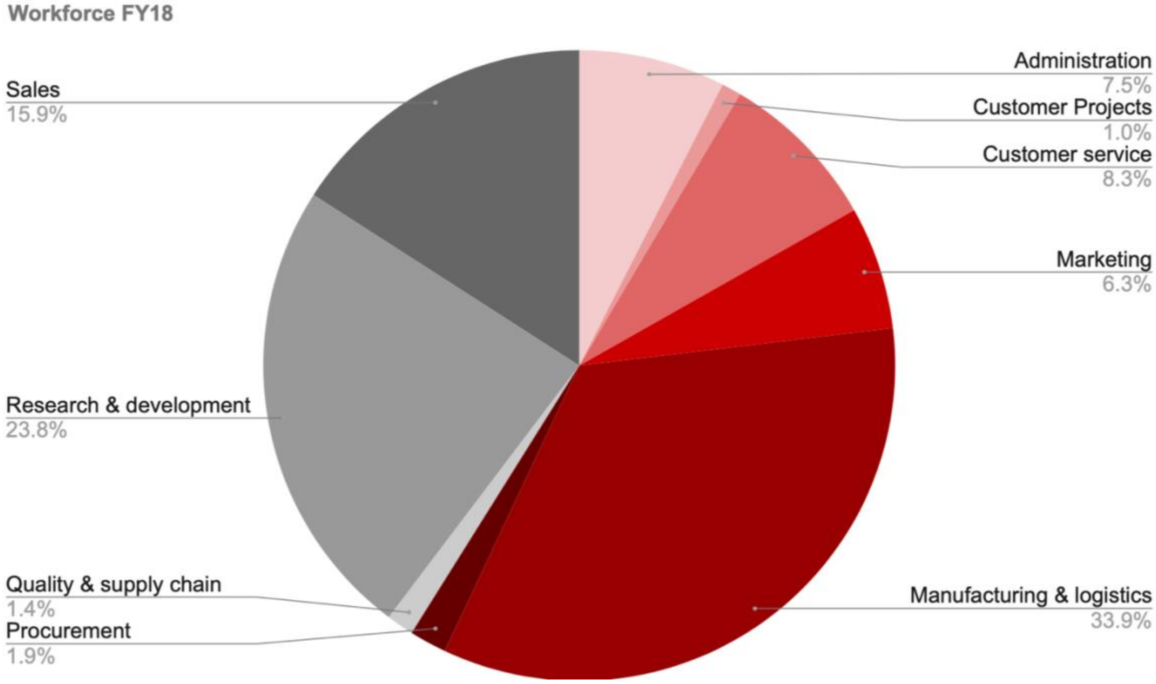
Strategic risk 3 (SR3) - Failure of SaaS: A potential risk could be the inability to monetize the SaaS products. Indeed, the change of business model requires considerable adaptations which Barco may not be able to achieve. Since the company's long term strategy is heavily reliant on this change of business model, a failure in this area would be a major setback for Barco (**Prob.** medium - **Impact** high).

Legal and regulatory risk 1 (LRR1) - Patent expiration & renewal: In the technological industry R&D is crucial, but having patents is vital as the technology can be stolen by competitors. Barco is well protected with 340 patents (10 year length) spread over each segment. The first patent for ClickShare is supposed to expire in 2026. However, it is not certain that the company will then be able to renew its patents for every product. Moreover, new partnerships in China lead to more uncertainty regarding intellectual property as the regulations are not similar in this region (**Prob.** high - **Impact** medium).

Legal and regulatory risk 2 (LRR2) - Political risk in China: Risks associated with business in China are numerous: devaluation of currency, taxes on the repatriation of CF, expropriation, problems with sales forces locally. More broadly speaking, the strong political power and protectionism represent a risk for any foreign company in China. In the worst case, Barco could face expropriation and would not be able to continue its activities in China which would result in lower sales overall but also major losses regarding local investments (**Prob.** low - **Impact** high).

Appendix 1 - Business Description and Governance

Appendix 1.1: Details of the workforce (FY18)



Source: Barco's annual report 2018

Appendix 1.2: Key events in line with strategy

Year	Deal type	Company	Strategic objective
2019	Strategic partnership and acquisition of minority stake of 5%	**Unilumin** (Chinese LED manufacturer)	Secure **cost-competitive supply** of high-quality LED display components and cooperation in the **development** of new LED products (cinema and control rooms).
2019	Strategic partnership and acquisition of minority stake	**Caresyntax** (software solutions for surgical automation, analytics, and AI)	Include workflows and analytics software in Nexxis digital platform and cross-selling.
2018	Divestment	**BarcoCFG**	Reduced stake in the JV (49%) to better address the smaller tier 3 and 4 cities in China (as CFG is better positioned to lead the next phase of development of the market).
2018	Joint venture	**Cinionic** (CFG, Appotronics, Barco, and CITIC)	Capture replacement wave and growth opportunities by becoming a **solution** provider (+ Appotronics' Laser Phosphor technology and CFG's Premium Cinema technology)
2016	Joint venture	**CEC Panda** (Chinese display manufacturer)	Address Control Rooms market in China (ICFC strategy)
2016	Acquisition	**MTT Innovation** (developer of HDR technology)	Collaborate to develop long-term technologies (HDR) for Entertainment (Cinema and V&H)
2015	Acquisition	**Advan Intl Corp** (US-based LCD/LED display manufacturer)	Expand healthcare and OEM businesses worldwide
2014	Divestment	Aerospace & Defense Display division	Focus on most profitable segments
2013	Acquisition	**AWIND** (Taiwanese provider of wireless content sharing)	Strengthen wireless collaboration capabilities (for corporate and education) and geographical presence in Asia.
2011	Joint venture	**BarcoCFG** (Two Barco subsidiaries & China Film Equipment Co. Ltd.)	Address the Cinema market in large Chinese cities.

Source: Barco's press releases

Appendix 1.3: Key products and associated business models

	Product	Customer	Value proposition	Revenues
Entertainment	**Laser Series 4 Projector**	Cinema exhibitors	Outstanding image quality and lower total cost of ownership (TCO)	**Hardware sold by unit**
	Laser as a Service		Retrofit of current projector with financial flexibility	Service over time ("hardware as a service")
	UDM/UDX Projectors	V&H exhibitors	Outstanding image quality	Hardware sold by unit
	Screen Management Systems		Video processing system	Hardware build-to-order
Enterprise	**ClickShare**	Companies	Wireless presentation system allowing **easy** and **reliable** collaboration in meeting rooms	**Hardware sold by unit**
	WeConnect	Universities	Wireless collaboration system for education purposes	Subscription-based (SaaS)
	Overture	Companies	Remote AV management	Subscription-based (SaaS)
	Video walls > **Unisee**		High-quality displays for CR > **Revolutionary LCD video wall**	Hardware sold by unit > **Subscription-based**
	Transform N CMS, OpSpace		Collaboration and monitoring software for control rooms	Software license
Healthcare	Diagnostic Displays	Hospitals and companies (OEM)	High-quality displays enabling better diagnostics	Hardware sold by unit
	Nexxis	Hospitals	Digitally integrated surgery room (display and software)	Hardware+Software, sold by unit
	Demetra	Hospitals, Dermatologists	Digital dermatoscope and imaging platform to help decision-making (AI)	Subscription-based (SaaS)
	Synergi	Hospitals	Clinical collaboration	Subscription-based (SaaS)

Source: Company's website

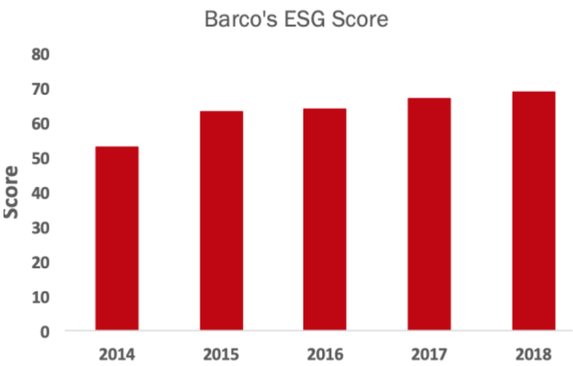
Appendix 1.4: The future of meetings (Global whitepaper)

