EDISON

MagForce

Commercial strategy review

Transitioning towards sustainable profitability

Healthcare equipment & services

MagForce is making progress with its strategy to drive the uptake of its thermal ablation treatment, NanoTherm. It is approved in Europe for brain tumours and is in a registrational US study for prostate cancer. MagForce has realigned its commercial strategy in Europe by installing its first NanoActivator in Poland where, unlike Germany, payments are less dependent on reimbursement from insurers. New treatment centres (ex-Germany) could be the catalysts for meaningful growth in the top line and enable sustainable profitability from 2022. The pivotal US study has experienced unforeseen delays in standardising the procedure, and approval and launch are now expected in Q420. Long-term growth depends on the commercial treatments in the US. We value MagForce at €261.5m.

Year end	Revenue (€m)	PBT* (€m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/17	0.7	(9.5)	(36.0)	0.0	N/A	N/A
12/18	0.1	(8.7)	(32.8)	0.0	N/A	N/A
12/19e	0.7	(10.5)	(38.7)	0.0	N/A	N/A
12/20e	2.9	(6.6)	(23.7)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments. Financial forecasts prepared under HGB.

European roll-out installs first device in Poland

Revenues from NanoTherm have not grown materially since commercial treatments started in late 2015, primarily due to ongoing issues with reimbursement in Germany. MagForce guides that it now has sufficient patient data to negotiate with local health insurers, but we do not expect this to be fully resolved until 2021. The first tranche from its EIB loan has been utilised (in part) to establish a new treatment centre in Poland, where management believes there is significant demand from private pay patients for NanoTherm, which should enable near-term growth in sales. Negotiations are ongoing with hospitals in Italy and Spain, markets where MagForce is looking to continue its roll-out in Europe.

US trial hits delays – launch now expected in Q420

We believe the most potential for growth resides in the opportunity for NanoTherm in the US, as urologists and payers will value a treatment that could extend the time prostate cancer patients can remain within active surveillance programmes. A registrational study investigating NanoTherm for the focal ablation of prostate lesions is nearing completion of its first stage (safety and tolerability in 10 patients) and will then enrol up to 110 patients to establish efficacy. Management guides that regulatory approval in the US and commercial treatments could now start in Q420.

Valuation: €261.5m (€9.5/share)

Our revised valuation of MagForce at €261.5m or €9.5/share (previously €303.1m or €11.5/share) is based on a risk-adjusted NPV analysis. This downgrade was driven by adjusting our sales forecasts in Europe to reflect the slow uptake and adjusting our US launch to reflect delays to the US trial, pushing back our forecast launch from Q419 to Q420; we highlight that this will require timely execution as further delays would have a material impact. We have rolled forward our model and included proceeds from the capital raise on 25 June 2019.

9 July 2019

Price	**€5.3**
Market cap	**€146m**
	$1.13/€
Net debt (€m) at 31 December 2018 (does not include proceeds from the capital raise on 25 June 2019)	14.4
Shares in issue	27.6m
Free float	66%
Code	MF6
Primary exchange	Frankfurt (Xetra)
Secondary exchange	N/A

Share price performance

%	1m	3m	12m
Abs	17.5	8.3	9.9
Rel (local)	12.9	3.3	9.5
52-week high/low		€7.0	€4.1

Business description

MagForce is a German firm with the first Europe-approved nanotechnology-based therapy to treat brain tumours. NanoTherm consists of a nanoparticle instillation into the tumour, activated by an alternating magnetic field, producing heat and thermally destroying or sensitising the tumour.

Next events

Installation of a NanoActivator device in Zwickau, Germany	Q319
Additional NanoActivator installations in Europe (ex-Germany)	2020
Trial completion, FDA approval and launch of NanoTherm in the US	2020

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Edison profile page

Investment summary

Company description: Advancing on all fronts

MagForce has a unique medical device, NanoTherm, which is approved in Europe by a CE mark for treating brain cancers. Unlike other thermal ablation techniques, NanoTherm is designed to directly target cancerous tissue while sparing surrounding healthy tissue. Magnetic nanoparticles are directly instilled into a tumour or a resection cavity and activated by an alternating magnetic field generated by specialist equipment (NanoActivator). This can either thermally ablate tumours or sensitise them to other treatments (chemotherapy or radiotherapy). The product is utilised in Europe for recurrent glioblastoma multiforme (GBM) and MagForce is working closely with leading experts in neuro-oncology to certify surgeons in using NanoTherm, which will aid in driving uptake and acceptance of this therapy. MagForce is actively pursuing development in the US, with a pivotal trial for the treatment of prostate cancer underway. Management guides that this could lead to a launch in Q420 and would become a significant value driver for MagForce in the long term.

