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PATENT-DRIVEN M&A – AN INSIDE-OUT APPROACH ON PRE- AND POST-ACQUISITION OPERATIONAL PERFORMANCE

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Abstract

The acquisition of technology entails one of the main knowledge gathering strategies of modern-day companies. This Work Project analyses the operational performance and the synergies in the acquisition of Osram Licht AG by ams AG. I find evidence of post-acquisition operational performance deterioration on key financial indicators such as operational margin, operational asset turnover, return on invested capital and return on equity, at least in the short-term. Even though this patent-driven acquisition generated a net synergy of EUR 2,648 million, non-negligible financial dyssynergies also seem to be present, particularly associated to higher WACC conditions.

Keywords: M&A; Operational Performance; Operational Synergies; Intangible Assets

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I. Introduction

a. General Background

The latest decades show the importance of knowledge-gathering as a strategic investment that sustain long-term competitive advantage of companies (Pickering and Matthews 2000; Argote and Ingram 2000; Soniewicki and Paliszkiewicz 2019). This leads to the growing emergence of ways to codify and protect knowledge, which in turn lead to the rise of patents' importance. Despite the generalised attention devoted to this topic, recent data shows that the manufacturing sector is lagging behind the most high-tech and innovation-based industries when it comes to patent exploitation. A recent survey conducted by Deloitte US shows that between 2009-2017, despite the heavy weight such sector holds in domestic GDP (circa 11%), R&D expenditure after the 2008 financial crisis seems to have stagnated around 3% per year. Such data appears to shed some light on the difficulties that the sector faces in carrying out an effective in-house innovation strategy.

Alongside with this trend, developing a successful M&A strategy has been a crucial part of worldwide operating companies. Such priority is therefore reflected on the latest data bundling carried out by Refinitiv: in 2021, a record of US$5.9 Trillion was conveyed into M&A activity. Out of the total M&A volume, S&P Global estimates that US$442.5 Billion have been attributable to the industrial sector, recording a 32% volume increase compared to the previous year (US$320.1 Billion). Nevertheless, the sector still places itself in the 5th place of the most dynamic M&A segments, having the second lowest positive change percentage-wise.

Sound research has contradictorily shown that significant relative size differences can either hinder post-acquisition financial performance (Ahuja and Katila 2001) or provide the adequate context for the exploitation of synergies, such as reinforced bargaining power and economies of scale/scope (Seth 1990). Therefore, it can be assumed that such criteria can be applied to a multitude of contexts, including whenever the value creation determinant of mergers and acquisitions mainly consists into the access to

Intangible Assets as a mean to unlock operational synergies (Gupta and Roos 2001) - such that, this principle seems to have been congruently reflected in a 2021 survey conducted by Ernest & Young, whereby respondents placed the acquisition of new technologies among the top priorities of their companies.

The above-mentioned context constitutes, thus, the backbone of this Work Project, whereby its main aim is to understand the operational impacts on the acquirer company whenever the target company holds a patent portfolio several times larger than the acquirer's. Since this circumstance is not common within the mergers and acquisitions industry, this Work Project is conveyed into a case study of the acquisition of Osram Licht AG (from now on, the "**Target Company**" or "**Osram**") by ams AG (henceforth, the "**Acquirer Company**" or "**ams**"), closed on 9 July 2020 (the "**Closing Date**").

b. The Case

The Acquirer Company is an Austrian-based company that focuses on the production of high-tech sensor solutions, mainly split into two large groups: (i) those intended to end-user applications, such as mobile and smartphones, wearable and gadgets or home appliances, and (ii) those conceived for industrial purposes, hence integrating the supply chain of leading appliance manufacturers. Out of this group, construction, medical and automotive industries represent the largest slice of the Acquirer Company's commercial partners.

The Acquirer Company seems to derive its competitive advantage from a differentiation strategy, implemented through complementary technology-led acquisitions. This strategy culminated into the acquisition of companies such as Heptagon (2016), Princeton Optronics (2017) and KeyLemon (2018), as a way to respectively gain access to leading technology on micro-optics and optical packaging, Vertical Cavity Surface-Emitting Lasers and 3-D face recognition software. All these complementary acquisitions aimed at creating, and subsequently fostering, a cluster on 3-D sensing and optical technologies, in which the Acquirer Company is recognized as a reference in the market.

In such a highly competitive market, the Acquirer Company faces the competition of, among others, the following main competitors: TDK, Teledyne Technologies, Renesas Electronics, Maxim Integrated and Nexperia.

Out of all these, (i) TDK represents the major competitor to the Acquirer Company due to its unique MEMS technology. By also engaging into an active and programmatic M&A strategy, TDK has been able to leverage upon such advantage by integrating it into its sensors manufacturing business units, mainly comprising former Tronics and InvenSense, acquired in 2016 and 2017, respectively; (ii) Teledyne Technologies also represents one of the Acquirer Company's main competitors: even though the company traditionally focuses its main activity on instrument manufacturing, it became a prominent market player on sensor-based imaging following the acquisition of the company e2v technologies, in 2017; (iii) Renesas Electronics is also a direct competitor in the semiconductor sector, which products overlap those of the Acquirer Company, particularly in the automotive and industrial segments; (iv) Maxim Integrated is a direct competitor of the Acquirer Company, predominantly in the categories of linear and mixed-signal appliances, where there is a partial end-market overlapping in the consumer, industrial and automotive segments; (v) finally, in the case of Nexperia, the company primarily focuses on security-related semiconductors development, thus only partially targeting the same range of customers as the Acquirer Company. In any case, it is a considerable competitor in the automotive segment, particularly following the acquisition of Freescale, in 2015, a well-established provider of semiconductor-based connectivity and display solutions in such market.

Comparatively to these companies, the Acquirer Company features a relatively smaller scale, therefore occupying a low-band market position revenue-wise (*cfr*. **Appendix 1**).

The Target Company is a German company that became a worldwide leading manufacturer in lighting appliances. However, during the latest years, the company started gradually shifting its main strategic focus to photonics solutions whereby sensors and semiconductors are combined to provide a seamless user experience. Even though such solutions are applied in a multitude of devices, the Target Company

operates mainly in the electronic consumer, automotive, industrial, medical and mainstream lighting markets.

It faces, nonetheless, the competition of companies such as (i) Signify, the world leader manufacturer in lighting devices and associated services that capitalizes a strong competitive advantage on connected lighting, when compared to its peers. Further to this, it also fosters its market position in this field by means of an active M&A strategy, vertically integrating companies such Klite (2019) and WiZ (2019), the later a prominent company on Wi-Fi connected lighting; (ii) Nichia, the worldwide leading end-to-end LED manufacturer, due to its superior ability to develop phosphor-based solutions; (iii) Seoul Semiconductor and (iv) Everlight, both companies offering an integrated range of products, comprising LED and sensor solutions and directly competing with the Target Company in the industrial, automotive, consumer and general lighting sectors; and (v) Cree, predominantly when it comes to the electric automotive and LED markets, where it provides a wide range of screen-based electronic devices particularly applied in the automotive sector.

In the case of Target Company, its relevant market position arises principally from its state-of-the-art LED manufacturing capabilities, which are in turn conveyed as a key input in broader manufacturing processes. Such competitive advantage is naturally translated into the third highest revenue worldwide in the LED segment (*cfr*. **Appendix 2**).

Further to the above, and according to information provided and filtered by Google Patent Search Engine, the Acquirer Company's patent portfolio comprised 2219 granted and applied patents on Closing Date. Following the combination of ams and Osram businesses, the company announced that it started disposing over 15000 patents, also applied and granted. Given the proportion of each patents' portfolios, this acquisition has been perceived as predominantly patent-driven, whereby the portfolio of the Target Company figured around 6.8 times larger than the one of the Acquirer Company. Therefore, by delving into the specifics of such transaction, it is expected to be possible to assess the unique characteristics of this deal and extract valuable insights regarding the impact of abnormally large patent

portfolios acquisitions on operational performance. This Work Project aims exactly at finding valuable insights on relatively unexplored indicators in the context of knowledge-based mergers and acquisitions.

II. Literature Review

Even though a significant number of researchers devote their effort analysing the performance effects that mergers and acquisitions produce upon involved parties, there does not seem to be unassailable consensus on whether such impact is positive, negative, or merely negligible. Some studies advocate a positive impact of M&A activity and anchor such findings on asset productivity and higher post-merger operating cash-flows relative to sector benchmark (Healy, Palepu and Rubak 1990; Ramaswamy and Waegelein 2003), the latter corroborated by an improvement in the post-acquisition operating margins measured by means of cash-flow-to-sales (Andrade, Gregor, and Stafford 2001).

On the contrary, some other studies show robust data on the above referred negative impacts of M&A activity, i.e., a deterioration of operating performance, particularly by comparing (i) the return on assets between acquirers and non-acquirers (Dickerson, Gibson and Tsakalotos 1997) and (ii) the pre- and post-acquisition operating cashflows, even when corrected by the existence of superior pre-acquisition performance (Ghosh 2001). It is also possible to find scientific literature that focuses on the post-M&A performance whenever the acquisition is perceived by the parties as a tool to restructuring the target companies. Despite the absence of evidence vis-à-vis targets, it is revealed that post-acquisition performance in a distressed context tends to deteriorate acquirers' financial strength, phenomenon that can nonetheless be largely explained by industry-related aspects (Clark and Ofek 1994).

Conversely, research conducted in the context of tender offers seems to lay down a neutral effect (i.e., some positive effects, others negative, ending up mutually offsetting the overall impact) on post-acquisition financial performance, thus failing to draw a generalizable consistent effect upon acquired companies' financial efficiency (Scherer 1988).

In addition, when post-acquisition performance research has been carried out in a geographic-sensitive way, research failed to find (i) significant and region-specific post-merger performance trends, identifying nonetheless a non-negligible amount of mergers that described a consistent pattern of profit increase alongside sales reduction (Gugler et al. 2003) and (ii) significant evidence that superior pre-acquisition profitability of European (UK included) acquirers and targets described a substantial decrease in the post-acquisition moment, when controlled by peer companies (Martynova, Oosting and Renneboog 2006).

As the acquisition of knowledge becomes a prominent competitive advantage for the long-term superior performance of companies, the access to Intangible Assets through mergers and acquisitions also turns into one vital activity of companies, thus a relevant field of academic research. The concepts of relatedness and complementarity between the patent portfolio of the acquirer and the target constitutes one of the main criteria for future potential value creation (Cassiman et al. 2005; Makri, Hitt and Lane 2009) and post-M&A integration success (Wubben, Batterink and Omta 2016). However, more strategic-aligned motivations also made their way among researchers, such as the strategic protection of the acquirer's operating business (Hagedoorn and Duysters 2002) or distinct market and tech positions (i.e., leading or incumbent companies, new enterers or market leader pretenders, or niche-only competitors) (Lin, Chen and Chu 2015).

Likewise, literature seems to suggest that companies tend to engage into M&A activity whenever they aim at (i) acquiring more complex and advanced operating-related Intangible Assets (Caviggioli, De Marco, Scellato and Ughetto 2017), (ii) preserving and mitigating the deterioration of their own patent portfolios and R&D capabilities (Higgins and Rodriguez 2005), but also when they (iii) pursue either an exploitation strategy envisaging the target's patent portfolio as a way to build upon already available technologies, or an exploration strategy so as to leverage upon new technological capabilities arising from the synergetic merger of two or more companies (Benner and Tushman 2003; Phene, Tallman and Almeida 2010).

However, when scientific literature zooms into acquirers' characteristics, there seems to be evidence that (i) relatively poorer innovative-wise companies are likelier to adopt an M&A strategy as a way to fill in their internal R&D capabilities gap and that (ii) lower pre-merger innovative levels tend to lead to the extraction of higher potential benefits from an innovation-led acquisition (Zhao 2009). Moreover, the profile of companies that play each role (i.e., acquirer and target) seems to be connected to R&D spending and the size of their portfolio of patents by the time of merger completion – those with high levels of R&D investment and small patent portfolios are likelier to become targets, whereas those with lower R&D budgets but with significant patent portfolios are likelier to become acquirers (Bena and Li 2014).

Besides, academic literature similarly focuses on how Intangible Assets affect companies' financial and innovation performance. In such regard, sound evidence seems to have been gathered pertaining to a positive relationship between the exploitation and adoption of Intangible Assets-based production methods and key financial and operational metrics such as return on investment, return on sales and return on assets (Pucci, Simoni and Zanni 2013). There also seems to be a close link between the deployment of such assets and more technology-led business models. In line with this, evidence shows that Intangible Assets are strictly connected to the specific business models adopted by companies, which in turn have a direct impact on companies' sales and return's levels (Cucculelli and Bettinelli 2015). The acquisition of large and diversified knowledge-bases incorporated under Intangible Assets also seem to be clearly associated with operational performance enhancement (Miller 2006).

Further to the above, absolute and relative sizes of acquirers' and targets' technological endowment seem to play a non-negligible role relative to post-acquisition innovation performance, where larger innovative-wise targets tend to improve acquirer's pre-merger poorer innovative productivity (Ahuja and Katila 2001).

Even though there seems to be intensive research conducted on how mergers and acquisitions relate to Intangible Assets and operational performance, this Work Project tries to fill not only a methodological

gap but also a perspectival one. With regard to the first, typical scientific literature approaches this topic by looking at metrics derived directly from the financial statements of their samples, as a way to compute key indicators (return on equity, return on assets, etc.). The methodological gap herein addressed by adopting an Operating, Non-Operating and Financial reformulation of the financial statements - as a precondition to evaluate the influence of Intangible Assets on firms' performance - has the objective of cancelling-out potential distortions that can easily be produced by Non-Operating or Financial assets and/or liabilities - which tend to have a null (or, at maximum, negligible) impact on how those relate to actual operational performance. Further to that, this Work Project also emphasises a different perspective from the one that is typically adopted in the above referred literature: by conveying a case-study format, it allows us to focus on the pre- and post-financial determinants that two companies (ams and Osram) had when approached their M&A strategy. Such method allows us to corroborate whether, in a context of patent-led acquisitions where the target company possesses a significantly larger portfolio of Intangible Assets, particularly under the form of patents, the typical characteristics and trends found in previous literature remain applicable to such specific context, or not.