Key findings	Conclusions
1. **Technology is at the heart of great meetings**	- Employees take of lot of technology to meetings (often their own devices): need for **agnostic** technology - Technology improves engagement in meetings (displays, screen sharing, and video)
2. **Meetings are changing**	- Employees prefer short meetings: the set-up of technology must be efficient and **easy** - Most meetings now have remote attendees and this trend will continue at a faster pace in the future (flexible working) - Employees prefer the use of video conferencing
3. **New technology will revolutionize meetings**	- 83% of employees want voice recognition in meetings within two years - 81% of employees expect AR and VR in meetings within three years (to improve collaboration between in-person and remote participants) - Employees also want video filters, avatars and bots, hand gestures. **In three years' time, the typical meeting will...** ... use voice recognition technology 75% ... use AR/VR to improve collaboration between in-person and remote participants 72% ... be coordinated or managed by bots/avatars 68%

Appendix 1.5: ESG data and management structure

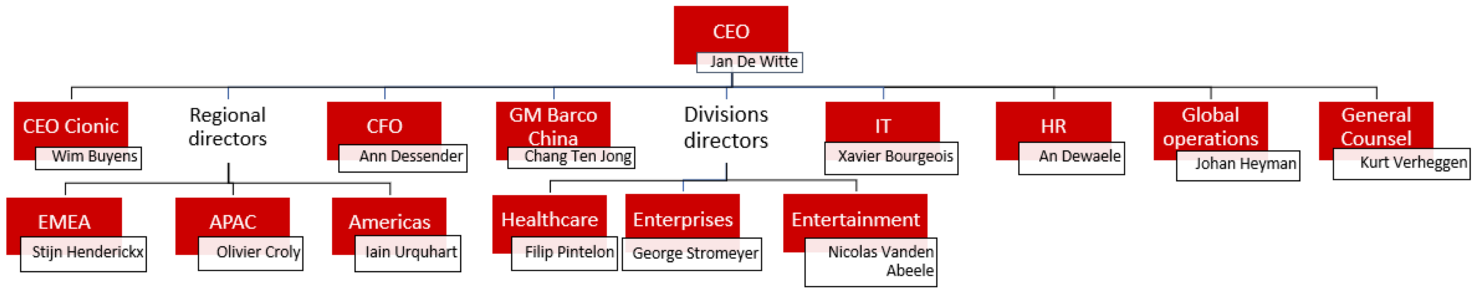
Indicators	2015	2016	2017	2018
# of improvement suggestions per operator	6.7	8.4	8.6	7.3
Turnover/outflow - voluntary	5.6%	6.0%	7.7%	9.1%
Lost time injury frequency rate (LTIFR)	1.0	3.3	1.9	3.0
% of employees in LT illness (>1 yr)	0.9%	0.7%	0.7%	0.6%
% women Barco overall	28%	28.2%	28.4%	28.1%
% women in management	14%	14.5%	15.2%	16.6%

Indicators	2015	2016	2017	Target
Barco's Greenhouse gas emissions (tCO2e/€m revenues)	80.5	73.1	70.6	64.4
Energy efficiency index of sold products	100%	96%	82%	75%



Sources: Barco's sustainability report & Eikon

Management structure:



Source: Barco

Appendix 2 - Industry Overview & Competitive Positioning

Appendix 2.1: Porter analysis

	Entertainment	Enterprise	Healthcare
Threat of entry	**Low (2)**	**Medium (3)**	**Very low (1)**
Barriers to entry	The key players have developed strong **expertise** in imaging technology after years of R&D. They also have developed efficient cost structures and processes. New entrants would have to invest a lot to catch up on these companies (**high intellectual and capital requirements)**.	The WPS* require **moderate expertise and capital**. Display technology for control rooms requires more intellectual capital.	The key players have developed strong **expertise** in medical imaging after years of R&D. They have also developed efficient cost structures and processes. New entrants would have to invest a lot to catch up on these companies (**high intellectual and capital requirements**). In Surgical, capital requirements for software are lower.
Customer captivity	Imaging equipment is a long-term investment for exhibitors, with **high switching costs.** These long-term relationships and the required maintenance services further foster **customer loyalty**. As a result, it would be difficult for new entrants to convince customers to change equipment suppliers.	Switching costs for WPS are relatively low (in terms of price). However, the **familiarity** of employees with a specific product may increase switching costs for companies. Switching costs for video walls are higher.	Medical equipment is a long-term investment for hospitals, with **high switching costs**. **Trust** is critical on the market and **brand loyalty** is very high. It would therefore be very difficult for new entrants to convince customers to change equipment suppliers.
Other barriers		There is close monitoring of **patent** infringements by Barco on the WPS market. The necessity to develop a **distribution** network is another barrier.	In developed markets, medical equipment has to meet stringent standards and be approved to obtain a **certification** and be sold in the market (CE in Europe and FDA in the U.S.)

Supplier power	**Medium (3)**	**Low (2)**	**Low (2)**
Dependency on suppliers	All key players on projection market depend on **Texas Instruments** for a specific chip which is difficult to replace. Other suppliers have less power.	For wireless presentation systems there is **no critical component** (value is added with in-house developed software) For video walls, there are five to six LCD suppliers, **interchangeable** following the application. Chinese LED suppliers have power as they are the only ones able to keep up with LED demand.	There are several suppliers for medical imaging displays, easily **interchangeable**. In the surgical segment, there is less dependence as value is added through **software**.
Buyer power	**Medium (3)**	**Low (2)**	**Medium (3)**
Buyer characteristics	Buyers of imaging equipment are **large accounts** with negotiating power.	Buyers are **companies** of all types, with limited negotiating power.	**Hospitals** have moderate negotiating power, while big companies in the medical imaging industry (for **modality displays)** have strong negotiating power.
Switching costs	Imaging equipment is a **significant investment** for exhibitors, as they will equip all their cinemas (or venues) with the same equipment for a long period of time. Switching costs are therefore very high.	WPS systems do not represent a significant investment, and switching costs are relatively low. Switching costs for video walls are high, as this equipment represents a **significant investment.**	Imaging and surgical equipment is a **significant and long-term investment** for hospitals. Doctors (end-users) develop familiarity with specific equipment and have decision power in hospitals.
Buyer dependency	Buyers' choice of imaging equipment is **critical** as it directly impacts their customers' experience and represents a long-term investment.	The choice of the WPS is not critical, although **reliability** and **simplicity** are important as it will impact the employees' productivity. In control rooms, quality of display is **critical** to enable the operator to work.	Buyers' choice of equipment is **critical** as it directly impacts the quality and efficiency of care and represents a long-term investment. In the context of budget restrictions in developed markets, hospitals' choice will likely be well-informed (regarding quality and TCO*)
Threat of substitutes	**Medium (3)**	**Low (2)**	**Low (2)**
Technology evolution	All key players need to invest in new projection technologies to offer up-to-date and quality products (laser being the latest). The first **LED** screen was introduced recently and represents a substitute as these screens don't require projectors.	On the WPS market, there is a moderate degree of technological disruption. On the control room market, there are three different technologies (cannibalizing each other); generally, key players offer all technologies.	Technology in healthcare evolves steadily but **hospitals' adoption** of new technologies is **prudent**. The risk of a disruptive technology exists for the surgical market, but in a longer-term horizon (as technology must be trusted to be reliable)
Rivalry	**Medium (3)**	**High (4)**	**Medium (3)**
Concentration	The global market is **concentrated** with 4 to 5 key players across the sub-segment. Barco and Christie control 75% of the cinema projection market.	The WPS market is quite **fragmented** as there are many different players, although Barco clearly dominates the market. The video wall market is moderately concentrated.	The diagnostic market is concentrated, with 4 to 5 key players **following regions**. The surgical market is more fragmented (but is consolidating as key players gain market shares)
Product differentiation	Key players all offer a wide range of products with different characteristics to meet exhibitors' specific needs. Companies attempt to differentiate themselves on **quality (of products and services)** and innovation. **Total cost of ownership** (and thus life span) is also an important selection factor for customers.	Companies on the WPS market offer quite similar products and attempt to differentiate themselves on **price and reliability.** Quality and reliability are the main criteria for control rooms.	Key players focus on developing products meeting hospitals' specific needs. **Quality and reliability are critical,** both in terms of products and services (support). Total cost of ownership is also a criterion for hospitals.