Valuation: Risk-adjusted NPV of €261.5m or €9.5/share

Our valuation is €261.5m or €9.5/share, based on a risk-adjusted NPV analysis, which takes into account the €14.4m net debt held in MagForce at the end of December 2018, net proceeds from the capital raise in June 2019 (c €4.9m) and net cash held in MagForce USA, which is not specifically disclosed in the financial statements but we estimate at €8.0m based on the gross proceeds from the capital raise in August 2018. We present a base case in both the EU and the US focusing on GBM and prostate cancer, respectively; our rNPV is heavily weighted (70%) to the US, with an 80% risk adjustment.

Sensitivities: US execution and delivering growth in Europe

MagForce is subject to the usual risks associated with product development in healthcare, including clinical trial delays or failures, regulatory risks, competitor successes, partnering setbacks, financing and commercial risks. In the near term, the timely execution of the US trial and obtaining FDA approval for NanoTherm will be critical. Likewise obtaining reimbursement for NanoTherm will be essential to achieving uptake in treatment sales; we highlight that based on the current single-arm trial design in the US, a similar issue seen in achieving reimbursement in Europe could again be encountered. We expect updates on the safety and tolerability of the treatment from the first stage of the study in coming months. In addition, progress with the ongoing negotiations to establish new treatment centres in Europe and delivering on commercial revenues will help to increase confidence in management's target to attain sustainable profitability in the next two to three years.

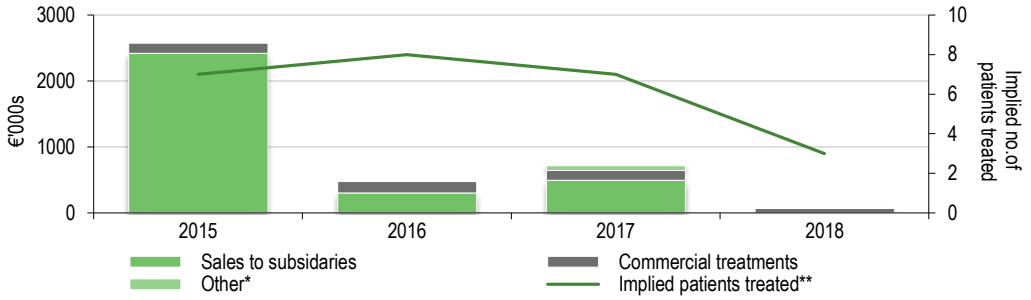
Financials: Loan facilities in place until profitability in 2022

Although MagForce reported profits in 2018, this was driven by a non-cash exceptional item relating to an intra-group share transfer and booking €13.9m from the revaluation of investments (at a fair market value). Meaningful growth in the top line through treatment sales has been hampered by local reimbursement issues in Germany. We have reviewed our revenue forecasts and now assume a slower sales ramp, but project sustainable profitability from 2022, driven by a roll-out of NanoActivator devices in the broader European market (ex-Germany). MagForce reported net debt of €14.4m at 31 December 2018, primarily from the draw-down of the first tranche (€10m) of the loan from the European Investment Bank (EIB) in January 2018. Following a private placement of 1.2m shares (in June 2019) MagForce raised gross proceeds of €5m; we believe an additional €15m will be required (at a group level) to fund operations until profitability in 2022. We note that as per the company accounts, we do not consolidate the US into our financial model; however, we do include our assumed R&D, S&M and potential future sales revenue of MagForce USA in our valuation.

Two-pillar strategy in place; sales ramp needed

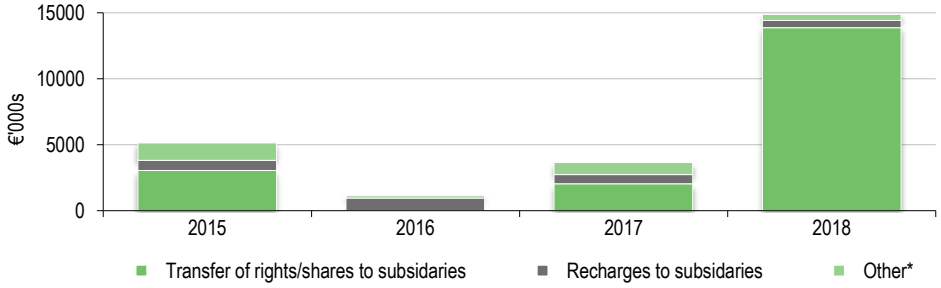
MagForce is currently in a transitional period as it implements its two-pillar strategy to drive uptake and adoption of NanoTherm in key European markets (for glioblastoma) and the US (for prostate cancer), which should start to enable some meaningful top-line growth and build the foundations to achieve sustainable profitability. Although commercial treatments with NanoTherm have been ongoing since 2015, their contribution to the reported operating result has not grown materially in the four years since launch; the breakdowns highlighted in Exhibits 1 and 2 imply that MagForce has only been fully remunerated for the treatment of c 25 patients.