III. Methodology

Given the scope of this analysis, this Work Project is conveyed in the format of a case study. Since our aim is to find relevant connections between financial variables in the context of large acquisitions of patent portfolios, i.e., portfolios' acquisitions that significantly surpass the acquirer's patent holdings, the best way seems to consist in deriving valuable insights from an illustrative example so that, at a later stage and when suitable scientific ground is laid down, generalisable research can be carried out. In such regard, and as explained in Section I (Introduction), the acquisition of Osram by ams fulfils a set of features that makes it a one-of-a-kind suitable case.

Therefore, this Work Project adopts an exploratory research method (as opposed to a confirmatory research method). The difference between those methods refers to the adopted processes and objectives. If on one hand a confirmatory (or prediction) method consists in a hypothesis-testing attempt, an

exploratory (or postdiction) research method focuses on a hypothesis-generating approach instead, as a way to come up with sound starting points for future or prospective research lines. Even though the later can be deemed as more prone to errors (Szollosi and Donkin 2021), it is in any case the most suitable method to lay down the research foundations and controls to avoid research biases and other methodologic problems, such as reproducibility, overconfidence, fudging or the so-called HARKing (Hypothesising After the Results are Known).

By comparison, the great advantage of exploratory research is that it lacks the need for a strict premeditated hypothesis, giving therefore room to incorporate whatever findings and insights that might arise from the data analysed. This is exactly the sort of approach that this analysis benefits from: since there does not seem to be many consistent cases of acquisitions of patent-portfolios that would allow us to derive information without skewing the results towards the largest players (typically with more complex financial structures that could prevent statistical control vis-a-vis other explanatory variables), it is possible to devise scientific advantages from beforehand creating the conditions to know, at a later stage, which relations ought to be (re)searched within a given data set - and also which analytical tools could be employed as a way to better control and isolate the relevant financial metrics and explanatory variables.

Further to this, using a large sample would amplify noise in any given dataset and combine transactions with different underlying motivations, which could in turn potentially distort results simply due to different levels of attention attributed to Intangible Assets throughout the post-acquisition integration process. Should relatively lower attention be given at the maximization of the acquired patent portfolio in some of the companies comprising a hypothetical dataset, any improvements or deterioration of operational performance could be attributed to misleading or unknown sources.

Therefore, and in order to control - to the extent possible - the role of financial variables that could significantly distort the assessment of pre- and post-merger financial performance, it is applied a Reformulation Method pertaining to both the Acquirer Company and Target Company's financial

statements within a relevant time frame: 5 years pre-merger and 6 years post-merger. This is where the first layer of methodological innovativeness lays: prior profitability assessments have been carried out by adopting an undistinguishable treatment to company's Operating and Non-Operating activities when evaluating financial indicators, typically merely taking information from the financial statements of companies. It is argued in this Work Project that such approach can be deceptive with regard to the effects that mergers and acquisitions produce over companies, since acquisitions aiming at operational synergies are typically led by operating business integration, as opposed to Non-Operating or Financial revenue streams derived from Non-Operating or Financial assets or liabilities, respectively. Furthermore, by looking at, among others, capitalised investments after deducting the relevant liabilities from the recorded assets, under the same Operating, Non-Operating or Financial classification, in practice it is being assessed the real needs of capital that such given company needs to invest in each part of its operations.

To achieve this ultimate goal of focusing into the company's operating fundamentals, the reformulation methodology was guided by the principles laid down in *Valuation – Measuring and Managing the Value of Companies* by Tim Koller, Marc Goedhart and David Wessels, with slight terminological and procedural adjustments to the exact applicable circumstances. Therefore, both Acquirer Company's and Target Company's Income Statement and Balance Sheet (*cfr.* **Appendixes 3** and **4**) were reorganised under an Operating, Non-Operating and Financial structure, based on the information comprised in each year's annual report. Due to lack or excessive aggregation of accounting information in the original financial statements, punctual assumptions have been introduced. Consistent with the above referred classification, statutory taxes and inherent tax adjustments have also been allocated depending on the Operating or Non-Operating nature of each underlying tax event.

Noteworthy in this context is also the 1-year lag introduced when computing Invested Capital during the periods under analysis. This adjustment is expected to turn our analysis on Asset Turnover (and, by extension, on Return on Invested Capital) more robust, since it fits well the principle that most

investments that companies make take some time prior to yielding results on profitability. For computational reasons, this approach was not followed when computing Operating, Non-Operating and Free Cash Flow, since part of the computations entail a change between FYs, and a lag would represent an excessive deviation from each one of them.

To the extent of available knowledge, this is the first time that research is conducted strictly focused on the potential effects of acquiring a large portfolio of patents, whereby the concept of operational performance is dissected into its genuine operating content, thus preventing non-operational and financial effects from distorting potential takeaways.

IV. Results

a. Pre-Acquisition

i. Operational Performance

According to the computations based on the Reformulated Versions of the Financial Statements (*cfr.* **Appendix 5** and **6**), prior to the acquisition, the Acquirer Company featured a non-consistent growth of its Operating Result, characterised by a sharp decrease from FY 2016 to FY 2018, followed by a significant recovery in FY 2019. Likewise, the Target Company's Operating Result over the same period followed a similar trend, ranging from a 54,33% growth from 2015 to 2016 to a negative change of 287,61% from 2018 to 2019.

Naturally, such different evolutionary patterns of each company's Operating Results would decisively affect their overall profitability performance. The first indicators where such impact becomes evident is the Operational Margin (*cfr.* **Appendix 7**). Once the Operating Result is weighted through the amount of revenues achieved in each FY, it is possible to verify that the Acquirer Company generally overperformed the Target Company throughout the pre-merger relevant period: despite achieving its lowest point in 2018 (0.78%), it remained positive during the whole period. As for the Target Company,

the Operational Margin described an opposite evolution, reflected into an inverted U-shape curve throughout the years 2015 to 2018, after which it sunk to negative 8.15% (FY 2019).

With respect to the Operating Invested Capital (*cfr*. **Appendix 5** and **6**), and despite some oscillations, the Acquirer Company also seems to carry out a steadier increase of its Operating investments than the Target Company, despite the progressive deterioration in FY 2018 and FY 2019, the later reaching a negative figure of 3.94%. In contrast, the Target Company swung from a negative growth rate of its Operating investments in FY 2015 (-4.98%) and FY 2016 (-17.91%), followed by a significant improvement in FY 2017 (22.38%) and FY 2018 (36.97%), and a subsequent deterioration prior to the acquisition in FY 2019 (9.02%).

However, when Operating Asset Turnover is computed, the Target Company showcased a much stronger revenue generation per unit of Operating capital deployed throughout the pre-merger period (*cfr*. **Appendix 8**). Respectively from FY 2015 to FY 2019, it ranged from 287.55% (the highest level) to 136.67% (the lowest level). In contrast, the Acquirer Company featured a positive but significantly less robust indicator, achieving its highest point in FY 2015 (113.23%).

When focusing on the Asset Turnover analysis specifically carried out for the Intangible Assets, it is possible to derive two very different exploitation patterns (*cfr*. **Appendix 9** and **10**). On one hand, the relative weight that such caption holds in the pre-merger moment is tremendously different in both companies. In the case of the Acquirer Company, Intangible Assets decreased over the pre-acquisition period, but represented a minimum of 46.63% in FY 2019 and a maximum of 66.22% in FY 2016 of the overall investment made in Operating Invested Capital. On the other hand, in the case of the Target Company, the portfolio of patents, licences, and other rights recorded a minimum weight of only 4.87% in FY 2015 and a maximum of 10.57% in FY 2019. Further to this, the Acquirer Company also recorded during this period a superior Operating Asset Turnover on its Intangible Assets, ranging from 50.67% in FY 2015 to 105.83% in FY 2016, whereas the Target Company's Asset Turnover on such investments remained relatively low between FY 2015 and FY 2018, followed by a modest increase in

FY 2019 (7.74%). Even if taking into consideration capitalized software development costs and capitalized development costs for other projects, the revenue exploitation derived from the Target Company's intangible property remained small-scale.

Through these main drivers it was possible to build the Return on the Invested Capital ("**ROIC**"), an insightful financial performance indicator that combined the ability of the Acquirer Company and the Target Company to generate income per unit of Invested Capital deployed.

In this aspect, Operating ROIC of both companies described a substantially different evolution throughout the pre-merger period (*cfr.* **Appendix 11**). It results clear a progressive deterioration of the Acquirer Company's Operating ROIC between FY 2015 (25.08%) and FY 2018 (0.45%), to partially recover only in FY 2019 (10.50%).The lowest value in this indicator – i.e., FY 2018 – has been mainly a consequence of (i) a relative increase of the weight of the Cost of Goods Sold in the revenue generated, alongside a (ii) lower level of revenue generation per unit of Properties, Plant and Equipment deployed and per unit of trade liabilities incurred. Nonetheless, it is still remarkable the maintenance of a positive Operating ROIC throughout the whole period, mainly sustained by an equally positive Operational Margin. With regard to the Target Company, the Operating ROIC evolution closely related to an inverted-U evolution, whereby it started increasing in FY 2015 (8.99%), reaching a spike in FY 2017 (17.87%), followed by a sharp decline until FY 2019 (-11.13%). Similarly to the Acquirer Company's, this downward evolution can be explained due to (i) a deterioration of revenues generated in FY 2019 in face of the Cost of Goods Sold incurred, as well as (ii) an hindered capacity of extracting higher revenue levels from Property, Plant and Equipment.

ii. Return on Equity ("ROE")

Looking into the ROE analysis, there seems to be evidence that the Target Company recorded a generally poorer track-record on this performance indicator than the Acquirer Company (*cfr.* **Appendix 12**, **13** and **14**). By computing the historical performance, it is possible to identify that up until the

acquisition, the Acquirer Company's shareholders benefited from an overall strong return on their equity investments, described by a V-shape evolution. In FY 2015, a ROE of 30% has been achieved, mainly driven by a very strong Operating activity performance, which contributed with 24.07% of such value. After a steady decrease of ROE until FY 2017 (-7.60%), ROE recovered to 31% in FY 2019. However, the relative contribution of the Acquirer Company's activities to such result quite differed from the one of FY 2015 – in such period, the Operating activity of the company was only responsible for 10.80%, the remainder contribution being attributable to both Financing and Non-Operating activities.

In contrast with this well-defined ROE evolution, the Target Company's shareholders benefited from a lower level of return upon their equity investments. In FY 2015 and FY 2016, the Target Company recorded a positive ROE of 11.33% and 17.75%, respectively, from which point onwards it featured a sharp decrease, reaching negative values in FY 2019 (-15.80%). However, its Operating activity can be construed as the main driver of the ROE performance, contributing each year, either positively or negatively, with the highest proportion of this financial metric on shareholders' return.

iii. Cashflow generation

Another prominent financial indicator to assess operational performance is cashflow. In this domain, the Acquirer Company recorded an unstable Operating Cashflow performance in the 5-year period prior to the acquisition, nevertheless achieving a relatively high figure in FY 2019, right before the acquisition taking place (*cfr.* **Appendix 15**).

In contrast with such pattern, the Target Company achieved a much stronger (and stabler) Operating Cashflow throughout the pre-acquisition period, having FY 2018 as the sole negative outlier when it recorded a negative figure of EUR 266 million.

b. Post-acquisition

i. Operational Synergies

Following the merger, the Acquirer Company is expected to generate synergies in three distinctive operational areas, in a two-to-three years' timeframe. From the consolidation of production and manufacturing procedures, particularly from its Asian operations, it is forecasted that it will be able to achieve synergies on Cost of Goods Sold amounting at least to EUR 120 million, per year. Furthermore, it is also forecasted a set of important integration procedures that are expected to lead to operational expenditure synergies in the amount of EUR 120 million, per year. Such synergies are deemed to derive from cost savings from marketing, branding, and back-office expenses, as well as an overall optimisation of the R&D programs in place. Finally, by leveraging upon complementary market strengths, particularly in the optical solutions sector, the Acquirer Company is expected to achieve at least EUR 60 million, per year, on revenue enhancement synergies.

After following a valuation approach consisting into assessing whether the combined value of the Acquirer Company and the Target Company was superior to a standalone basis valuation, it was possible to conclude that this merger is expected to generate overall net synergies with a present value of EUR 2,648 million.

ii. Operational Performance

When focusing on the post-merger indicators, the Acquirer Company presented relatively meagre operational profitability captured by Operating ROIC: in FY 2021 such indicator only advanced to 1.94%. These results were mainly driven by a modest Operational Margin of 2.59% in FY 2021, alongside an Operating Asset Turnover of 74.81%. However, and based on the post-acquisition Financial Statements and subsequent Operating Forecast Model (*cfr.* **Appendix 16**), that indicator is expected to consistently grow up until FY 2026, from which point onwards it is expected to reach 8.03% in the long-term, mainly constrained by the long-term growth rate adopted of 1.33% so as to reflect (i) the long-term GDP growth rate of Austrian and Germany and (ii) the weight that each business (ams and Osram) represent in the overall revenue generation of both combined firms.

Also of particular interest was the absolute reshape of the relative importance that Intangible Assets gained following the merger, both Operating Asset Turnover- and Operating Invested Capital weight-wise. In this regard, Asset Turnover on Intangible Assets achieves 80.41% in FY 2021 and the investment in Intangible Assets as a proportion of the total Operating investments becomes the most prominent, recording 60.16% in FY 2021.

iii. Return on Equity

After computing this very same indicator in the post-acquisition, the Acquirer Company recorded an utterly opposed metric in FY 2021. From the pre-acquisition scenario, the Acquirer Company's shareholders experienced a 64.52% decrease in their ROE, from 31% to 11% in FY.

iv. Cashflow generation

Also based on Forecast Model (*cfr.* **Appendix 16**), it is expected that the Acquirer Company consistently records higher Operating Cashflows when compared to the standalone situation, should both companies have not proceeded with the merger. In such regard, and if it is taken into account the latest explicit period of the Forecast Model, the Target Company is expected to achieve an Operating Free Cashflow of EUR 1,062 million, compared to an Operating cashflow of only EUR 272 million (Acquirer Company) and EUR 549 million (Target Company), should both companies remained unmerged (*cfr.* **Appendix 17**).