Industry prospects	In developed countries, the market is mature and shows little growth. Competition concerns **replacements** and is moderate (customer loyalty and long-term relationships). In emerging countries, there are growth opportunities as **new cinemas** are built. Competition to win these new customers is higher.	Both markets are growing. In the WPS market, there is **high competition**. Price pressure is high, especially since Chinese competitors entered the market. The control room market is more mature and rivalry is moderate.	Diagnostic market is mature but is expected to keep showing stable growth, while the surgical market is growing. In emerging countries, there are growth opportunities as **new hospitals** are built. In developed countries, growth is driven by **replacements**.
Competitors	All key players operate worldwide and in several markets.	Players are diverse in terms of size and strategy (pure-play or diversified).	Players are diverse in terms of size and strategy (pure-play or diversified).

***** WPS = Wireless presentation system; TCO = total cost of ownership.

Source: Team analysis

Appendix 2.2.: External influences

	Entertainment	Enterprise	Healthcare
Government & regulatory	Patent validation	**Patent validation**	Patent validation **Budget restrictions** National and international **regulations** and **certification** standards
Social	**Increasing customers' expectations** in terms of experience and interactivity (in cinema and live-events)	**New ways of working**: increasing need for collaboration and co-creation in the workplace, for connectedness and for remote working **Education** (adjacent market) is moving towards interactive and remote learning	**Increasing patients' expectations** in terms of quality and efficiency **Medical staff duty** to offer quality healthcare and "ego" (need best available equipment)
Demographic	**Emerging markets**: regional and rural expansions drive the building of new cinemas (increasing number of screens)	Increasing number of students (need for **remote learning**) **Tech-savvy** generation Z coming into the workforce	**Aging population** in EMEA and the Americas **Growing population** in APAC (driving the building of new hospitals)
Technological	**Fast technological evolution:** improvement of projection technology (laser, 8K resolution, 3D) and development of LED screens **Internet of Things** and connectedness in cinema (e.g. remote monitoring) **Replacement wave** for cinema in developed countries	**UC&C** and **WPS** markets coming together (full meeting room experience) Development of **LED** displays for control rooms **Internet of Things**: digital and data-driven era increases the need for real-time visibility and control systems (CDM) and also offers opportunities in meeting rooms	**Digital transformation**: Internet of Things, cloud, robotics and AI in healthcare (to help doctors' decision-making) **Evolution of medicine**: growth of minimally invasive surgery and need for higher collaboration among specialists

**UC&C = Unified communication & collaboration; CDM = Critical decision making*

Source: Team analysis

Appendix 2.3: SWOT analysis

<table>
<tr><th>Strengths</th><th>Weaknesses</th></tr>
<tr><td>

Diversification: three segments with different dynamics
Synergies in R&D (visualization technology across segments)
Strong installed base in all segments and brand loyalty (long-term relationships, especially in healthcare and cinema)
Strong expertise and reputation in core markets
Strong distribution network and strategic partnerships
High-end and up-to-date technology in “mission critical” segments
Historical recovery and the new direction that demonstrated its ability to make good strategic decisions
First-mover on the WPS market
Consistent ESG strategy and control of suppliers’ compliance

</td><td>

Excess cash suggesting an inability to seize growth opportunities
Long product life cycles (and dependence on replacement cycles)
Strong dependence on ClickShare’s profit
Lack of well-defined strategy in some sub-segments (V&H and CR)
Increasing employee turnover outflow
Slow processes and lack of internal communication
Still weak presence in APAC for Enterprise and Healthcare

</td></tr>
<tr><th>Opportunities</th><th>Threat</th></tr>
<tr><td>

Growing Chinese market in Healthcare and control rooms
Artificial Intelligence (deep learning) and Internet of Things (monetization of data)
Software and services to enable recurring revenues
Growth prospects in all segments: increasing customer expectations in entertainment; growing need for collaboration and for technologies in meeting rooms; technological development in healthcare.

</td><td>

Loss of confidence of investors and opportunity cost because of the excess cash
Rising competition in WPS and threat of substitution in projection
Chinese environment: risk of devaluation of currency, taxes on the repatriation of CF, expropriation, problems with sales forces locally
Wrong bets in R&D leading to an inability to keep up with fast technological evolution
Adjacent markets and big technological players (e.g. Samsung)

</td></tr>
</table>

Source: Team analysis

Appendix 3 - Financial Analysis

Appendix 3.1: Income statement

P&L account (€m)											
	FY15	**FY16**	**FY17**	**FY18**	**FY19E**	**FY20E**	**FY21E**	**FY22E**	**FY23E**	**FY24E**	**FY25E**
Sales	1,030.9	1,102.5	1,084.7	1,028.5	1,108.0	1,183.3	1,249.7	1,306.1	1,360.9	1,400.3	1,430.7
COGS	668.2	695.0	646.7	581.1	612.7	649.6	681.5	708.1	734.1	752.6	766.4
%COGS	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.5*	*0.5*	0.5	0.5	0.5	0.5
Gross profit	**362.7**	**407.5**	**438.0**	**447.4**	**495.3**	**533.8**	**568.2**	**598.1**	**626.9**	**647.7**	**664.3**
SG&A	188.7	202.0	204.9	205.2	222.9	242.0	258.6	273.3	287.6	298.3	307.1
%SG&A	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	0.2	0.2	0.2	0.2
R&D	100.8	120.5	122.3	120.3	121.9	130.2	137.5	143.7	149.7	154.0	157.4
%R&D	*9.78%*	*10.93%*	*11.28%*	*11.69%*	*0.1*	*0.1*	*0.1*	0.1	0.1	0.1	0.1
Other operating income	2.96	3.33	−3.71	2.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EBITDA	**76.2**	**88.3**	**107.1**	**124.4**	**150.5**	**161.5**	**172.1**	**181.1**	**189.6**	**195.4**	**199.8**
EBITDA margin	*7.39%*	*8.01%*	*9.87%*	*12.10%*	*0.1*	*0.1*	*0.1*	0.1	0.1	0.1	0.1
D&A	72.34	51.45	33.88	34.49	34.8	35.2	35.4	35.7	36.0	36.3	36.5
%D&A	*7.02%*	*4.67%*	*3.12%*	*3.35%*	*0.0*	*0.0*	*0.0*	0.0	0.0	0.0	0.0
EBIT	**3.81**	**36.87**	**73.23**	**89.95**	**115.7**	**126.4**	**136.7**	**145.4**	**153.6**	**159.1**	**163.4**
EBIT margin	*0.37%*	*3.34%*	*6.75%*	*8.75%*	*0.1*	*0.1*	*0.1*	0.1	0.1	0.1	0.1
Non-operating adjustments	-29.1	-6.0	−32.4	−0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	-25.3	30.8	40.8	89.3	115.7	126.4	136.7	145.4	153.6	159.1	163.4
Interest income	7.1	4.4	4.7	5.9	5.4	5.8	6.2	6.5	6.8	7.1	7.3
Interest expenses	−4.1	−3.2	-2.7	−1.6	−1.6	−1.0	−0.4	0.0	0.0	0.0	-0.1
Income before taxes	**−22.2**	**32.1**	**42.8**	**93.7**	**119.5**	**131.2**	**142.4**	**151.9**	**160.3**	**166.2**	**170.6**
Taxes	4.9	−6.3	−11.4	−16.6	23.9	26.2	28.5	30.4	32.1	33.2	34.1
Income after taxes	−17.4	25.7	31.5	77.1	95.6	104.9	113.9	121.5	128.3	133.0	136.5
Share from JV	−1.1	0.3	1.3	0.191	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Adjustments	38.0	−14.7	−8.0	−2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net income	**19.6**	**11.3**	**24.8**	**74.9**	**95.8**	**105.1**	**114.1**	**121.7**	**128.5**	**133.1**	**136.7**