Exhibit 1: Breakdown of reported revenues



Source: MagForce accounts, Edison Investment Research. Note: *Based on the assumption that treatment costs around €23k.

Exhibit 2: Breakdown of reported other operating income



Source: MagForce accounts, Edison Investment Research. Note: *Includes FX difference, reversal of device sales and other undisclosed income.

Historically, the largest contributors to reported revenue (at a group level) have been intra-group sales between subsidiaries (NanoActivators and NanoTherm). Other operating income has primarily been driven by the intra-group transfer of rights/shares. Although maiden operating profits (€6.9m) were reported in FY18, they were driven by a non-cash item relating to an intra-group transfer of 975,000 shares in MagForce USA and the booking of €13.9m from the revaluation of investments, which management has guided was based on the fair market value established from the capital raise in August 2018. We regard this as non-operating in nature, so our adjusted operating income indicates an operating loss of €7.1m for FY18, in line with management's previous guidance.

Achieving reimbursement for NanoTherm in Germany has been difficult, both locally and cross-border, attained only through a lengthy process on a per-patient basis. Management believes that it now has the necessary number of patient outcomes for reimbursement to be negotiated with local health insurance providers; we do not expect this to be fully resolved until 2021. As part of its two-pillar strategy, the roll-out of devices into the broader European market (ex Germany) is being funded by a loan facility with the EIB; we believe this could prove to be the near-term catalyst to stimulate the increase in treatment sales as MagForce will be targeting territories where reimbursement will not present as big a hurdle, as management has guided that more patients in

these countries are willing to pay 'out of pocket' (€23k) for NanoTherm until reimbursement from payers can be negotiated. Based on our forecasts we believe the treatment of c 400 GBM patients is necessary for MagForce to break even.

Polish treatment centre established; next up Spain and Italy

During H119 MagForce announced the establishment of its first treatment centre outside of Germany in Lubin, Poland. This has marked an important moment for the company as it is a clear signal that MagForce is progressing in its plans to broaden its geographical coverage, and enables it to provide patients, who were previously unable to travel cross-border into Germany, to access NanoTherm. Management has highlighted that there has been significant demand (c 280 patient enquires) from Poland and this first treatment centre could prove to be the much-needed catalyst to drive near-term uptake in revenues; we expect that c 20 patients will be treated by year end. A small investigator-led trial will also be conducted prior to NanoTherm being included on local reimbursement lists, until which time patients will pay out of pocket for NanoTherm; however, unlike when patients had to travel cross-border, all other treatment costs are covered.

In June 2019, an agreement was made with the Paracelsus Clinic in Zwickau, Germany, to establish a new treatment centre, which will broaden MagForce's geographical coverage further, although treatments are still likely to consist of private paying patients until reimbursement in Germany is attained. This new centre will utilise the same portable solution (which resembles a shipping container) to quickly install the device and will be fully operational in Q319. As MagForce has now established the ability to quickly install devices in a more cost-effective manner, and is making progress in its European roll-out, we expect that MagForce will continue to install two NanoActivator devices a year in new markets. We estimate that c 4,000 deaths a year can be attributed to GBM in Spain and Italy during 2018 (source: Global Cancer Observatory), markets that management has highlighted it is looking to expand into next and management is in negotiations with neurosurgical units to establish new treatment centres.

European sales forecasts

Our forecasts for Europe are based on the number of NanoActivators that MagForce could install in both Germany and other European states, along with clinical uptake based on usage per device. We have reviewed our forecasts and have changed our sales trajectory to reflect flat sales in Germany, due to reimbursement. With the first device in Poland installed in April 2019 and another expected in Zwickau during Q319, MagForce guides that it will have four fully commercial treatment centres established by end-2019. Our estimates for peak sales are outlined in more detail Exhibit 5 but are based on annual roll-out of two devices per year (ex Germany), with usage ramping up to 150 patients treated per device at peak usage in 2025. We expect that MagForce will maintain its competitive pricing at c €23k per patient, irrespective of geography, given the comparative cost of chemotherapy is around the same.