V. Discussion

As referred in Section IV (Results), the different evolutionary patterns show that the Acquirer Company consistently recorded a much stronger operational performance compared to the Target Company in terms of how it managed its operating cost structure. When the main drivers that caused the contrasting performances are assessed, it seems straightforward to conclude that its superior Operational Margin played a crucial role in achieving such results. Therefore, there seems to be evidence that this acquisition aimed at introducing relevant operational corrective measures in a post-acquisition moment, in the

absence of which the Acquirer Company would run the risk of deteriorating its own Operating Performance - particularly taking into account the relative size of both companies, thus potentially magnifying the impact in its financial metrics. In this regard, such objective seems to have been moderately accomplished in FY 2021, with the achievement of a 2.59% Operational Margin. In any case, and despite the apparent success by the Acquirer Company on shifting the needle to a positive figure given the Target Company's Operational Margin in FY 2019, such achievement seems to have been achieved by the Acquirer Company at a significant sacrifice of its pre-acquisition operational performance.

Also, when it comes to the post-acquisition Operating Asset Turnover, the Target Company's previous substantially higher figures seem to have been partially forfeited to achieve 74.81% in FY 2021. This conclusion becomes evident when comparing both companies' pre-and post-merger Operating Asset Turnovers, whereby such figure comes much closer to the - relatively poorer - historic performance of the Acquirer Company rather than to the Target Company's.

However, when assessing the post-merger Operating ROIC performance, its post-merger deterioration seems to be evident. Since this is the most comprehensive financial indicator that integrates both the ability of the company to manage its Operating cost structure and the efficiency with which it can extract income from its Operating assets, it can also be construed as an indicator of difficult post-merger integration.

On the relative status of Intangible Assets (particularly patent holdings), two aspects are of particular importance: (i) in the pre-merger context, the Acquirer Company and the Target Company developed completely opposite trends regarding their Operating Asset Turnover, whereby the Acquirer Company significantly decreased such financial indicator from FY 2016 to FY 2019 and the Target Company increased such holdings; and (ii) the relative weight that this caption occupied in the overall Operating Invested Capital is unequivocally different, having a much higher importance in the context of the Acquirer Company's Operating investments compared to the Target Company (despite the latter being

the holder of a much larger patent portfolio of patents). This may also be an insightful indicator of under-exploitation and inefficiency of the Target Company's portfolio of patents, as it carried out significantly large investments on Operating Invested Capital that were very poorly monetised, despite having a highly patent-dependent business model.

The ultimate consequence of such structural change, given the performance improvements highlighted in Section IV (Results) above on this particular category of assets, leads Asset Turnover on intangible property to levels closers to those achieved by the Acquirer Company prior to the merger and much superior to those of the Target Company, whilst integrating and leveraging upon a much bigger structure of the latter company. From the intersection of both Operating ROIC and Asset Turnover on Intangible Assets insights, it seems to be possible to derived the intuitions that (i) larger pools of Intangible Assets in the target company can play a positive integration tool to achieve high performance in a post-acquisition moment on asset-turnover, but also that (ii) excessive focus on the integration of Intangible Assets can lead to lower ability to conduct an overall integration, thus reflected in lower ROIC levels. In this later regard, macroeconomic negative conditions, such as the COVID-19 pandemic, do not seem to be a comprehensive explanation for the recorded Operating ROIC's deterioration, as the Acquirer Company actually managed to keep a revenue level in line with its expected order of magnitude in FY 2021 (EUR 5,038 million). Such assessment is based on the level of revenues reported by the Target Company alone in FY 2019 (EUR 3,046 milion) and those reported by the Acquirer Company alone in FY 2019 (EUR 1,885 million), which provide a revenue proxy reference of at least EUR 4,931 million. Such high level of revenues in a macroeconomic context characterised by an intense demand contraction and slowdown of economic activity seem to point towards the creation of the above referred revenue synergies, that countercyclically prevented further revenue decreases, should both companies kept their operations on a standalone basis.

By comparing the pre- and post-acquisition ROE levels, it seems that the acquisition has a favourable impact on the Target Company shareholders' return and a detrimental one on the Acquirer Company's

shareholders, at least in the short-term. To some extent, this finding is in line with, and is complementary to, the scientific literature that attribute most of the gains derived from M&A activity to the selling shareholders. Following the acquisition, and excluding the outlying FY 2017 whereby the Acquirer Company recorded a negative ROE (-7.60%), the latter failed to achieve the high levels of ROE that its shareholders had been benefiting from during the pre-merger timeframe under assessment. On the other hand, the Target Company's shareholders seemed to have been able to restore significantly better levels for their investment in equity in the post-merger period, when compared to those achieved in the closest FYs of such event. From this perspective, there seems to be an intuition that points to a trade-off borne by the Acquirer Company's shareholders, who choose to acquire a company particularly attractive due to its patent portfolio, at the expense of short-term returns on their equity investments.

Typically, cash flows tend to be the focus of investors, rather than just accounting increments (Bruner and Perella 2004). In this regard, based on the computations carried out, it is not possible to rule out a potential managerial bias attributable to the Acquirer Company's management team on their superior abilities to extract from the Target Company's high Free Cash Flow levels, which in turn would allow them to revert the long-standing negative Free Cash Flow pattern that their own company recorded from FY 2017 to FY 2019 (*cfr*. **Appendix 18**). In any case, based on the Forecasted Model, it seems possible to corroborate this managerial intention on producing positive - and large - operating cashflows in a post-acquisition moment (*cfr*. **Appendix 17**), driven by (i) particularly favourable market prospects on each of the segments the combine company operates and (ii) relevant operational synergies, which in the absence of the acquisition would not be monetizable.

Concerning the above, those operational synergies seem to arise from two distinct sources: (i) revenue enhancement and (ii) cost reduction. With respect to the first source, it is expected that by combining the Acquirer Company's and Target Company's capabilities, not only significant cross-selling, but also cross-branding opportunities, arise - the later already noticeable by the immediate aggregation of both companies' original names into one (ams Osram AG), suggesting a confederation integration method

aiming at leveraging each company's strong brand identity; as for the second operating synergies source, economies of scale and scope are expected to arise due to the projected company's ability to efficiently combine complementary plant and equipment exploitation, integrate logistics and distribution channels and enhance technology and know-how sharing, which shall in turn lead not only to higher product development capability on both sensors and lighting sectors, but also to future additional cost savings. It can be argued that the relatively ambitious operating synergies that the Acquirer Company expects to achieve in a relatively short period of time is intrinsically related to its innovative capability in the years after the merger – which are in turn strictly connected to its ability to monetise the large patent portfolio that becomes available and is perceived as the key enabler of the envisaged synergetic strategy.

By analysing the synergies valuation model in detail, it is possible to conclude that this merger created relevant operational synergies that enabled the creation of value. However, other key insight seems to be of importance, despite being relatively out-of-scope of this Work Project considering its primary operational focus: if it seems true that the Acquirer Company and the Target Company are worth more combined than if each one remained on a standalone basis, there seems to be significant financial dyssynergies associated to this operation. Such financial dyssynergies arise from a substantially higher Weighted Average Cost of Capital ("**WACC**") for the Acquirer Company (5.72% in FY 2021 and 7.30% for Terminal Value purpose), when compared to its pre-merger WACC of 2.56%. The drivers behind such financial dyssynergy can be attributed to a poorer exploitation of debt tax shields in the post-acquisition context, essentially derived from the dilution of the Acquirer Company's Net Debt-to-Equity ratio from 117.13% to 58.52%. Hence, by computing the joint value of both companies deducted from the operational synergies, it is possible to reach to a financial dyssynergy of EUR 506 million. This seems to represent one relevant source of pressure over management so as to implemented and monetise revenue growth and cost savings, making the value creation nature of this acquisition absolutely contingent on the effective and successful implementation of the envisaged operational synergies.

VI. Conclusions, limitations and directions for future research

a. Conclusions

One of the preliminary findings of this Work Project is that it failed to find support to the idea that companies with low R&D costs but with abundant patent portfolios are likelier to become acquirers (Bena and Li 2014), contradicted by the fact that the Operational Margin on R&D is significantly higher in the case of Acquirer Company than in the case of the Target Company throughout the entire pre-merger period (*cfr*. **Appendix 19**), despite the latter being the owner of a significantly larger patent portfolio.

Furthermore, it seems possible to conclude from this analysis that, at least in the short-term, the most prominent financial indicators worsened, comparing the pre- to the post-acquisition operational performance, particularly from the acquirer's perspective. In this regard, Operational Margin and Operating ROIC of the Acquirer Company achieve significantly lower levels than those recorded prior to the acquisition of the Target Company. And although the Operating Asset Turnover records a slight improvement, it is far from what could be expected, given the Target Company's leading performance on this indicator. When it comes to the ROE, the Acquirer Company's shareholders seem to end up worse-off when compared to the return they managed to extract from their equity investments in a pre-merger moment. In sharp contrast, the Target Company's shareholders may have been the major winners of this acquisition, since the acquisition allowed them to shift from a negative return in the year prior to the acquisition to a fairly reasonable return in FY 2021.

Also in terms of Cash Flow generation, there seems to be a definite pattern, whereby the Acquirer Company recorded consistent negative Free Cash Flows pre-acquisition, and the Target Company, despite registering them 2 years prior to the moment of acquisition (i.e., in FY 2018), shows based on its past records, ability to generate positive strong Free Cash Flows. When combined, the Forecasted Model features the reversal of the Acquirer Company's trend, showcasing the generation of strong positive Operating Cashflows throughout the explicitly forecasted period. This fact leads to the insight that points to an opportunistic acquisition by the Acquirer Company, perhaps convinced that under its

control it will be able to benefit from the Target Company's ability to generate strong cash flows. This aspect may, thus, represent a distinct signal of either (i) managerial bias by the Acquirer Company consistent on its ability to superiorly manage the Target Company (particularly by leveraging upon its vast portfolio of patents) or (ii) an attempt to repair the historic Acquirer Company's poorer Free Cash Flow generation performance. The deterioration of the overall ROIC may be perused as the immediate tradeoff on this managerial decision.

In any event, the Acquirer Company's management may have taken this decision based on a fairly prominent indication of their ability to extract revenues from Intangible Assets, as opposed to the Target Company's management. This evidence is highlighted from the acquirer's superior Operating Asset Turnover on Intangible Assets. Furthermore, such perception may also have been fostered by the Acquirer Company's management awareness of superior ability to reduce the overall weight that the cost structure has in obtaining a certain level of revenues. Even at the expense of a significant portion of the Acquirer Company's pre-acquisition Operational Margin, the relatively low (but positive) performance achieved in this indicator in the post-acquisition moment seems to back this intention.

Finally, the existence of significantly different proportions in Intangible Assets between acquirer and target may also entail a proxy indicator on how much each business models is dependent upon the exploitation of patents. If that is to be the case, the fact that the weight on Intangible Assets in the post-acquisition Operating Invested Capital becomes closer to the weight registered by the acquirer in the pre-acquisition period, seems to pave the way to argue that the acquisition of large portfolios of patents may entail the continuation of the acquirer's business model and the suppression of the one of the target companies.

As far as operational synergies are concerned, there seems to be reasons to argue that the acquisition of Intangible Assets is expected to be one of the key enablers of value creation, particularly reflected in higher revenue levels and in the exploitation of combined production processes and products, which in turn are anticipated to account for significant savings on Cost of Goods Sold (and other Operating

Expenses). In any case, the fact that the Acquirer Company faces a significant amount of financial dyssynergies arising from a higher WACC in the post-acquisition period may represent an important reflag in the context of large acquisition of patent portfolios: should those acquisitions entail the deterioration of WACC components, particularly the Net Debt-to-Equity ratio, in a way that deprives the acquirer from benefiting from larger tax shields, those need to be carefully considered when computing net synergies, by deducting them from envisaged operational synergies.

In general, our findings also seem to back the idea that the acquisition of companies with relatively abnormal large patent portfolios vis-à-vis acquirers represent an extra operational integration challenge. Intuitively this might make sense, since patents represent much more than just an exclusive exploitation rights on products or processes, but also entail underlying substance, such as a set of techniques, machinery, and/or skilled labors, which combination is contingent to post-acquisition integration success.

b. Limitations

Despite the insights gathered, it is important to note that this Work Project suffers from an important set of limitations. First of all, it is focused on one acquisition only, which despite providing valuable insights, hinders the ability to generalize any of them – even though that was not the main priority of this Work Project, as highlighted under Section III (Methodology). Second, given the timeframe in which this Work Project is carried out and the moment at which the acquisition of the Target Company took place, some conclusions are based on a Forecast Model, which inevitably entail a certain degree of predictive uncertainty. Finally, it cannot be excluded that the post-acquisition moment took place in a very specific pandemic context - such context may have influenced how some variables have performed throughout such period. In any case, it is understood that (i) the relatively high level of revenues achieved in FY 2021 and the fact that (ii) the pandemic effects significantly improved over time, provides enough confidence that most of the post-acquisition effects captured would still be verifiable under more straightforward circumstances. In this regard, any similar research based on a broader data set would

suffer from non-negligible skewness with respect to mergers and acquisitions carried out within the same timeframe.

c. Future research paths

For the reasons highlighted above, there seems to be plenty of paths for future research activity. Now that potential connections have been established between financial variables in the context of acquisitions of companies with large portfolios of patents, sufficient ground has been laid down to conduct a much broader, perhaps confirmatory, research. In such event, five main topics of research are worth being considered.