Appendix 3.2: Balance sheet

Assets (€m)												
	FY15	FY16	FY17	FY17 (adj)	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Goodwill	132.4	124.3	113.4	105.4	105.6	105.6	105.6	105.6	105.6	105.6	105.6	105.6
Other intangibles	75.5	75.8	63.4	63.4	47.4	59.5	63.5	67.1	70.1	72.9	74.7	76.1
Gross PPE	225.83	238.96	237.67	237.67	240.0	267.7	297.9	329.9	363.8	399.8	437.4	476.4
Depreciation	133.26	135.02	132.3	132.3	131.2	167.2	205.7	246.3	292.0	339.5	388.3	437.9
Net PPE	92.6	103.9	105.3	105.3	108.8	100.5	92.2	83.6	71.8	60.3	49.1	38.5
Investments	9.0	14.5	7.9	7.9	19.1	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Deferred tax assets	78.0	89.1	80.0	69.9	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5
Other non-current assets	23.2	19.1	12.9	12.9	9.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3
Non-current assets	410.7	426.6	515.2	364.7	358.1	357.9	353.6	348.6	339.8	331.0	321.8	312.5
Inventory	166.0	166.2	154.1	132.8	135.1	137.3	145.5	152.7	158.6	164.0	167.6	170.2
Trade debtors	186.9	188.6	182.1	149.4	161.8	174.4	192.7	210.4	227.0	243.3	247.9	252.5
Other amounts receivable	26.2	15.6	19.4	19.4	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
Short-term investments	-	-	-	-	112.8	112.8	112.8	112.8	0.0	0.0	0.0	0.0
Cash and cash equivalents	341.3	353.5	321.5	254.1	251.8	204.4	152.7	218.6	290.2	366.0	462.1	559.8
Prepaid expenses & accrued income	9.3	8.7	5.0	5.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Assets held for sales	-	-	-	139.5	-	-	-	-	-		-	-
Current assets	729.6	732.6	682.1	700.3	689.2	656.5	631.5	722.2	703.6	801.0	905.4	1010.2
Total assets	1140.3	1159.2	1197.3	1065.0	1047.3	1014.4	985.1	1070.7	1043.4	1132.0	1227.2	1322.7

Debt & equity (€m)												
	FY15	FY16	FY17	FY17 (adj)	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Equity	597.7	590.2	579.4	579.4	633.3	697.3	765.6	838.1	912.2	989.0	1067.2	1146.2
Non-controlling interests	13.9	25.2	14.1	14.1	1.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9
Equity	611.7	615.5	593.5	593.5	635.0	705.2	773.6	846.0	920.1	996.9	1075.1	1154.1
LT debt	79.5	66.8	47.2	41.0	29.9	44.1	62.8	84.6	109.8	138.1	170.0	200.9
Deferred tax liabilities	4.5	8.8	4.6	4.6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Other LT liabilities	2.8	11.2	4.6	4.6	24.6	-40.8	-140.5	-126.2	-223.4	-205.7	-186.6	-166.3
LT provisions	18.0	30.8	24.6	24.6	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3
Non-current liabilities	104.8	117.6	81.0	74.8	91.8	26.4	-73.2	-58.9	-156.1	-138.4	-119.3	-99.0
Current portion of LT debts	10.0	11.5	10.0	10.0	7.5	7.2	10.2	13.8	17.9	22.5	27.7	32.8
Short-term debt	2.1	2.1	0.7	0.7	0.7	0.1	0.2	0.3	0.3	0.4	0.5	0.6
Trade payables	139.5	135.1	114.5	102.9	105.1	108.0	114.5	120.2	124.8	129.1	131.9	133.9
Advances received from cust.	113.9	109.1	88.9	67.0	53.7	44.3	41.4	37.5	29.4	23.8	17.4	10.6
Tax payables	13.0	13.9	23.4	9.8	11.4	11.3	12.1	12.8	13.4	13.9	14.3	14.5
Employee benefit liabilities	48.8	57.1	51.2	50.0	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3
Other current liabilities	7.7	9.7	10.6	10.6	48.5	16.4	13.3	9.1	7.3	1.7	2.4	2.8
Accrued charges & deferred income	60.0	58.1	60.8	18.1	10.1	11.1	11.8	12.5	13.1	13.6	13.9	14.2
ST provisions	28.9	29.7	30.5	26.9	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Liab. linked to assets held for sale	-		-	100.7	-	-	-	-	-	-	-	-
Current liabilities	423.8	426.1	390.5	396.6	320.4	282.8	284.7	283.6	279.5	273.5	271.4	267.6
Total equity & liabilities	1140.3	1159.2	1065.0	1065.0	1047.3	1014.4	985.1	1070.7	1043.4	1132.0	1227.2	1322.7

Source: Team analysis

Appendix 3.3: Cash flow statement

CF statement (€m)											
	FY15	FY16	FY17	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
EBIT (adj)	*3.8*	*36.9*	*73.2*	*90.0*	*115.7*	*126.4*	*136.7*	*145.4*	*153.6*	*159.1*	*163.4*
Tax expenses	*-14.9*	*-11.5*	*-4.4*	*-12.5*	*-23.1*	*-25.3*	*-27.3*	*-29.1*	*-30.7*	*-31.8*	*-32.7*
NOPAT	-11.1	25.3	68.8	77.5	92.6	101.1	109.3	116.3	122.8	127.3	130.7
D&A	72.3	51.4	33.9	34.5	34.8	35.2	35.4	35.7	36.0	36.3	36.5
Other non cash expenses	-9.7	4.5	-4.1	-1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change in WC	63.3	9.3	-15.1	-34.1	-14.5	-24.7	-25.9	-26.7	-28.2	-11.0	-11.7
Interest income	4.3	7.3	4.7	5.9	5.4	5.8	6.2	6.5	6.8	7.1	7.3
Interest expenses	-4.1	-3.2	-2.7	-1.6	1.6	1.0	0.4	0.0	0.0	0.0	0.1
Operating cash-flow	**115.0**	**94.7**	**85.5**	**80.3**	**119.9**	**118.4**	**125.4**	**131.9**	**137.5**	**159.7**	**162.9**
CAPEX	-14.7	-24.2	-23.2	-25.6	-27.7	-30.2	-32.0	-34.0	-36.1	-37.8	-39.3
Short-term investments	0.0	0.0	0.0	-112.8	-112.8	0.0	0.0	0.0	0.0	0.0	0.0
Other CF from investing activities	107.2	-15.7	-3.0	-29.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Investing cash-flow	**92.4**	**-39.9**	**-26.2**	**-168.2**	**-140.5**	**-30.2**	**-32.0**	**-34.0**	**-36.1**	**-37.8**	**-39.3**
Total debt issued	8.7	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total debt repaid	-18.0	-13.6	-17.5	-12.8	-14.0	-14.0	-9.5	0.0	0.0	0.0	0.0
Issuance of common stock	0.9	8.2	5.7	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repurchase of common stock	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dividends	-19.4	-21.0	-23.3	-26.0	-28.1	-30.3	-32.7	-34.0	-35.4	-36.8	-38.3
Sale of own shares	-1.7	5.7	5.3	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other CF from financing activities	9.2	-20.9	-44.2	41.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financing cash-flow	**-18.6**	**-41.6**	**-72.5**	**14.8**	**-42.0**	**-44.3**	**-42.2**	**-34.0**	**-35.4**	**-36.8**	**-38.3**
Beginning cash	**145.3**	**341.3**	**353.6**	**321.5**	**251.8**	**189.2**	**233.2**	**284.5**	**348.4**	**414.5**	**499.5**
Change in cash	**188.8**	**13.3**	**-13.2**	**-73.0**	**-62.6**	**44.0**	**51.3**	**63.9**	**66.1**	**85.1**	**85.3**
Adjustment (forex)	7.1	-1.0	-18.8	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
End in cash	**341.3**	**353.6**	**321.5**	**251.8**	**189.2**	**233.2**	**284.5**	**348.4**	**414.5**	**499.5**	**584.8**