First of all, a hypothesis could be built in order to understand if, at least in the short-term, the acquisition of companies with large portfolios of patents entails, on average, a lower ROIC performance in the post-acquisition moment. Further to this, a sound research path could also comprise the confirmation that acquirer's typically evidence higher pre-merger ROE, whereas the target's shareholders feature lower (perhaps negative) return levels on their equity investments. Also, another potential research direction could relate to the differences on acquirer's and target's pre-acquisition cashflow levels: in this case, it could be verified whether companies with momentaneous low (or even negative) Free Cash Flows are likelier to become acquirers, and whether there is any pattern on large patent-holders' pre-acquisition cashflow generation levels. Moreover, it could be assessed whether the acquisition of large patent portfolios typically entail financial dyssynergies, namely due to WACC deterioration (and, if so, which driver is responsible for such finding). Finally, research attention could also be devoted trying to understand whether companies with superior Operational Margin and Asset Turnover on Intangible Assets are likelier to become acquirers, whereas those with lower levels of these indicators are likelier to become targets.

In the event that any of these research questions become the object of further analysis in the future, then the full purpose of this Work Project will be absolutely fulfilled.

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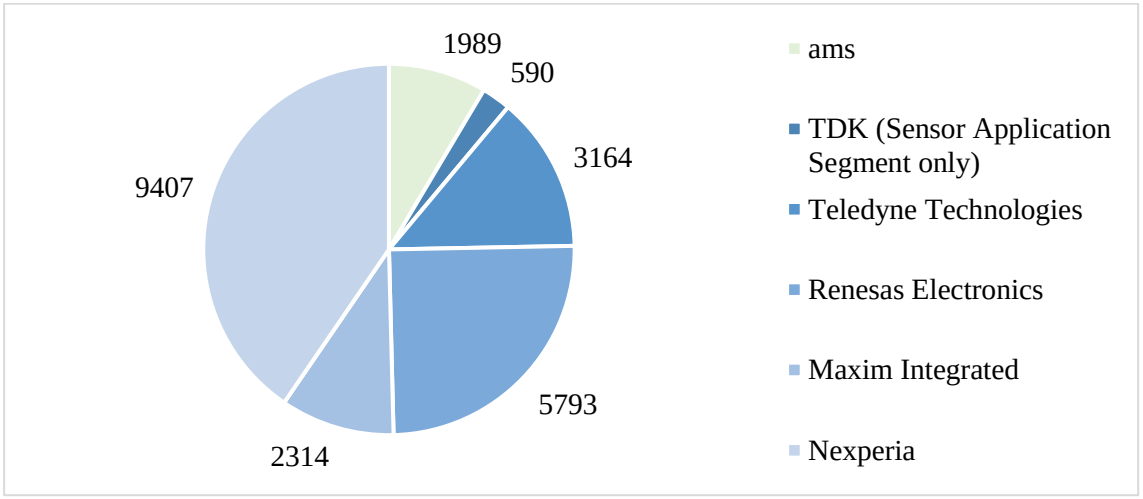
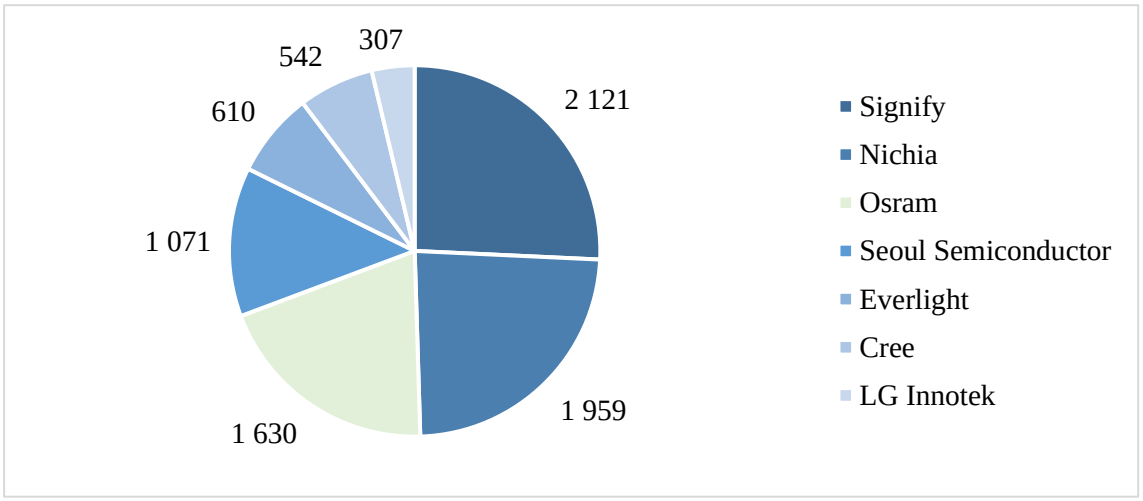
VIII. Appendixes

Appendix 1 – ams AG market position in the semiconductors sector, by revenues (in millions of EUR) in 2019



Source: companies' 2019 Annual Reports

Appendix 2 – Osram Licht AG market position among the main LED companies, by revenues (in millions of U.S Dollars) in 2019



Source: Statista

Appendix 3 (ams AG's Financial Statements)

Income Statement (as of December 31)						
(in thousands of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Revenues	464 370 €	623 100 €	549 940 €	1 063 773 €	1 426 306 €	1 885 265 €
Cost of sales	-211 132 €	-283 878 €	-261 850 €	-653 951 €	-1 038 386 €	-1 162 327 €
Gross profit	**253 238 €**	**339 222 €**	**288 091 €**	**409 822 €**	**387 920 €**	**722 938 €**
Research and development	-77 021 €	-107 770 €	-138 590 €	-213 995 €	-239 064 €	-261 180 €
Selling, general and administrative	-76 857 €	-93 525 €	-96 361 €	-139 261 €	-142 098 €	-174 968 €
Other operating income	7 821 €	8 096 €	39 886 €	21 432 €	10 388 €	62 537 €
Other operating expenses	-1 377 €	-503 €	-1 481 €	-1 943 €	-3 747 €	-18 765 €
Results from investment in associates	-455 €	1 750 €	1 717 €	-117 €	-514 €	-1 846 €
Result from operations	**105 355 €**	**147 269 €**	**93 263 €**	**75 938 €**	**12 885 €**	**328 716 €**
Finance income	1 219 €	14 192 €	8 888 €	50 232 €	130 926 €	48 331 €
Finance expenses	-2 466 €	-2 538 €	-4 905 €	-52 449 €	-52 483 €	-61 278 €
Net financing result	**-1 248 €**	**11 654 €**	**3 982 €**	**-2 217 €**	**78 443 €**	**-12 946 €**
Result before tax	**104 108 €**	**158 923 €**	**97 245 €**	**73 722 €**	**91 328 €**	**315 769 €**
Income tax result	-6 568 €	-10 256 €	**5 653 €**	**15 024 €**	**2 088 €**	**-15 953 €**
Net result	**97 540 €**	**148 667 €**	**102 898 €**	**88 745 €**	**93 416 €**	**299 816 €**
Basic Earnings per Share in EUR	1 €	2 €	2 €	1 €	1,14 €	3,74 €
Diluted Earnings per Share in EUR	1 €	2 €	1 €	1 €	0,61 €	3,64 €

Balance Sheet (as of December 31)						
(in thousands of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Assets						
Cash and cash equivalents	203 681 €	103 579 €	179 575 €	288 356 €	625 158 €	500 414 €
Trade receivables	78 992 €	88 734 €	97 155 €	284 799 €	121 015 €	201 892 €
Inventories	59 856 €	79 752 €	92 855 €	253 914 €	309 924 €	210 178 €
Other receivables and assets	18 286 €	28 663 €	33 422 €	77 103 €	38 021 €	129 696 €
Financial assets	25 993 €	40 321 €	36 259 €	104 007 €	0 €	0 €
Assets held for sale	0 €	0 €	0 €	0 €	0 €	86 097 €
Total current assets	**386 747 €**	**341 049 €**	**439 264 €**	**1 008 179 €**	**1 094 117 €**	**1 128 277 €**
Property, plant and equipment	204 096 €	256 631 €	319 250 €	996 876 €	1 206 516 €	1 130 078 €
Intangible assets	315 749 €	582 022 €	603 447 €	1 182 125 €	1 221 635 €	1 127 974 €
Rights of use	0 €	0 €	0 €	0 €	0 €	122 820 €
Investments in associates	6 549 €	1 876 €	2 278 €	1 896 €	2 960 €	27 878 €
Deferred tax assets	34 075 €	34 824 €	35 389 €	26 060 €	16 333 €	8 548 €
Other long-term assets	7 749 €	6 979 €	23 360 €	46 179 €	7 327 €	1 803 €
Financial assets	0 €	0 €	0 €	0 €	35 645 €	886 033 €
Total non-current assets	**568 218 €**	**882 332 €**	**983 723 €**	**2 253 136 €**	**2 490 416 €**	**3 305 134 €**
Total assets	**954 964 €**	**1 223 381 €**	**1 422 988 €**	**3 261 315 €**	**3 584 534 €**	**4 433 412 €**
Liabilities and shareholders' equity						
Liabilities						
Interest-bearing loans and borrowings	38 474 €	74 961 €	108 018 €	586 417 €	220 022 €	781 594 €
Trade liabilities	51 032 €	58 590 €	68 231 €	308 392 €	175 887 €	135 461 €
Income tax liabilities	0 €	46 333 €	36 750 €	28 118 €	16 455 €	19 649 €
Provisions	37 615 €	34 747 €	20 063 €	44 394 €	80 673 €	112 711 €
Other liabilities	42 096 €	30 972 €	31 449 €	546 864 €	55 552 €	153 396 €
Liabilities in regard to assets held for sale	0 €	0 €	0 €	0 €	0 €	1 336 €
Total current liabilities	**169 217 €**	**245 603 €**	**264 511 €**	**1 514 185 €**	**548 589 €**	**1 204 147 €**

Interest-bearing loans and borrowings	146 138 €	200 223 €	364 051 €	671 787 €	1 599 013 €	1 300 597 €
Employee benefits	27 015 €	32 449 €	36 965 €	40 215 €	40 319 €	48 981 €
Long-term provisions	27 125 €	0	0 €	0 €	0 €	0 €
Deferred tax liabilities	20 846 €	57 890 €	53 953 €	67 085 €	65 666 €	62 612 €
Other long-term liabilities	8 858 €	6 008 €	35 953 €	139 411 €	37 193 €	127 407 €
Total non-current liabilities	**229 983 €**	**296 569 €**	**490 921 €**	**918 498 €**	**1 742 191 €**	**1 539 598 €**
Shareholders' equity						
Issued capital	73 267 €	73 409 €	73 409 €	84 420 €	84 420 €	84 420 €
Additional paid-in capital	200 031 €	203 785 €	211 625 €	577 592 €	709 958 €	719 056 €
Treasury shares	-54 533 €	-77 612 €	-166 079 €	-190 812 €	-118 462 €	-134 133 €
Other reserves (translation adjustment)	38 119 €	60 288 €	59 860 €	-211 399 €	-18 148 €	9 902 €
Retained earnings	298 881 €	421 339 €	488 741 €	568 831 €	635 986 €	1 010 423 €
Total shareholders' equity and reserves	**555 764 €**	**681 209 €**	**667 556 €**	**828 632 €**	**1 293 754 €**	**1 689 667 €**
Total liabilities and shareholders' equity	**954 964 €**	**1 223 381 €**	**1 422 988 €**	**3 261 315 €**	**3 584 534 €**	**4 433 412 €**

Appendix 4 (Osram Licht AG's Financial Statements)

Income Statement (as of 30 September)						
(in millions of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Revenue	5 142 €	5 574 €	3 785 €	4 128 €	4 115 €	3 464 €
Cost of goods sold and services rendered	-3 529 €	-3 957 €	-2 432 €	-2 692 €	-2 800 €	-2 578 €
Gross Profit	**1 613 €**	**1 617 €**	**1 353 €**	**1 436 €**	**1 315 €**	**886 €**
Research and development expenses	-331 €	-345 €	-334 €	-364 €	-421 €	-418 €
Marketing, selling and general administrative expenses	-985 €	-1 064 €	-604 €	-697 €	-702 €	-612 €
Other operating income	41 €	63 €	6 €	30 €	38 €	33 €
Other operating expenses	-53 €	-8 €	-9 €	-7 €	-22 €	-234 €
Income (loss) from investments accounted for using equity method, net	36 €	5 €	306 €	-2 €	-4 €	-10 €
Interest income	3 €	3 €	2 €	7 €	3 €	2 €
Interest expenses	-41 €	-30 €	-17 €	-12 €	-10 €	-14 €
Other financial income (expenses), net	-3 €	4 €	-2 €	-1 €	0 €	-10 €
Income before income taxes OSRAM (continuing operations)	**279 €**	**239 €**	**701 €**	**389 €**	**197 €**	**-377 €**
Income taxes	-86 €	-68 €	-169 €	-114 €	-55 €	33 €
Income OSRAM (continuing operations)	▬	▬	**532 €**	**275 €**	**142 €**	**-343 €**
Loss discontinued operation	▬	▬	-134 €	-51 €	-2 €	-123 €
Net Income	**193 €**	**171 €**	**398 €**	**224 €**	**141 €**	**-467 €**
Attributable to:						
Non-controlling interests	5 €	5 €	1 €	3 €	3 €	-62 €
Shareholders of OSRAM Licht AG	188 €	166 €	397 €	220 €	137 €	-405 €
Basic earnings per share (in €)	1,80 €	1,59 €	3,84 €	2,27 €	1,42 €	-4,23 €
Diluted earnings per share (in €)	1,79 €	1,58 €	3,83 €	2,26 €	1,42 €	-4,22 €
Basic earnings per share (in €) OSRAM (continuing operations)	▬	▬	5,14 €	2,79 €	1,44 €	-2,94 €
Diluted earnings per share (in €) OSRAM (continuing operations)	▬	▬	5,12 €	2,78 €	1,44 €	-2,93 €

Balance Sheet (as of September 30)						
(in millions of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Assets						
Current Assets						
Cash and cash equivalents	668 €	727 €	457 €	609 €	333 €	310 €
Available-for-sale financial assets	1 €	1 €	1 €	2 €	0 €	0 €
Trade receivables	858 €	898 €	580 €	634 €	614 €	558 €
Other current financial assets	65 €	71 €	53 €	44 €	45 €	29 €
Contract assets	0 €	0 €	0 €	0 €	0 €	9 €
Inventories	1 152 €	987 €	655 €	662 €	743 €	692 €
Income tax receivables	29 €	58 €	52 €	35 €	49 €	21 €
Other current assets	91 €	93 €	192 €	112 €	151 €	113 €
Assets held for sale	3 €	95 €	1 136 €	2 €	49 €	93 €
Total current assets	**2 867 €**	**2 929 €**	**3 124 €**	**2 100 €**	**1 984 €**	**1 824 €**
Goodwill	38 €	77 €	77 €	148 €	369 €	186 €
Other intangible assets	106 €	133 €	113 €	142 €	296 €	273 €
Property, plant, and equipment	1 137 €	1 115 €	1 060 €	1 396 €	1 621 €	1 493 €
Right-of-use Assets	0 €	0 €	0 €	0 €	0 €	0 €
Investments accounted for using the equity method	62 €	1 €	0 €	66 €	66 €	56 €
Other financial assets	12 €	5 €	4 €	13 €	19 €	25 €
Deferred tax assets	425 €	452 €	384 €	314 €	309 €	410 €
Other assets	63 €	54 €	38 €	59 €	65 €	70 €
Total assets	**4 710 €**	**4 765 €**	**4 801 €**	**4 238 €**	**4 730 €**	**4 335 €**
Liabilities and Equity						
Current liabilities						
Short-term debt and current maturities of long-term debt	44 €	37 €	20 €	16 €	233 €	539 €

Trade payables	799 €	749 €	601 €	752 €	714 €	548 €
Other current financial liabilities	46 €	51 €	50 €	29 €	40 €	113 €
Current contract liabilities	0 €	0 €	0 €	0 €	0 €	14 €
Current provisions	124 €	105 €	98 €	75 €	74 €	69 €
Income tax payables	90 €	78 €	89 €	99 €	110 €	65 €
Other current liabilities	466 €	526 €	305 €	309 €	373 €	347 €
Liabilities associated with assets held for sale	0 €	0 €	785 €	0 €	12 €	90 €
Total current liabilities	**1 568 €**	**1 546 €**	**1 948 €**	**1 280 €**	**1 555 €**	**1 786 €**
Long-term debt	138 €	50 €	42 €	184 €	152 €	120 €
Pension plans and similar commitments	444 €	464 €	206 €	150 €	162 €	167 €
Deferred tax liabilities	1 €	11 €	2 €	10 €	14 €	17 €
Provisions	15 €	19 €	18 €	32 €	26 €	33 €
Other financial liabilities	0 €	2 €	2 €	10 €	24 €	27 €
Contract liabilities	0 €	0 €	0 €	0 €	0 €	1 €
Other liabilities	142 €	192 €	97 €	111 €	121 €	102 €
Total liabilities	**2 309 €**	**2 238 €**	**2 315 €**	**1 778 €**	**2 053 €**	**2 252 €**
Equity						
Common stock, no par value	105 €	105 €	105 €	105 €	105 €	97 €
Additional paid-in capital	2 026 €	2 033 €	2 035 €	2 035 €	2 034 €	1 672 €
Retained earnings	190 €	234 €	512 €	699 €	780 €	255 €
Other components of equity	57 €	100 €	60 €	5 €	3 €	79 €
Treasury shares, at cost	-3 €	-1 €	-237 €	-392 €	-386 €	-99 €
Total equity attributable to shareholders of OSRAM Licht AG	**2 376 €**	**2 470 €**	**2 473 €**	**2 452 €**	**2 536 €**	**2 004 €**
Non-controlling interests	25 €	12 €	13 €	8 €	140 €	79 €
Total equity	**2 401 €**	**2 482 €**	**2 486 €**	**2 460 €**	**2 676 €**	**2 083 €**
Total liabilities and equity	**4 710 €**	**4 765 €**	**4 801 €**	**4 238 €**	**4 730 €**	**4 335 €**

Appendix 5 (Reformulated Version of ams AG Financial Statements)

Income Statement (as of December 31) - Reformulated Version						
(in millions of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Operating Activity						
Revenues	464 €	623 €	550 €	1 064 €	1 426 €	1 885 €
COGS	-174 €	-236 €	-200 €	-503 €	-834 €	-886 €
Depreciation	-24 €	-30 €	-34 €	-72 €	-121 €	-180 €
Amortization	-13 €	-18 €	-28 €	-79 €	-84 €	-96 €
R&D	-77 €	-108 €	-139 €	-214 €	-239 €	-261 €
SG&A	-77 €	-94 €	-96 €	-139 €	-142 €	-175 €
Other Operating Income	8 €	8 €	40 €	21 €	10 €	63 €
Other Operating Expenses	-1 €	-1 €	-1 €	-2 €	-4 €	-19 €
Operating Result before taxes	**106 €**	**146 €**	**92 €**	**76 €**	**13 €**	**331 €**
Statutory taxes	26 €	36 €	23 €	19 €	3 €	83 €
Tax adjustments	15 €	29 €	31 €	-4 €	1 €	27 €
Operating Result	**95 €**	**138 €**	**99 €**	**53 €**	**11 €**	**275 €**
Non-Operating Activity						
M&A-related costs	0 €	0 €	0 €	-2 €	0 €	0 €
Income from subsidiaries	0 €	2 €	2 €	0 €	-1 €	-2 €
Financial Income	1 €	14 €	9 €	50 €	131 €	48 €
Non-Operating Result before taxes	**1 €**	**16 €**	**10 €**	**48 €**	**130 €**	**46 €**
Statutory taxes	0 €	4 €	3 €	12 €	33 €	12 €
Tax adjustments	4 €	1 €	-1 €	37 €	24 €	36 €
OCI	31 €	19 €	-1 €	-145 €	85 €	91 €
Non-Operating Result	**36 €**	**31 €**	**6 €**	**-72 €**	**207 €**	**162 €**
Financial Activity						
Financial Costs	-2 €	-3 €	-5 €	-52 €	-52 €	-61 €

Financing result before taxes	**-2 €**	**-3 €**	**-5 €**	**-52 €**	**-52 €**	**-61 €**
Statutory taxes	-1 €	-1 €	-1 €	-13 €	-13 €	-15 €
Financing result	**-2 €**	**-2 €**	**-4 €**	**-39 €**	**-39 €**	**-46 €**

Balance Sheet (as of December 31) - Reformulated Version						
(in millions of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Operating Business						
Operating Cash	9 €	12 €	11 €	21 €	29 €	38 €
Trade receivables	79 €	89 €	97 €	285 €	121 €	202 €
Inventories	60 €	80 €	93 €	254 €	310 €	210 €
Government grants related to R&D expenses	11 €	17 €	17 €	10 €	8 €	7 €
Amounts due from tax authorities	1 €	2 €	5 €	15 €	15 €	12 €
Prepaid expenses	3 €	3 €	3 €	7 €	5 €	4 €
Property, plant and equipment	204 €	257 €	319 €	997 €	1 207 €	1 130 €
Intangible assets	316 €	582 €	603 €	1 182 €	1 222 €	1 128 €
Rights of use	0 €	0 €	0 €	0 €	0 €	123 €
Trade liabilities	-51 €	-59 €	-68 €	-308 €	-176 €	-135 €
Income tax liabilities	0 €	-38 €	-35 €	83 €	-1 €	-12 €
Provisions	-37 €	-34 €	-19 €	-44 €	-49 €	-103 €
Other liabilities	-42 €	-31 €	-29 €	-50 €	-50 €	-71 €
Other long-term liabilities	-1 €	-2 €	-2 €	-10 €	-19 €	-14 €
Operating Invested Capital	**550 €**	**879 €**	**995 €**	**2 442 €**	**2 620 €**	**2 517 €**
Non-Operating Business						
Assets held for sale	0 €	0 €	0 €	0 €	0 €	86 €
Financial assets	26 €	40 €	36 €	104 €	36 €	886 €
Bank deposits pledged as collateral	0 €	0 €	0 €	37 €	0 €	0 €
Accrual for financial transaction costs	0 €	0 €	0 €	0 €	0 €	95 €

Other financial assets	4 €	6 €	9 €	8 €	10 €	12 €
Deferred interests	0 €	0 €	0 €	0 €	0 €	0 €
Investments in affiliates	7 €	2 €	2 €	2 €	3 €	28 €
Deferred tax assets	34 €	35 €	35 €	26 €	16 €	9 €
Other Long-Term Assets	8 €	7 €	23 €	46 €	7 €	2 €
Income tax liabilities	0 €	-9 €	-2 €	-112 €	-16 €	-7 €
Other liabilities	0 €	0 €	-2 €	-496 €	-5 €	-83 €
Liabilities in regard to assets held for sale	0 €	0 €	0 €	0 €	0 €	-1 €
Employees benefits	-27 €	-32 €	-37 €	-40 €	-40 €	-49 €
Deferred tax liabilities	-21 €	-58 €	-54 €	-67 €	-66 €	-63 €
Other long-term liabilities	-8 €	-4 €	-34 €	-130 €	-18 €	-113 €
Non-Operating Invested Capital	**23 €**	**-13 €**	**-23 €**	**-621 €**	**-72 €**	**802 €**
Financial						
Excess of cash	204 €	104 €	180 €	288 €	625 €	500 €
Debt	-185 €	-275 €	-472 €	-1 258 €	-1 819 €	-2 082 €
Provisions	-27 €	0 €	-1 €	-1 €	-31 €	-10 €
Net Financial Assets	**-8 €**	**-172 €**	**-294 €**	**-971 €**	**-1 225 €**	**-1 592 €**
Equity	**556 €**	**681 €**	**668 €**	**829 €**	**1 294 €**	**1 690 €**

Appendix 6 (Reformulated Version of Osram Licht AG Financial Statements)

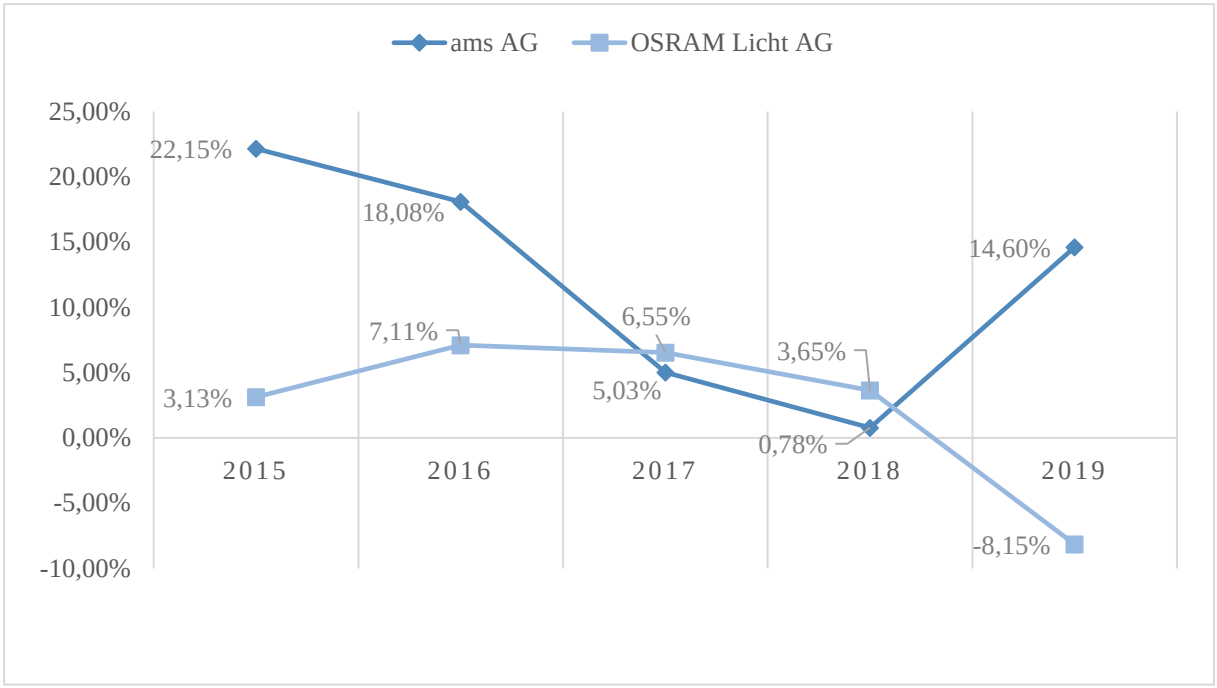
Income Statement (as of September 30) - Reformulated Version						
(in millions of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Operating Activity						
Revenues	5 142 €	5 574 €	3 785 €	4 128 €	4 115 €	3 464 €
COGS	-3 257 €	-3 664 €	-2 222 €	-2 468 €	-2 532 €	-2 057 €
Depreciation	-246 €	-263 €	-181 €	-202 €	-241 €	-469 €
Amortization	-26 €	-31 €	-29 €	-22 €	-27 €	-52 €
R&D costs	-331 €	-345 €	-334 €	-364 €	-421 €	-418 €
Marketing and SG&A	-985 €	-1 064 €	-604 €	-697 €	-702 €	-612 €
Other operating income	41 €	63 €	6 €	30 €	38 €	33 €
Other operating expenses	-53 €	-8 €	-9 €	-7 €	-22 €	-234 €
Operating Result before taxes	**284 €**	**264 €**	**412 €**	**398 €**	**208 €**	**-345 €**
Statutory taxes	86 €	80 €	124 €	120 €	63 €	-104 €
Tax adjustments	-14 €	-9 €	-19 €	-8 €	5 €	-41 €
Operating Result	**183 €**	**174 €**	**269 €**	**270 €**	**150 €**	**-282 €**
Non-Operating Activity						
Income from subsidiaries	36 €	5 €	306 €	-2 €	-4 €	-10 €
Interest income	3 €	3 €	2 €	7 €	3 €	2 €
Other financial income (expenses)	-3 €	4 €	-2 €	-1 €	0 €	-10 €
Non-Operating Result before taxes	**36 €**	**12 €**	**306 €**	**4 €**	**-1 €**	**-18 €**
Statutory taxes	11 €	4 €	92 €	1 €	0 €	-5 €
Tax adjustments	13 €	14 €	61 €	11 €	0 €	-38 €
Loss discontinued operation	0 €	0 €	-134 €	-51 €	-2 €	-123 €
OCI	35 €	20 €	-66 €	10 €	-23 €	67 €
Non-Operating Result	**73 €**	**42 €**	**75 €**	**-27 €**	**-26 €**	**-107 €**
Financial Activity						
Financial Costs	-41 €	-30 €	-17 €	-12 €	-10 €	-14 €