Appendix 3.4: Barco's ratios

Barco's ratios											
	FY15	FY16	FY17	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Solvency											
Debt/equity	0.15	0.15	0.1	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Debt/capital	0.13	0.13	0.09	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Tot. liabilities/assets	0.46	0.47	0.44	0.39	0.33	0.23	0.21	0.20	0.18	0.17	0.16
Financial leverage	1.86	1.88	1.79	1.65	1.49	1.30	1.27	1.25	1.22	1.21	1.19
Interest coverage	2.9	13.0	28.0	57.3	74.4	127.8	n.a.	n.a.	n.a.	n.a.	n.a.
Fixed charge coverage	6.7	20.8	39.5	72.2	92.5	156.1	n.a.	n.a.	n.a.	n.a.	n.a.
Net debt/EBITDA	-8.94	-3.94	-1.88	-2.87	-1.73	-1.16	-1.35	-1.61	-1.86	-2.21	-2.56
Liquidity											
Current ratio	1.7	1.7	1.8	2.2	2.3	2.1	2.4	2.8	3.2	3.5	3.9
Quick ratio	1.3	1.3	1.1	1.7	1.1	0.9	1.1	1.3	1.6	1.9	2.3
Cash ratio	0.8	0.8	0.6	1.1	1.1	0.8	1.0	1.3	1.5	1.9	2.2
CCC	22	5	8	30	39	45	50	55	61	63	65
Activity ratios											
DSO	63	62	62	55	57	59	61	63	65	65	65
DIO	93	84	86	79	82	82	82	82	82	82	82
DPO	66	69	67	62	64	64	64	64	64	64	64
DOO	68	71	73	43	36	32	29	25	22	19	18
Total asset turnover	0.9	1	1	1	1.1	1.2	1.2	1.2	1.1	1.1	1.0
Fixed asset turnover	13	11.2	10.4	9.6	10.1	10.7	11.2	11.7	12.0	12.3	12.5
Profitability											
ROA	0.01	0.02	0.04	0.051	0.09	0.10	0.10	0.10	0.10	0.10	0.09
ROE	0.03	0.02	0.04	0.12	0.14	0.14	0.13	0.13	0.12	0.12	0.11
ROIC	0.01	0.08	0.13	0.23	0.25	0.20	0.20	0.19	0.19	0.18	0.18
Gross margin	35.2%	37.0%	40.4%	43.5%	44.7%	45.1%	45.5%	45.8%	46.1%	46.3%	46.4%
EBITDA margin	7.4%	8.0%	9.9%	12.1%	13.6%	13.7%	13.8%	13.9%	13.9%	14.0%	14.0%
EBIT margin	0.4%	3.3%	6.8%	8.7%	10.4%	10.7%	10.9%	11.1%	11.3%	11.4%	11.4%
Net income margin	1.9%	1.0%	2.3%	7.3%	8.6%	8.9%	9.1%	9.3%	9.4%	9.5%	9.6%

Source: Team analysis

Appendix 3.5: Liquidity peers vs. Barco

Benchmark 2018	DSO	DPO	DIO	CCC
Dolby	79	35	78	122
EIZO	75	41	210	245
IMAX Corporation	155	38	93	211
Leyard	112	126	273	259
Novanta	49	45	101	106
NEC	104	87	40	58
Qisda	66	73	61	53
VTRON GROUP CO LTD-A	94	36	142	200
LogMein	29	38	n.a.	-9
Median peers	**79**	**41**	**93**	**122**
Barco	55	62	79	30

Source: Team analysis

Appendix 3.6: Working capital reconciliation

(€m)	FY14	FY15	FY16	FY17	FY17 (adj.)[3]	FY18
Receivables	**170.49**	**186.91**	**188.56**	**182.108**	**149.44**	**161.79**
Inventories	**185.63**	**165.96**	**166.2**	**154.059**	**132.75**	**135.11**
Payables	**-109.09**	**-139.5**	**-135.13**	**-114.548**	**-102.943**	**-105.15**
Other WC	**-178.18**	**-207.84**	**-223.43**	**-210.309**	**-131.02**	**-109.43**
Other amounts receivable	18.94	26.16	15.58	19.37	19.37	19.57
Prepaid expenses & accrued income	8.948	9.31	8.71	5.04	5.04	8.13
Advances received from customers	-107.544	113.87	109.06	88.854	67.04	53.75
Tax payables	-15.171	13.02	13.88	23.35	9.75	11.37
Employee benefit liabilities	-44.759	48.76	57.05	51.159	49.98	51.31
Other current liabilities	-5.204	7.69	9.68	10.59	10.59	48.53
Minority shareholder						*37.91*
Accrued charges & deferred income	-33.39	59.97	58.05	60.766	18.07	10.08
Bridge to Barco's WC (€m)						
Other non-current assets	*15.736*	*23.23*	*19.11*	*12.89*	*12.89*	*9.73*
Other LT liabilities		*2.84*	*11.2*	*10.727*	*4.56*	*24.56*
Provisions (ST & LT)	*40.148*	*46.9*	*60.48*	*55.118*	*51.51*	*66.3*
Barco's other WC (report)	***-202.92***	***-234.35***	***-276***	***-263.64***	***-174.2***	***-190.56***
Net WC	**68.85**	**5.53**	**-3.8**	**11.31**	**48.227**	**82.32**
Net WC (Barco's report)	*44.4*	*-21*	*-56.4*	*-41.6*	*-*	*2.5*
Net WC as a % of sales	**7.58%**	**0.54%**	**-0.34%**	**1.04%**	**4.66%**	**8.00%**
Change in WC	**-**	**-63.32**	**-9.33**	**15.11**	**52.027**	**34.093**

Source: Team analysis

[3] FY17 (adj) = Adjusted without CFG

Appendix 3.7: Assumption for NWC forecast

NWC components	Assumption	Justification
DSO	↗ by 2 days (until 2023) = (as of 2024)	Higher proportion of sales coming from software solutions & services as Barco bills its customer in advance and receives the payments over time
DIO	=	Softwares and services still embedded in Barco's hardware units
DPO	=	No significant impact
DOO/other WC as a % of sales	↘ by 1% (until 2023) ↘ by 0.5% (as of 2024)	Decrease in prepayments, partially offset by an increase in deferred income (coming from subscription-based contracts with a length that extends over several accounting periods)

Source: Team analysis

Appendix 3.8: Capital expenditures & peer comparison

	FY15	FY16	FY17	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Capex Barco	14.73	24.24	23.16	25.63	27.70	30.18	31.99	33.96	36.06	37.81	39.34
Capex/sales Barco	1.60%	2.56%	2.36%	2.59%	2.50%	2.55%	2.56%	2.60%	2.65%	2.70%	2.75%

Source: Team analysis

PEERS CAPEX/SALES	FY15	FY16	FY17	FY18
Leylard	4.03%	3.85%	2.17%	3.06%
Dolby	20.08%	21.62%	9.70%	7.29%
Eizo	1.55%	3.65%	3.86%	3.31%
IMAX	19.20%	15.48%	17.53%	12.86%
NEC	1.18%	27.12%	3.29%	2.22%
Novanta	1.49%	2.19%	1.75%	2.66%
Vtron	3.12%	1.42%	3.01%	3.74%
QISDA	1.20%	1.34%	2.57%	1.83%
Median peers	**2.33%**	**3.75%**	**3.15%**	**3.19%**
Capex BARCO	**14.73**	**24.24**	**23.16**	**25.63**
Capex/sales Barco	*1.60%*	*2.56%*	*2.36%*	*2.59%*