Financing result before taxes	**-41 €**	**-30 €**	**-17 €**	**-12 €**	**-10 €**	**-14 €**
Statutory taxes	-12 €	-9 €	-5 €	-4 €	-3 €	-4 €
Financing result	**-28 €**	**-21 €**	**-12 €**	**-8 €**	**-7 €**	**-10 €**

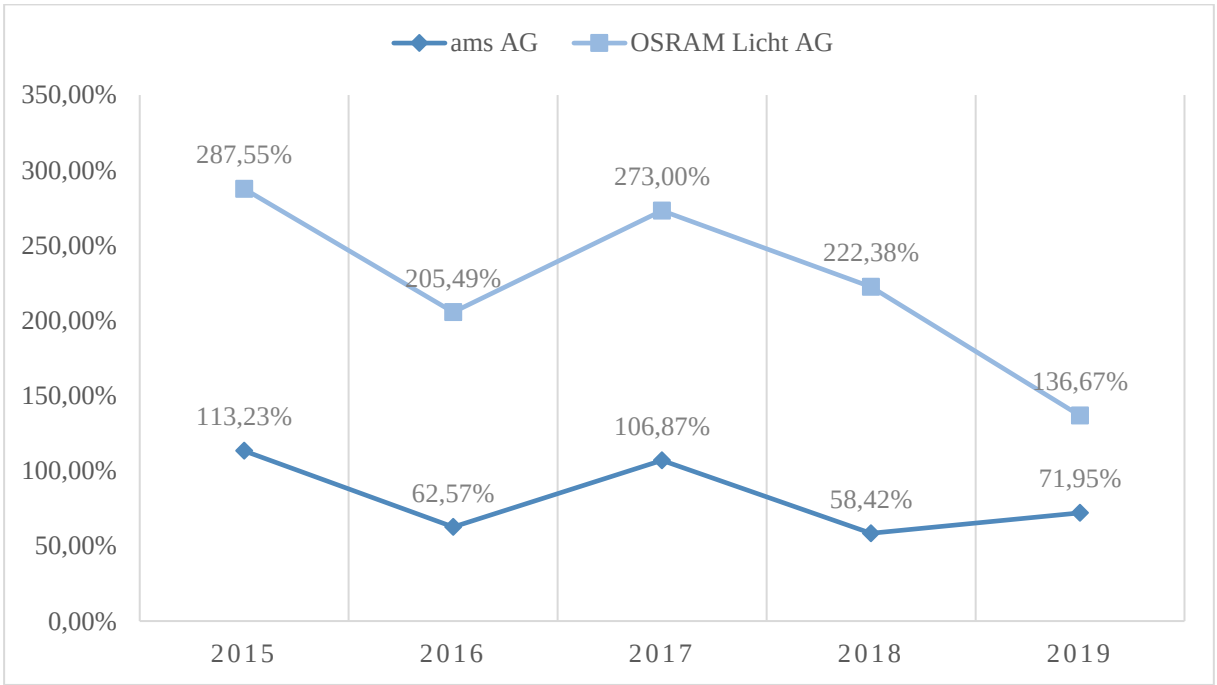
Balance Sheet (as of September 30) - Reformulated Version						
(in millions of EUR)	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Operating Business						
Operating Cash	103 €	111 €	76 €	83 €	82 €	69 €
Trade receivables	858 €	898 €	580 €	634 €	614 €	558 €
Contract assets	0 €	0 €	0 €	0 €	0 €	9 €
Inventories	1 152 €	987 €	655 €	662 €	743 €	692 €
Income tax receivables	29 €	58 €	52 €	35 €	49 €	21 €
Receivables from government grants	0 €	0 €	0 €	0 €	36 €	10 €
Prepaid expenses	28 €	32 €	23 €	50 €	61 €	41 €
Other current assets payments to customers related	16 €	16 €	15 €	27 €	34 €	35 €
Goodwill	38 €	77 €	77 €	148 €	369 €	186 €
Capitalized software development costs	2 €	1 €	1 €	1 €	3 €	3 €
Capitalized development costs for other projects	9 €	20 €	24 €	24 €	25 €	20 €
Patents, licenses, and other rights	94 €	112 €	89 €	118 €	268 €	250 €
Property, plant and equipment	1 137 €	1 115 €	1 060 €	1 396 €	1 621 €	1 493 €
Right-of-use Assets	0 €	0 €	0 €	0 €	0 €	0 €
Other assets	46 €	38 €	18 €	27 €	28 €	37 €
Trade payables	-799 €	-749 €	-601 €	-752 €	-714 €	-548 €
Current contract liabilities	0 €	0 €	0 €	0 €	0 €	-14 €
Provisions	-102 €	-93 €	-85 €	-72 €	-58 €	-59 €
Income tax payables	-64 €	-63 €	-70 €	-110 €	-133 €	-47 €
Other current liabilities	-466 €	-526 €	-305 €	-309 €	-373 €	-347 €

Contract liabilities	0 €	0 €	0 €	0 €	0 €	-1 €
Other liabilities	-142 €	-192 €	-97 €	-111 €	-121 €	-102 €
Operating Invested Capital	**1 938 €**	**1 842 €**	**1 512 €**	**1 850 €**	**2 535 €**	**2 306 €**
Non-Operating Business						
Available-for-sale financial assets	1 €	1 €	1 €	2 €	0 €	0 €
Other current financial assets	65 €	71 €	53 €	44 €	45 €	29 €
Tax receivables	65 €	61 €	174 €	66 €	57 €	44 €
Assets held for sale	3 €	95 €	1 136 €	2 €	49 €	93 €
Investment in affiliates	62 €	1 €	0 €	66 €	66 €	56 €
Other financial assets	12 €	5 €	4 €	13 €	19 €	25 €
Deferred tax assets	425 €	452 €	384 €	314 €	309 €	410 €
Overfunding of pension plans	0 €	0 €	0 €	0 €	0 €	16 €
Other current financial liabilities	-46 €	-51 €	-50 €	-29 €	-40 €	-113 €
Income tax payables	-26 €	-15 €	-19 €	11 €	23 €	-18 €
Liabilities associated with assets held for sale	0 €	0 €	-785 €	0 €	-12 €	-90 €
Pension plans and similar commitments	-444 €	-464 €	-206 €	-150 €	-162 €	-167 €
Deferred tax liabilities	-1 €	-11 €	-2 €	-10 €	-14 €	-17 €
Other financial liabilities	0 €	-2 €	-2 €	-10 €	-24 €	-27 €
Non-Operating Invested Capital	**116 €**	**143 €**	**688 €**	**319 €**	**316 €**	**241 €**
Financial						
Excess of cash	565 €	616 €	381 €	526 €	251 €	241 €
Debt	-182 €	-87 €	-62 €	-200 €	-385 €	-659 €
Non-controlling interests	-25 €	-12 €	-13 €	-8 €	-140 €	-79 €
Provisions	-36 €	-31 €	-32 €	-35 €	-42 €	-43 €
Net Financial Assets	**322 €**	**485 €**	**274 €**	**283 €**	**-316 €**	**-540 €**
Equity	**2 376 €**	**2 470 €**	**2 473 €**	**2 452 €**	**2 536 €**	**2 004 €**

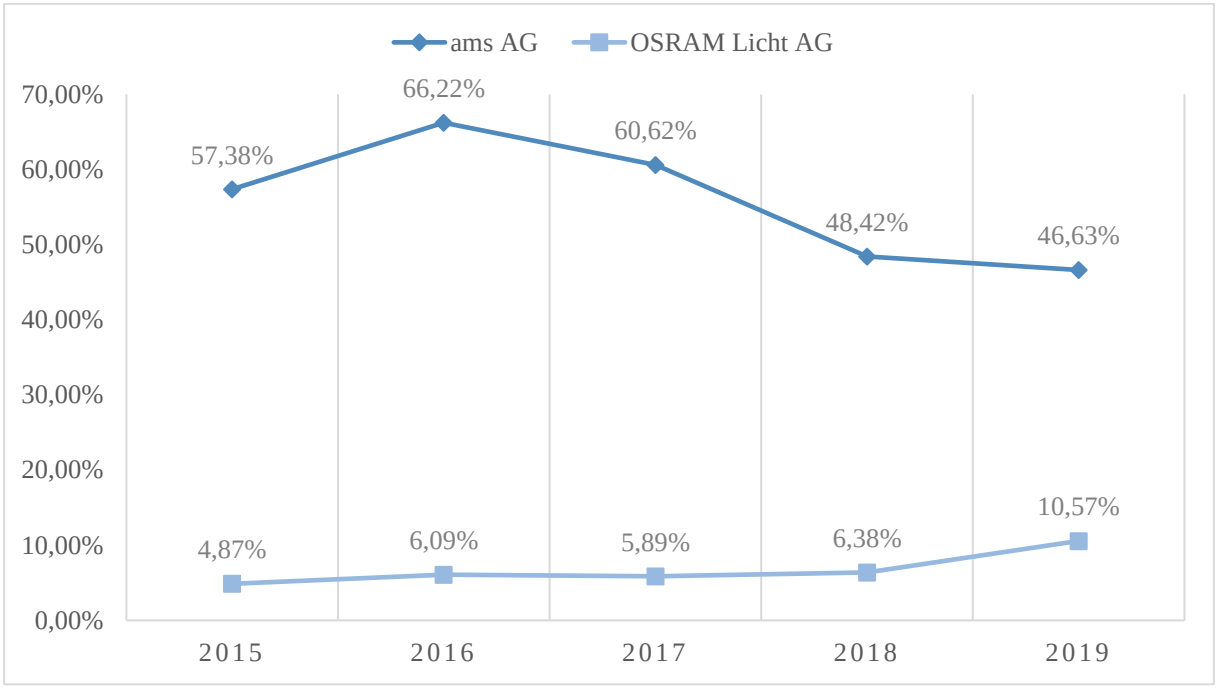
Appendix 7 – ams AG and Osram Licht AG Operational Margin, from 2015 to 2019



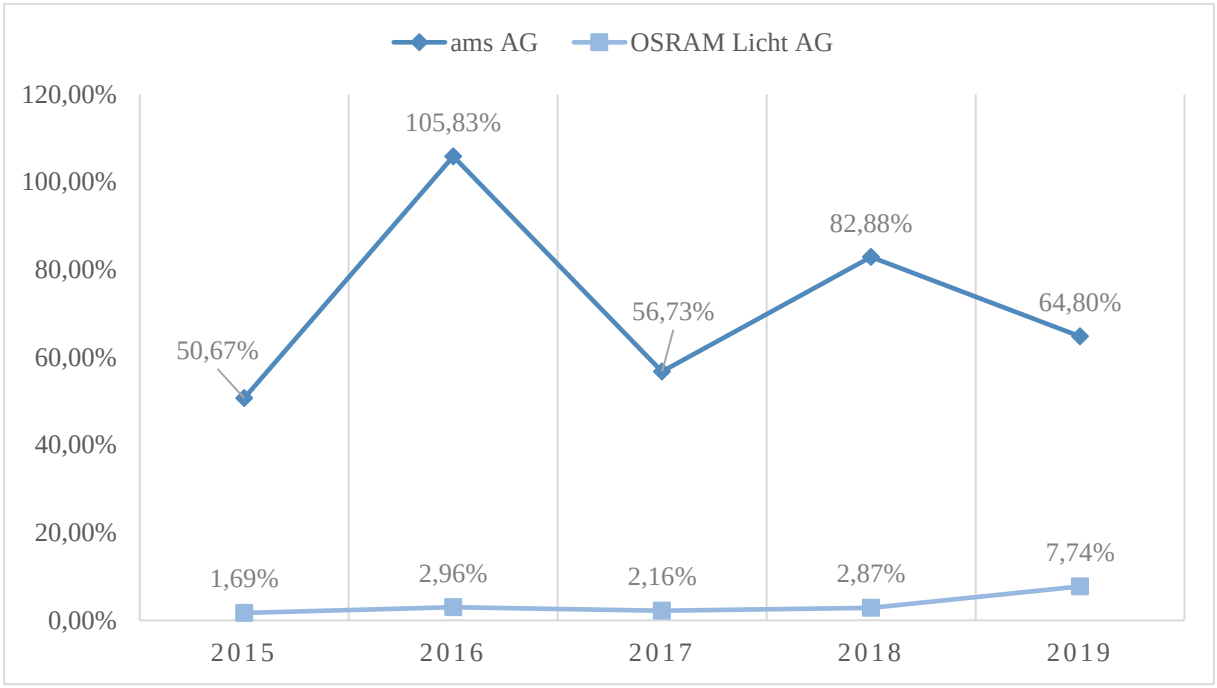
Appendix 8 - ams AG and Osram Licht AG Operating Asset Turnover, from 2015 to 2019