Source: Capital IQ

Appendix 3.9: Sales per segment

Sales (in €m)	FY15	FY16	FY17	FY17 (adj)	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Entertainment	514	578.2	533	482.5	447.6	468.6	483.5	494.4	501.1	507.2	511.6	513.5
	11.93%	*12.38%*	*-7.77%*		*-7.23%*	4.71%	3.17%	2.26%	1.35%	1.22%	0.86%	0.36%
Enterprise	300.4	289.7	308.2	308.2	335.9	377.7	421.5	460.9	495.7	525.8	544.3	558.1
	15.63%	*-3.60%*	*6.39%*		*9.01%*	12.46%	11.58%	9.37%	7.54%	6.08%	3.52%	2.54%
Healthcare	216	234.6	243.3	243.3	245	261.5	278.2	294.2	309.2	324	336.2	346.4
	15.70%	*8.63%*	*3.68%*		*0.72%*	6.76%	6.39%	5.75%	5.10%	4.77%	3.78%	3.03%
Group	1,028.9	1,102.3	1,084.7	1,033.9	1,028.5	1,108	1,183.3	1,249.7	1,306.1	1,357.1	1,392.2	1,418.14
	13.27%	*7.15%*	*-1.61%*		*-0.52%*	7.73%	6.80%	5.61%	4.52%	3.90%	2.59%	1.86%

Source: Capital IQ, team valuation

Appendix 3.10: Costs per segment

Categories as % of sales	FY15	FY16	FY17	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Entertainment											
COGS	68.53%	69.50%	66.50%	64.42%	63.00%	62.80%	62.60%	62.40%	62.20%	62.00%	61.80%
SGA	15.88%	15.74%	16.80%	17.24%	17.10%	17.15%	17.20%	17.25%	17.30%	17.35%	17.40%
Enterprise											
COGS	60.63%	51.05%	47.37%	44.87%	44.50%	44.50%	44.50%	44.50%	44.50%	44.50%	44.50%
SGA	21.42%	22.17%	23.61%	23.97%	24.97%	25.47%	25.72%	25.97%	26.22%	26.47%	26.72%
Healthcare											
COGS	62.73%	61.95%	60.04%	57.96%	57.10%	56.90%	56.70%	56.50%	56.30%	56.10%	55.90%
SGA	18.44%	18.62%	19.02%	18.38%	18.50%	18.60%	18.70%	18.80%	18.90%	19.00%	19.10%
Group											
COGS	64.94%	63.04%	59.62%	56.50%	55.30%	54.89%	54.53%	54.21%	53.93%	53.73%	53.55%
Sales & marketing	13.40%	13.34%	13.53%	14.36%	14.5%	14.9%	15.1%	15.3%	15.5%	15.7%	15.9%
General and administration	4.95%	5.00%	5.36%	5.59%	5.59%	5.59%	5.59%	5.59%	5.59%	5.59%	5.59%
R&D	9.80%	10.93%	11.28%	11.69%	11.00%	11.00%	11.00%	11.00%	11.00%	11.00%	11.00%

Source: Capital IQ and team calculation

Appendix 4 - Valuation

Appendix 4.1: FCFF

(In €m)	FY15	FY16	FY17	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Sales	**1,030.88**	**1,102.48**	**1,084.72**	**1,028.52**	**1,108.00**	**1,183.34**	**1,249.72**	**1,306.15**	**1,360.94**	**1,400.28**	**1,430.66**
Sales growth	*13.48%*	*6.95%*	*−1.61%*	*−0.52%*	*7.73%*	*6.80%*	*5.61%*	*4.52%*	*4.19%*	*2.89%*	*2.17%*
COGS	668.2	695.0	646.7	581.1	612.73	649.58	681.53	708.05	734.09	752.60	766.41
%COGS	*64.82%*	*63.04%*	*59.62%*	*56.50%*	*55.30%*	*54.89%*	*54.53%*	*54.21%*	*53.94%*	*53.75%*	*53.57%*
Gross margin	**362.68**	**407.48**	**438.02**	**447.42**	**495.28**	**533.75**	**568.19**	**598.09**	**626.85**	**647.68**	**664.26**
SG&A	188.70	202.00	204.90	205.19	222.86	242.05	258.64	273.33	287.59	298.27	307.06
%SG&A	*18.30%*	*18.32%*	*18.89%*	*19.95%*	*20.1%*	*20.5%*	*20.7%*	*20.9%*	*21.1%*	*21.3%*	*21.5%*
R&D	100.78	120.49	122.31	120.28	121.88	130.17	137.47	143.68	149.70	154.03	157.37
%R&D	*9.78%*	*10.93%*	*11.28%*	*11.69%*	11.00%	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*
Other operating income	2.96	3.325	−3.71	2.49							
EBITDA	**76.15**	**88.32**	**107.11**	**124.44**	**150.54**	**161.54**	**172.08**	**181.09**	**189.56**	**195.37**	**199.82**
EBITDA Margin	*7.39%*	*8.01%*	*9.87%*	*12.10%*	*13.59%*	*13.65%*	*13.77%*	*13.86%*	*13.93%*	*13.95%*	*13.97%*
D&A	72.34	51.45	33.88	34.49	34.80	35.15	35.42	35.70	36.00	36.25	36.47
%D&A	7.02%	4.67%	3.12%	3.35%	3.14%	2.97%	2.83%	2.73%	2.65%	2.59%	2.55%
EBIT	**3.81**	**36.87**	**73.23**	**89.95**	**115.74**	**126.39**	**136.67**	**145.39**	**153.55**	**159.12**	**163.35**
EBIT margin	*0.37%*	*3.34%*	*6.75%*	*8.75%*	*10.45%*	*10.68%*	*10.94%*	*11.13%*	*11.28%*	*11.36%*	*11.42%*
Tc	19%	20%	26%	18%	20%	20%	20%	20%	20%	20%	20%
NOPAT	**3.09**	**29.50**	**54.19**	**73.76**	**92.59**	**101.11**	**109.33**	**116.31**	**122.84**	**127.30**	**130.68**
D&A	72.34	51.45	33.88	34.49	34.80	35.15	35.42	35.70	36.00	36.25	36.47
CAPEX	14.73	24.24	23.16	25.63	27.70	30.18	31.99	33.96	36.06	37.81	39.34
Change in NWC	−63.32	−9.33	15.11	34.093	14.50	24.67	25.95	26.67	28.19	11.03	11.66
FCFF	**124.02**	**66.03**	**49.80**	**48.53**	**85.19**	**81.42**	**86.81**	**91.38**	**94.58**	**114.72**	**116.15**
TV											**3522.48**
DCF					**80.63**	**72.93**	**73.60**	**73.33**	**71.84**	**82.46**	**2475.64**

Source: Team analysis

Appendix 4.2. Sales forecast assumptions

	Entertainment		Enterprise		Healthcare	
	Cinema	*V&H*	*Control room*	*Meeting rooms*	*Diagnostic segment*	*Surgical segment*
Approach	Bottom-up	Top-down	Top-down	Bottom-up	Top-down	Bottom-up
Growth drivers	1.Increasing customer expectations (technology experience)					
	2. Increasing # of cinema screens (emerging countries)		1. Replacement of RPC video walls installed base	1. # of meeting rooms to be equipped	1. Increasing # of hospitals in emerging countries (APAC)	1. Increasing # of hospitals in China
	3. Replacement wave (US, EUR)		2. LCD and LED development		2. Adjacent markets (skin imaging)	2. Transition from analog to digital OR in developed countries (US, EUR)
Assumptions	1. CAGR # screens: 2.58%	1. CAGR: 4%	1. CAGR: 1.5% (global video wall market: growing LCD and LED and declining RPC)	1.CAGR # of meeting rooms: 7.76%	1. CAGR: 5.33%	1. # of hospitals per region (from population)
	2. Replacements every 10 years	2. Stable market shares (flagship projector)	2. Growing market shares in LCD market: 10.75% in 2025 (UniSee)	2. Decreasing revenue/units (price pressure)	2. Stable market shares (ICFC strategy and Demetra)	2. 100k people per operating room
	3. Increasing ASP (technology development and pricing power)		3. Stable market shares in RPC market: 22% (low competition)	3. Slight decrease in market shares (high competition for ClickShare)		3. Growing % of integrated OR per year
	4. Market shares: 50% (sustained leadership with flagship projector)		4. Growing market shares in LED market: 8% in 2025 (Unilumin partnership)			4. Increasing market shares in all regions (strong reputation and ICFC strategy): 15% in China, 28% in EMEA, 35% in America in 2025