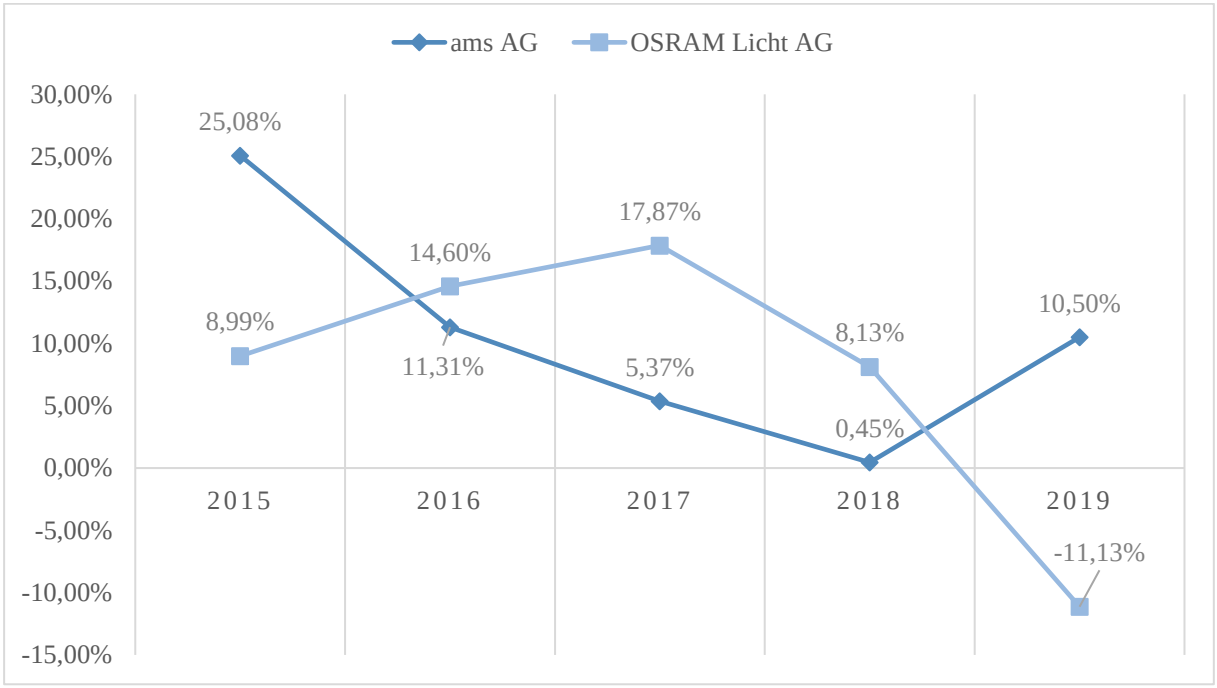
Appendix 9 – Intangible Assets' weight on ams AG's and Osram Licht AG's total Operating Invested Capital, from 2015 to 2019



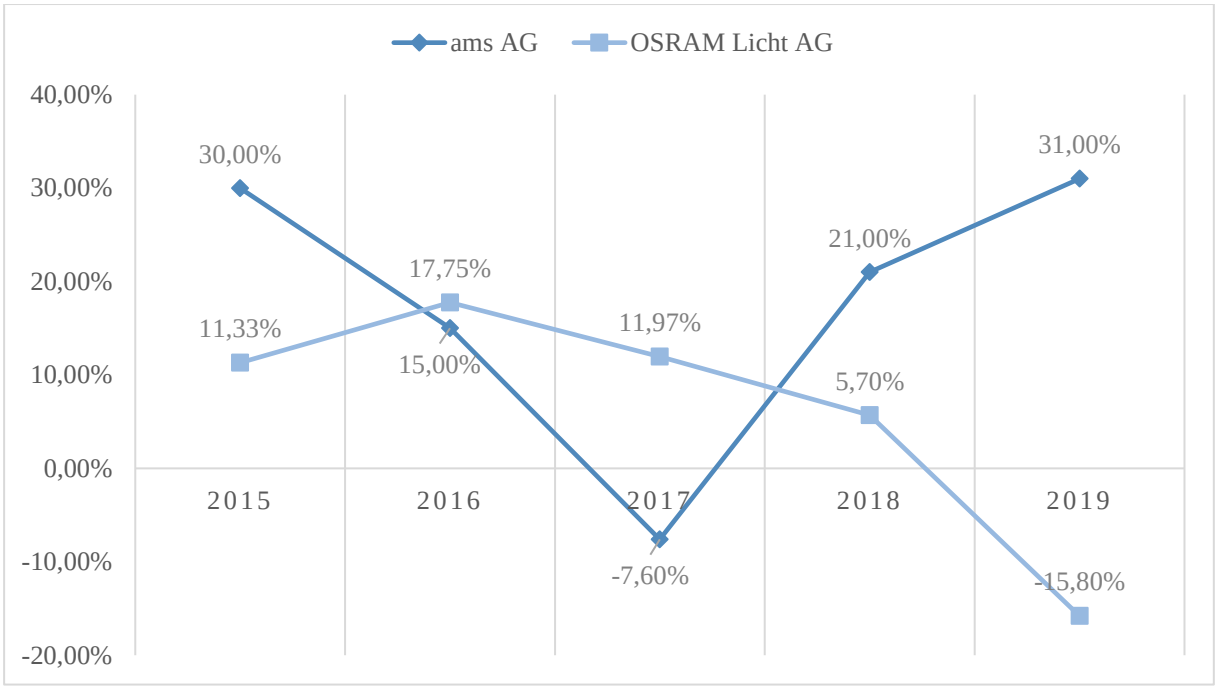
Appendix 10 – ams AG and Osram Licht AG Operating Asset Turnover on Intangible Assets, from 2015 to 2019



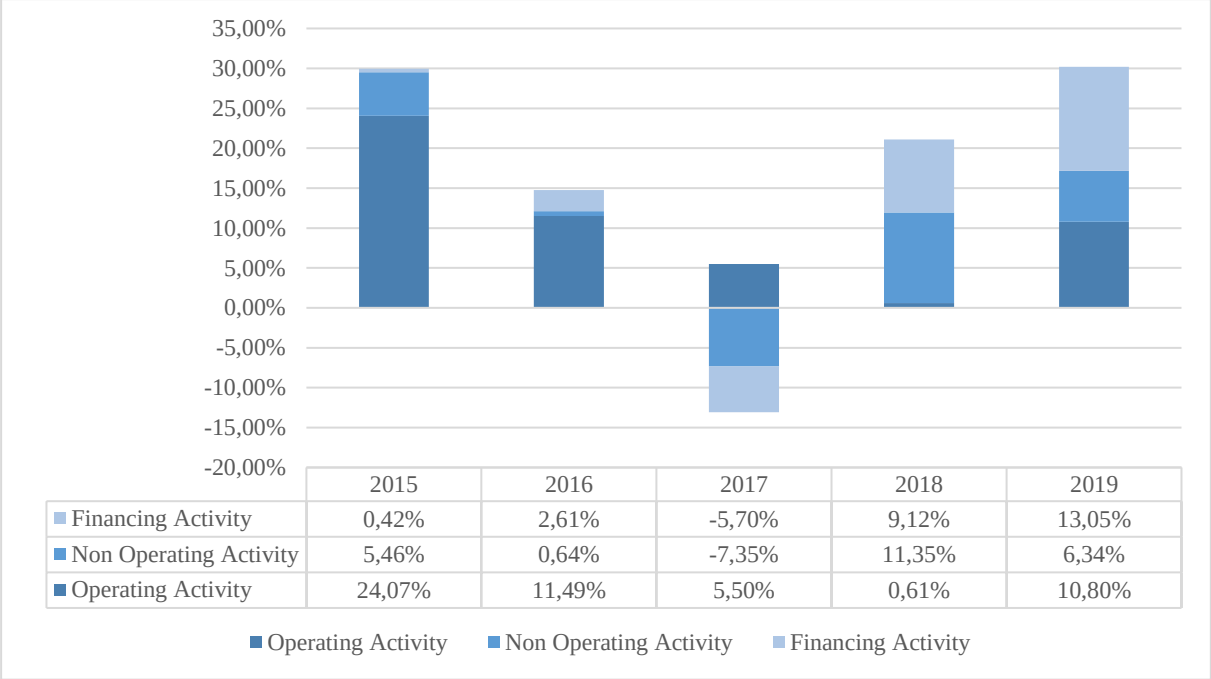
Appendix 11 – ams AG and Osram Licht AG Operating Return on Invested Capital, from 2015 to 2019



Appendix 12 – ams AG and Osram Licht AG Return on Equity, from 2015 to 2019

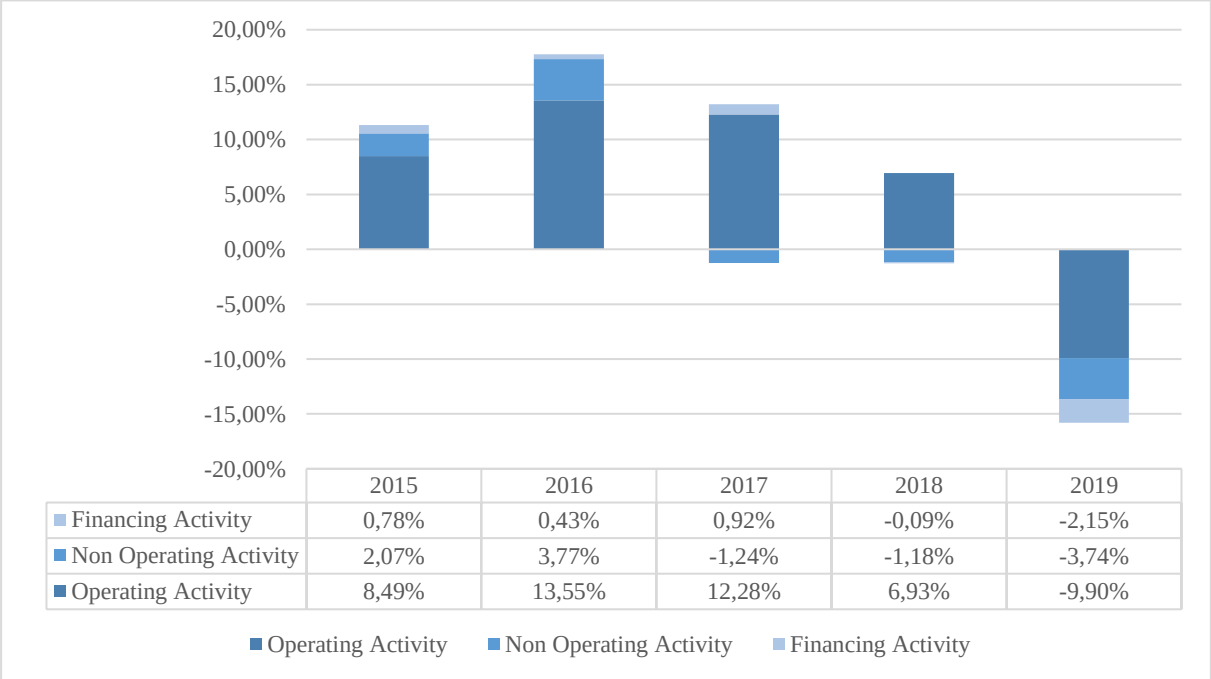


Appendix 13 – ams AG Return on Equity breakdown by activity, from 2015 to 2019



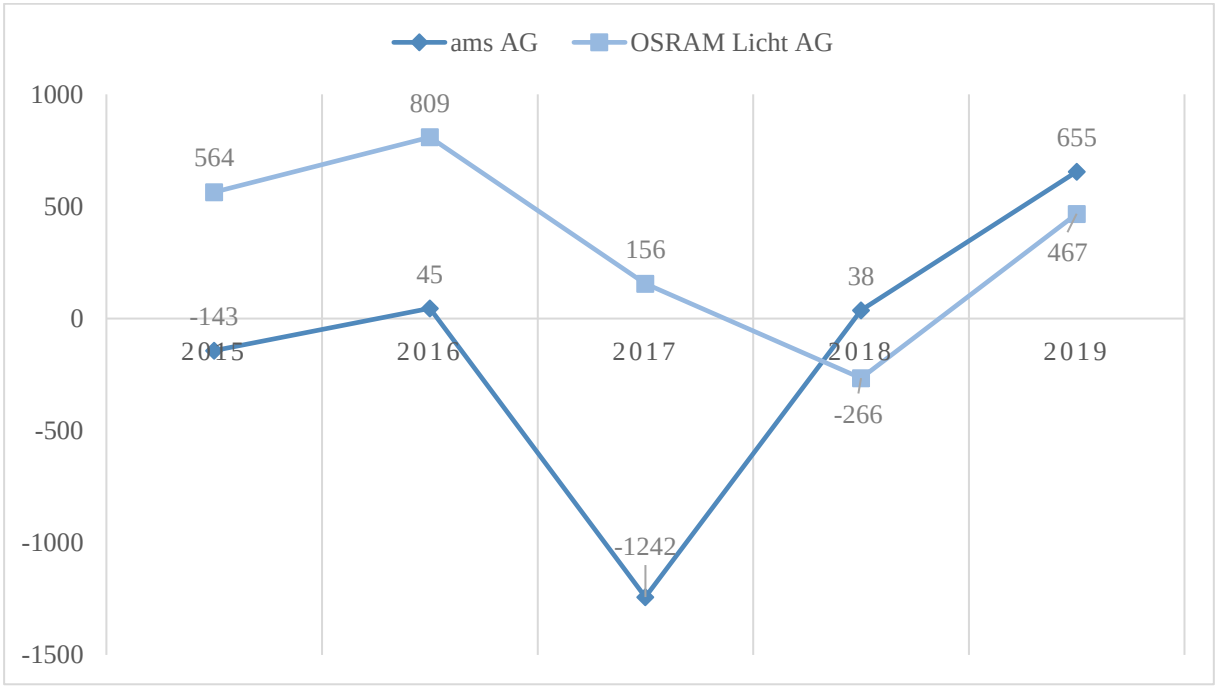
	2015	2016	2017	2018	2019
Financing Activity	0,42%	2,61%	-5,70%	9,12%	13,05%
Non Operating Activity	5,46%	0,64%	-7,35%	11,35%	6,34%
Operating Activity	24,07%	11,49%	5,50%	0,61%	10,80%

Appendix 14 – Osram Licht AG Return on Equity breakdown by activity, from 2015 to 2019



	2015	2016	2017	2018	2019
Financing Activity	0,78%	0,43%	0,92%	-0,09%	-2,15%
Non Operating Activity	2,07%	3,77%	-1,24%	-1,18%	-3,74%
Operating Activity	8,49%	13,55%	12,28%	6,93%	-9,90%

Appendix 15 – ams AG and Osram Licht AG Operating Cashflows, from 2015 to 2019, in millions of EUR