Source: Team analysis

		FY15	FY16	FY17	FY18	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Bottom-up Cinema	# of cinema screens worldwide	142,359	155,320	169,198	182,019	193,081.23	202,884.95	211,157.61	217,656.01	222,879.76	227,337.35	230,747.41
Top-down V&H	Total addressable market	900	950	1,000	1,050	1,099.98	1,150.03	1,200.06	1,250.1	1,300.1	1,345.61	1,385.97
Top-down control rooms	Total video wall for CR TAM	n.a.	1,070	1,150	1,300	1,400	1,500	1,550	1,580	1,585	1,575	1,555
Bottom-up meeting rooms	# of equipped meeting rooms (in k)	100	200	500	500	600	690	773	850	918	973	1,012
Bottom-up surgical												
China	# Hospitals	27,587	29,140	31,056	33,009	35,319.63	37,615.41	39,872.33	42,065.31	44,168.57	46,156.16	48,002.41
	#OR/Hospital	14	14	15	15	15	15	15	15	15	16	16
Europe	# Hospitals	5,300	5,200	5,100	5,000	4,950	4,925	4,900	4,875	4,850	4,825	4,800
	# OR/Hospital	14	14	15	15	15	15	15	15	15	16	16
US	# Hospitals	5,700	5,600	5,500	6,200	6,200	6,150	6,125	6,100	6,075	6,050	6,025
	# OR/Hospital	14	14	15	13	13	13	13	13	13	14	14
Top-down diagnostic	Total addressable market (in m)	n.a.	450	500	540	583.2	626.94	670.82	714.42	757.29	798.94	834.89

Source: Team analysis

Appendix 4.3: Beta computation

Company	Levered Beta	D/E	Tax rate	Unlevered Beta
IMAX	0.95	7.37%	5.0%	0.89
Dolby	0.84	0%	0%	0.84
Sony	1.55	36%	4.0%	1.15
NEC	0.78	64%	30.0%	0.54
LG Display	0.62	61.2%	0.0%	0.38
LogMeIn	1.14	6.7%	11.0%	1.08
Leyard	0.35	42.1%	15.0%	0.26
Novanta	1.5	56.31%	2.0%	0.97
Eizo	0.56	3.28%	25.0%	0.55
Panasonic	1.46	52.19%	19.0%	1.03
Ambarella	1.21	0.00%	18.0%	1.21
Qisda Corp	0.44	83.80%	20.7%	0.26
Seiko Epson Corp	1.28	26.35%	33.0%	1.09
VTRON	0.91	14.15%	15.65%	0.81
Median = Barco's Beta		31.32%		0.86

Source: Capital IQ

Appendix 4.4: Long term growth rate

	US	Europe	China
Inflation	2.10%	1%	2.8%
Real GDP growth	2.9%	1.9%	6.6%
Sales split	36%	36%	28%
g GDP	3.58%		
g inflation	1.90%		

Source: Team analysis

We computed several different long term growth rates but we base our DCF on the inflation of 1.90%.

Appendix 4.5: Sensitivity analysis

Share price (€)		LT growth rate				
		1.70%	1.80%	1.90%	2.00%	2.10%
LT WACC	4.24%	319.84	330.48	342.02	354.59	368.34
	4.49%	297.16	305.96	315.44	325.69	336.79
	5.01%	260.96	267.21	273.86	280.95	288.53
	5.26%	247.32	252.72	258.44	264.52	270.98
	5.51%	235.47	240.19	245.17	250.43	256.00
	5.76%	225.07	229.23	233.61	238.21	243.07
	6.01%	215.89	219.58	223.46	227.52	231.80

Source: Team analysis

Upside potential on Dec. 31		LT growth rate				
		1.70%	1.80%	1.90%	2.00%	2.10%
LT WACC	4.24%	46.05%	50.90%	56.17%	61.91%	68.19%
	4.49%	35.69%	39.71%	44.04%	48.72%	53.78%
	5.01%	19.16%	22.01%	25.05%	28.29%	31.75%
	5.26%	12.93%	15.40%	18.01%	20.78%	23.73%
	5.51%	7.52%	9.67%	11.95%	14.35%	16.90%
	5.76%	2.77%	4.67%	6.67%	8.77%	10.99%
	6.01%	-1.42%	0.27%	2.03%	3.89%	5.84%

Source: Team analysis

Appendix 4.6: Blue sky scenario

(In €m)	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Sales	**1108.00**	**1188.88**	**1261.52**	**1324.78**	**1386.98**	**1428.59**	**1471.45**
Sales growth	7.73%	7.30%	6.11%	5.02%	4.69%	3.00%	3.00%
COGS	612.73	646.68	681.65	711.53	741.20	760.67	780.90
%COGS	*55.30%*	*54.39%*	*54.03%*	*53.71%*	*53.44%*	*53.25%*	*53.07%*
Gross margin	**495.28**	**542.20**	**579.86**	**613.25**	**645.78**	**667.92**	**690.55**
SG&A	222.86	237.24	254.77	270.61	286.16	297.16	308.46
%SG&A	*20.11%*	*19.95%*	*20.20%*	*20.43%*	*20.63%*	*20.80%*	*20.96%*
R&D	121.88	130.78	138.77	145.73	152.57	157.14	161.86
%R&D	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*
EBITDA	**150.54**	**174.19**	**186.32**	**196.92**	**207.05**	**213.61**	**220.23**
EBITDA margin	*13.59%*	*14.65%*	*14.77%*	*14.86%*	*14.93%*	*14.95%*	*14.97%*
D&A	34.80	35.32	35.75	36.21	36.69	36.98	37.51
%D&A	*3.14%*	*2.97%*	*2.83%*	*2.73%*	*2.65%*	*2.59%*	*2.55%*
EBIT	**115.74**	**138.87**	**150.57**	**160.71**	**170.36**	**176.63**	**182.72**
Tc	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
NOPAT	**92.59**	**111.09**	**120.46**	**128.57**	**136.29**	**141.30**	**146.18**
D&A	34.80	35.32	35.75	36.21	36.69	36.98	37.51
CAPEX	27.70	30.32	32.29	34.44	36.75	38.57	40.46
Change in NWC	14.50	24.67	25.95	26.67	28.19	11.03	11.66
FCFF	**85.19**	**91.43**	**97.97**	**103.66**	**108.03**	**128.69**	**131.56**
TV							**3989.98**
DCF	**80.63**	**81.90**	**83.06**	**83.18**	**82.05**	**92.51**	**2804.21**

Source: Team analysis

Appendix 4.7: Doomsday scenario

	FY19E	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E
Sales	**1108.00**	**1160.74**	**1206.32**	**1244.44**	**1280.99**	**1306.91**	**1326.76**
Sales growth	7.73%	4.76%	3.93%	3.16%	2.94%	2.02%	1.52%
COGS	612.73	645.95	675.54	701.24	726.32	745.59	761.56
%COGS	55.30%	55.65%	56.00%	56.35%	56.70%	57.05%	57.40%
Gross margin	**495.28**	**514.79**	**530.78**	**543.20**	**554.67**	**561.32**	**565.20**
SG&A	222.86	237.42	249.66	260.42	270.70	278.38	284.76
%SG&A	*20.11%*	*20.45%*	*20.70%*	*20.93%*	*21.13%*	*21.30%*	*21.46%*
R&D	121.88	127.68	132.69	136.89	140.91	143.76	145.94
%R&D	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*	*11.00%*
EBITDA	**150.54**	**149.68**	**148.43**	**145.89**	**143.06**	**139.17**	**134.50**
EBITDA margin	13.59%	12.90%	12.30%	11.72%	11.17%	10.65%	10.14%
D&A	34.80	34.48	34.19	34.01	33.89	33.83	33.82
%D&A	*3.14%*	*2.97%*	*2.83%*	*2.73%*	*2.65%*	*2.59%*	*2.55%*
EBIT	**115.74**	**115.20**	**114.24**	**111.88**	**109.17**	**105.34**	**100.67**
Tc	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
NOPAT	**92.59**	**92.16**	**91.39**	**89.50**	**87.34**	**84.27**	**80.54**
D&A	34.80	34.48	34.19	34.01	33.89	33.83	33.82
CAPEX	27.70	29.60	30.88	32.36	33.95	35.29	36.49
Change in NWC	14.50	24.67	25.95	26.67	28.19	11.03	11.66
FCFF	**85.19**	**72.37**	**68.75**	**64.49**	**59.08**	**71.79**	**66.21**
TV							**2008.10**
DCF	**80.63**	**64.83**	**58.29**	**51.75**	**44.87**	**51.61**	**1411.32**

Source: Team analysis

Appendix 4.8: Restricted peer group for valuation

Name	Entertainment	Enterprise	Healthcare	Market cap (€m)	Business Description
Leyard				2,177.4	Chinese company specializing in LED manufacturing with a range of products including displays and lighting.
IMAX corporation				1,184.92	Canadian entertainment technology company, specializing in projection systems and large-format motion-picture presentations.
Dolby				6,344.83	American company that develops and produces audio, imaging, and voice technologies for cinema, home theaters, PCs, mobile phones, and games.
Eizo				731.59	Japanese visual technology manufacturer that produces LCD displays and display monitors for several industries.
Novanta				2,745.88	American supplier that provides technology solutions for medical and advanced industrial OEM customers. Its subsidiary, NDS Surgical, is a direct competitor of Barco in the healthcare industry.
NEC Corporation				9,717.74	Japanese technology company that integrates IT and network solutions to business enterprises, communications services providers, and government agencies.
Qisda				1,298.9	Taiwanese ODM/OEM service provider of electronic products for consumer, commercial, medical, and industrial applications.
VTRON GROUP				515.073	Chinese technology company that specializes in the research, development, manufacture, and distribution of video wall systems and solutions for control room applications.
LogMeIn				3,454.96	American company that provides SaaS and cloud-based services to support and improve collaboration.
BARCO				**2,581.5**	

Source: Team analysis

Appendix 4.9: Multiple analysis

Name	P/E FY19	EV/EBITDA FY19	EV/Revenues FY19	EV/EBIT FY19
Leyard	11.56×	11.25×	1.89×	13.62×
IMAX corporation	20.11×	8.88×	3.39×	16.65×
Dolby	19.44×	11.65×	4.39×	16.02×
Eizo	20.89×	8.87×	1.01×	13.22×
Novanta	41.88×	27.83×	5.40×	33.60×
NEC Corporation	15.43×	6.70×	0.59×	14.57×
Qisda	9.95×	7.04×	0.46×	10.69×
LogMeIn	15.56×	9.91×	3.25×	11.77×
VTRON GROUP CO LTD-A	40.10×	30.00×	3.10×	44.30×
Mean	**21.66×**	**13.57×**	**2.61×**	**19.38×**
Median	**19.44×**	**9.91×**	**3.10×**	**14.57×**
Barco	28.31×	16.06×	2.27×	21.54×

Source: Capital IQ

Appendix 4.10: Relative valuation

CCA (€)	Entertainment		Enterprise		Healthcare	
	EBIT FY19	**EBITDA FY19**	**EBIT FY19**	**EBITDA FY19**	**EBIT FY19**	**EBITDA FY19**
Barco	36.15	41.71	59.66	73.77	28.45	33.74
Avg peer multiple	15.22×	9.62×	18.03×	12.30×	19.17×	14.58×
EV estimate	550.05	401.28	1075.65	907.06	545.43	491.95
Avg EV estimate	475.67		991.36		518.69	
Net debt	-300.1					
Equity value estimate	2285.81					
Share price	**182.87**					

Source: Team analysis

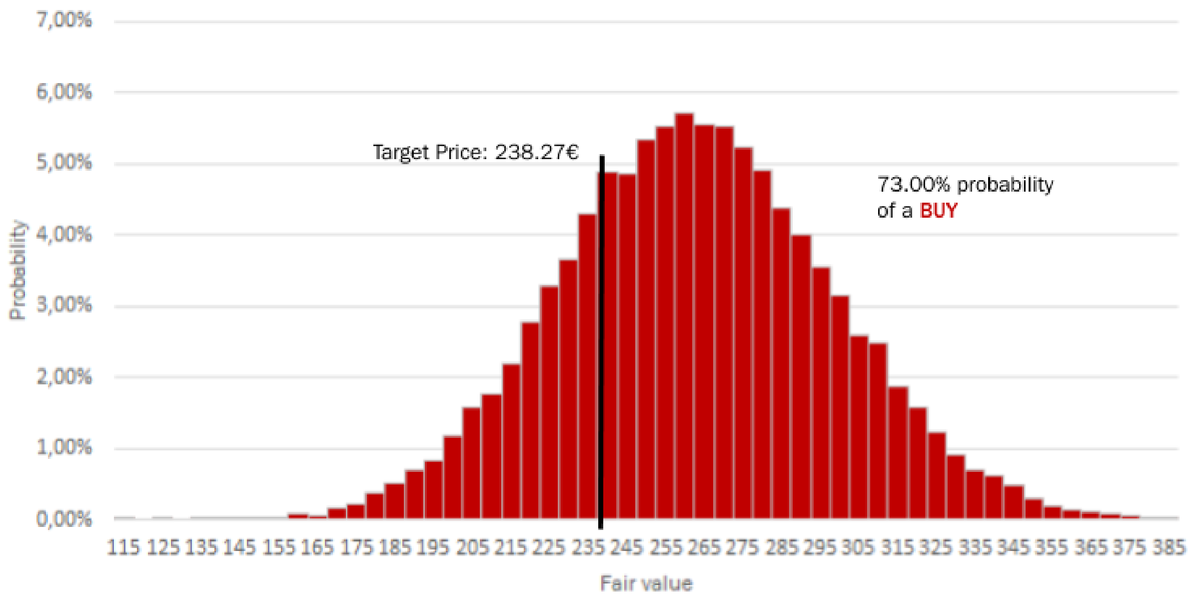
Appendix 4.11: Comparable transaction analysis

CTA (€m)	EBITDA FY19
Barco	149.40
Transaction multiple	13.9×
EV estimate	2076.7
Net debt	-300.1
Equity value estimate	2376.8
Share price (€)	**190.15**

Source: Team analysis

As explained in the relative valuation, we don't think that the EV/sales multiple is adequate for Barco. Using Capital IQ to retrieve past transactions in the technology hardware and equipment segment, deals have been closed on average at 13.9× the EBITDA *(Figure 42),* keeping in mind that companies are almost always acquired with a premium.

Appendix 4.12: Monte Carlo valuation



We assumed that EBITDA margins are normally distributed around 13.75% with 1.38% variance, with a symmetrical distribution around the EBITDA margin given by the management guidance and a dispersion of 10%. The long term growth rate is normally distributed with a mean of 1.9% and variance of 0.19% (10%). The long term growth rate is used for our DCF. These hypotheses have been made by the team to fit normal distributions. After 25000 iterations, we obtained Barco's share price distribution and a 73.00% chance to be above the target price.
Source: Team analysis