Appendix 16 – Post-acquisition Operating Forecast Model

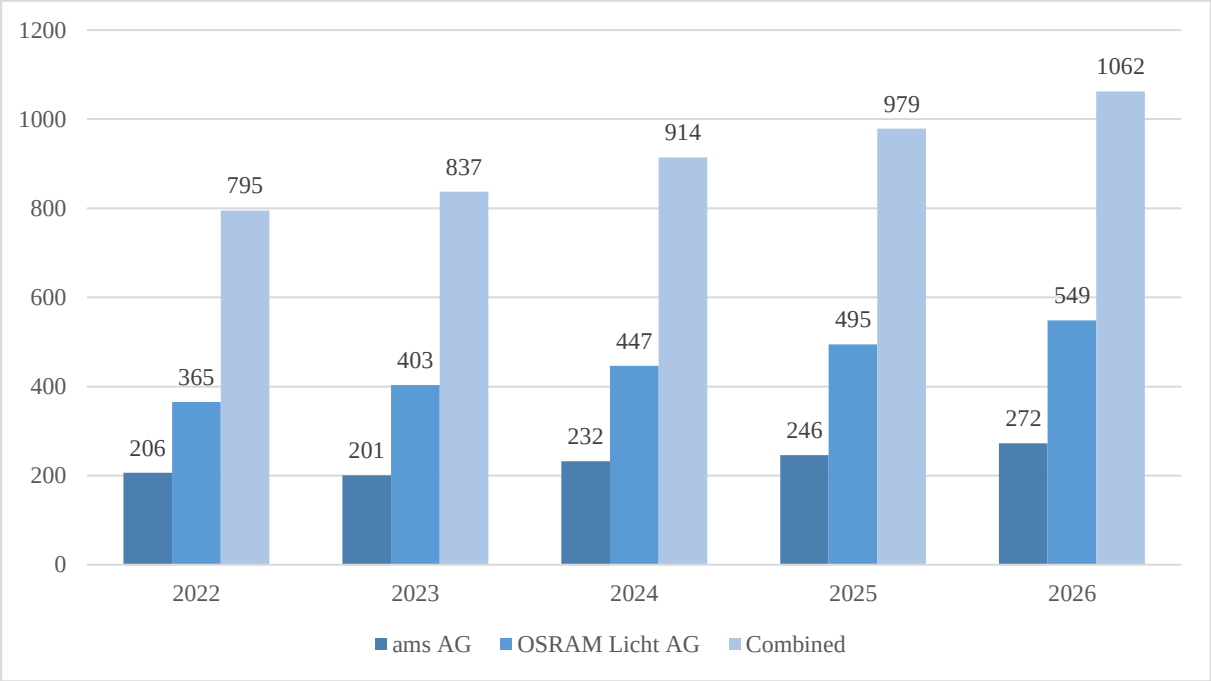
Income Statement (as of December 31) - Reformulated Version							
(in millions of EUR)	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	∞
	Historic Performance	Forecasted Performance					
Operating Activity							
Revenues	5 038 €	7 107 €	7 885 €	8 730 €	9 672 €	10 723 €	10 866 €
Total Revenues Growth		41,06%	10,95%	10,72%	10,79%	10,87%	1,33%
● Revenue Breakdown by Business							
Consumer	⊢	⊢	⊢	⊢	⊢	⊢	⊢
Revenue Growth on Consumer Business							
Non-Consumer	⊢	⊢	⊢	⊢	⊢	⊢	⊢
Revenue Growth on Non-Consumer Business							
OSRAM	⊢	⊢	⊢	⊢	⊢	⊢	⊢
Revenue Growth on OSRAM Business							
Semiconductor	3 279 €	4 311 €	4 691 €	5 094 €	5 534 €	6 015 €	6 106 €
Synergy effect	15	25	35	35	35	35	35
Revenue Growth on Semiconductor Business		31,47%	8,81%	8,60%	8,64%	8,69%	1,51%
Lamps & Systems	1 760 €	3 928 €	4 457 €	5 046 €	5 713 €	6 468 €	6 541 €
Synergy effect	5	15	25	25	25	25	25
Revenue Growth on Lamps & Systems Business		123,17%	13,48%	13,21%	13,22%	13,23%	1,12%
Reconciliation to consolidated financial statements		-1 132 €	-1 263 €	-1 410 €	-1 575 €	-1 760 €	-1 780 €
● Revenue Breakdown by Region							
EMEA	1 413 €	1 993 €	2 211 €	2 448 €	2 713 €	3 008 €	3 048 €
Weight on Total Revenues	28,05%	28,05%	28,05%	28,05%	28,05%	28,05%	28,05%
Americas	962 €	1 357 €	1 506 €	1 667 €	1 847 €	2 048 €	2 075 €
Weight on Total Revenues	19,09%	19,09%	19,09%	19,09%	19,09%	19,09%	19,09%

Asia / Pacific	2 663 €	3 756 €	4 168 €	4 614 €	5 112 €	5 668 €	5 744 €
Weight on Total Revenues	52,86%	52,86%	52,86%	52,86%	52,86%	52,86%	52,86%
COGS	-2 903 €	-3 986 €	-4 386 €	-4 875 €	-5 421 €	-6 031 €	-6 113 €
Synergy effect	40	80	120	120	120	120	120
COGS (% of Revenues)	-57,62%	-56,09%	-55,62%	-55,85%	-56,05%	-56,25%	-56,25%
Depreciation	-544	-571	-601	-632	-665	-699	-736
Depreciation (% PP&E)	-33,85%	-18,54%	-18,46%	-18,38%	-18,30%	-18,23%	-18,15%
Amortization	-161	-177	-194	-213	-234	-258	-262
Amortization (% Intangible Assets)	-4,04%	-6,69%	-6,75%	-6,81%	-6,86%	-6,92%	-6,92%
R&D	-642 €	-926 €	-1 006 €	-1 118 €	-1 243 €	-1 382 €	-1 402 €
Synergy effect	20	40	60	60	60	60	60
R&D (% of Revenues)	-12,74%	-13,03%	-12,76%	-12,81%	-12,85%	-12,89%	-12,90%
SG&A	-745 €	-965 €	-1 056 €	-1 181 €	-1 321 €	-1 476 €	-1 496 €
Synergy effect	20	40	60	60	60	60	60
SG&A (% of Revenues)	-14,79%	-13,58%	-13,40%	-13,53%	-13,65%	-13,77%	-13,76%
Other Operating Income	228 €	96 €	105 €	116 €	129 €	142 €	144 €
OPI (% of Revenues)	4,53%	1,35%	1,34%	1,33%	1,33%	1,33%	1,33%
Other Operating Expenses	-51 €	-38,48 €	-42,56 €	-47,10 €	-52,16 €	-57,79 €	-58,59 €
OOE (% of Revenues)	-1,01%	-0,54%	-0,54%	-0,54%	-0,54%	-0,54%	-0,54%
Operating Result before taxes	**230 €**	**539 €**	**704 €**	**779 €**	**865 €**	**961 €**	**944 €**
Statutory taxes	58 €	135 €	176 €	195 €	216 €	240 €	236 €
Statutory Tax Rate	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%
Tax adjustments	-42 €	20 €	23 €	26 €	29 €	33 €	33 €
Tax adjustments (% of Core Result before Taxes)	-18,26%	3,76%	3,26%	3,34%	3,41%	3,46%	3,45%
Operating Result	**131 €**	**424 €**	**551 €**	**611 €**	**678 €**	**754 €**	**741 €**

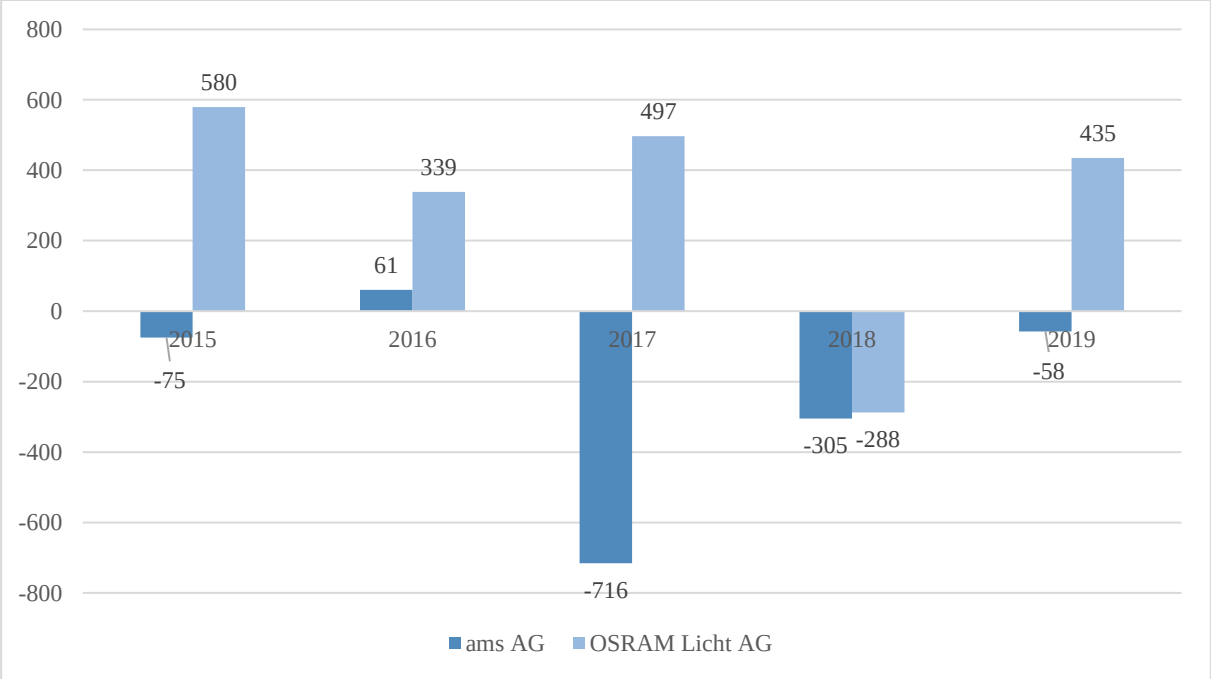
Balance Sheet (as of December 31) - Reformulated Version							
	Historic Performance	Forecasted Performance					
(in millions of EUR)	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Operating Business							
Operating Cash	101 €	141 €	156 €	173 €	192 €	213 €	216 €
Operating Cash (% Revenues)	2,00%	1,99%	1,98%	1,99%	1,99%	1,99%	1,99%
Trade receivables	688 €	1 020 €	1 131 €	1 256 €	1 394 €	1 549 €	1 569 €
Average Collection Period	49	43	49	49	49	49	52
Inventories	938 €	1 277 €	1 415 €	1 568 €	1 740 €	1 931 €	1 957 €
Days to sell inventory	116	100	110	110	110	110	114
Government grants related to R&D expenses	11 €	0 €	0 €	0 €	0 €	0 €	0 €
Government grants related to R&D expenses (% Revenues)	0,22%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Other tax receivables	80 €	65 €	72 €	79 €	88 €	98 €	99 €
Other tax receivables (% Revenues)	1,59%	0,91%	0,91%	0,91%	0,91%	0,91%	0,91%
Prepaid expenses	29 €	51 €	57 €	63 €	71 €	79 €	80 €
Prepaid expenses (% Revenues)	0,58%	0,72%	0,72%	0,73%	0,73%	0,74%	0,73%
Other Non-financial current receivables and assets	23 €	83 €	93 €	103 €	115 €	129 €	130 €
Other Non-financial current receivables and assets (% Revenues)	0,46%	1,17%	1,17%	1,18%	1,19%	1,20%	1,20%
Property, plant and equipment	1 606 €	3 083 €	3 255 €	3 437 €	3 630 €	3 836 €	4 053 €
PP&E Growth		91,95%	5,58%	5,60%	5,63%	5,65%	5,68%
Intangible assets	3 989 €	2 644 €	2 876 €	3 131 €	3 413 €	3 725 €	3 785 €
Intangible assets (% R&D)	621,34%	285,56%	285,71%	279,97%	274,59%	269,56%	269,91%
Rights-of-Use assets	260 €	159 €	173 €	189 €	207 €	226 €	230 €
Rights of use (% Revenues)	5,16%	2,24%	2,20%	2,17%	2,14%	2,11%	2,12%
Trade payables	-710 €	-849 €	-933 €	-1 040 €	-1 153 €	-1 283 €	-1 328 €
Average Payment Period		77	75	75	75	75	77

Income tax payables	-23 €	-105 €	-117 €	-130 €	-145 €	-161 €	-163 €
Income tax payables (% Revenues)	-0,45%	-1,47%	-1,48%	-1,49%	-1,50%	-1,50%	-1,50%
Current provisions	-260 €	-205 €	-226 €	-249 €	-274 €	-302 €	-306 €
Current provisions (% Revenues)	-5,16%	-2,89%	-2,86%	-2,85%	-2,83%	-2,81%	-2,82%
Other current liabilities	-315 €	-555 €	-617 €	-686 €	-764 €	-851 €	-861 €
Other current liabilities (% Revenues)	-6,25%	-7,81%	-7,83%	-7,86%	-7,90%	-7,94%	-7,93%
Non-current provisions	-48 €	0 €	0 €	0 €	0 €	0 €	0 €
Non-current provisions (% Revenues)	-0,95%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Other non-current liabilities	-93 €	-155 €	-172 €	-192 €	-214 €	-238 €	-241 €
Other non-current liabilities (% Revenues)	-1,85%	-2,18%	-2,19%	-2,20%	-2,21%	-2,22%	-2,22%
Core Business Invested Capital	6 276 €	6 654 €	7 163 €	7 704 €	8 302 €	8 951 €	9 220 €

Appendix 17 – Forecasted Cashflow generation compared to standalone benchmark, from 2022 to 2026



Appendix 18 – ams AG and Osram Licht AG Free Cash Flow generation, from 2015 to 2019



Appendix 19 – ams AG's and Osram Licht AG's Operational Margin on R&D, from 2015 to 2019