US prostate cancer launch delayed; trial is progressing

NanoTherm therapy is regulated as a device rather than a drug in the US, and therefore follows a medical device regulatory route to approval. Following receipt of an IDE from the US FDA, in July 2018 MagForce initiated its pivotal prostate cancer trial across two clinical sites where NanoActivators are installed (University of Washington in Seattle, Washington, and CHRISTUS Santa Rosa Hospital in San Antonio, Texas). Unexpected delays in standardising the procedure have affected the timeframe to complete the first stage of the study, but we now expect completion in H219. An additional site will be established in Sarasota, Florida, which will aid in recruitment of the second stage and both completion and submission for FDA review are now expected in 2020. With trial delays affecting the expected launch, we have reviewed our sales forecasts and now expect peak sales of $264m in 2026 (from $268m in 2025 previously).

The single-arm trial aims to recruit up to 120 patients with prostate cancer (Gleason score of 7) under active surveillance and will assess NanoTherm as focal treatment for prostate lesions. The study is structured such that 10 patients will be treated initially and preliminary data (H219) assessed to demonstrate that NanoTherm is safe and there is no systemic translocation of the nanoparticles from the prostate. Enrolment of the subsequent 110 patients will then be used to demonstrate efficacy as defined by no recurrence of tumour in a follow-up biopsy. In lieu of a control arm in the study, we assume that it will be compared to historical standard of care treatment outcomes to determine its benefit (similar to the GBM trial). Although this might be sufficient to achieve regulatory approval, payers might require a clearer measure of patient benefit before agreeing reimbursement; management has guided that, in its initial engagement with the Centres for Medicare & Medicaid (CMS), it has indicated efficacy in line with brachytherapy and tolerability in line with a biopsy could warrant similar reimbursement (c $7k). The therapy aims to destroy localised tumours in the prostate of patients by focal ablation. By ablating the prostate cancer focally, MagForce anticipates that patients will be able to maintain active surveillance and avoid definitive treatments such as surgery or whole gland radiotherapy, which is associated with side effects such as impairment in urinary functions (incontinence) and sexual functions (impotence).

With a relatively quick turnaround time in determining whether the primary endpoint has been met (biopsy to confirm reduction of prostate cancer lesions), a six- to nine-month timeframe to complete the second stage of the trials after the preliminary safety results (H219) is conceivable, provided that trial recruitment proceeds as planned, and a regulatory application for the treatment could be filled in 2020. The smaller pNanoActivators that MagForce intends to roll-out into urology centres prior to launch could be approved towards the end of the clinical trial, either by being included in the clinical data package or via the 510k route using the original NanoActivator as the predicate device. While the GBM indication is reliant on the larger NanoActivators for activation of the NanoTherm nanoparticles, more localised prostate cancer can be treated by the pNanoActivators (smaller ambulatory machines that resemble a dentist's chair), thereby widening outreach to the US patient pool in the longer term.

US sales forecasts

We now assume regulatory approval and first treatment sales from the US during Q420, assuming no additional delays are encountered that would affect recruitment and execution of the second stage of the study (efficacy in up to 110 patients). We assume that all future device sales will be smaller and substantially cheaper (c $50k) pNanoActivators provided via third-party leasing, and that MagForce will collect revenues from the sale of the pNanoActivators to the leasing provider. MagForce believes it will have 20 pNanoActivators installed by Q420, and we assume that each prostate NanoActivator will initially treat around 30 patients in 2020. As a smaller quantity of nanoparticles will likely be required in prostate cancer, we assume a lower vial price of around a quarter of GBM, ie around $7k, which would position NanoTherm competitively with brachytherapy. Obtaining reimbursement will be key if treatment sales are to pick up in the US. We have revised our fundamental assumptions for the roll-out of devices and their peak usage, but our estimates for peak sales of $264m remain in line with our previous forecasts of $268m. Our assumptions are outlined in more detail in Exhibit 5, but now assume the installation of 150 devices with 250 patients treated per device at peak usage in 2026 (or 37,500 patients); previously we had assumed an annual roll-out of 20–35 devices per year from 2019, with 190 devices installed and 200 patients treated per device at peak usage in 2025 (or 38,000 patients). The reason for revising these assumptions is based on the fact that we do not anticipate devices to continue being installed if those already installed devices are not being utilised to their full capacity; variation of these assumptions significantly affects our valuation, as highlighted in Exhibit 7.

NanoTherm

The treatment of cancerous cells with heat (hyperthermia) is an established technique, which looks to heat tumour sites and elevate tissue temperatures above the body's native temperature (37ºC) towards temperatures that can trigger cellular mechanisms that induce tumour cell death. Therapeutic hyperthermia has been achieved through a variety of techniques, such as thermal conduction (heated water), electromagnetic radiation (microwaves or radiowaves) or ultrasound. However, these can often be intrusive and can be hampered by unfocused heat distribution. MagForce's NanoTherm therapy is a more targeted approach that utilises magnetic hyperthermia to ablate cancerous cells at the core of a tumour, while generating lower temperatures in the hyperthermia region at the edges of the tumour, minimising healthy cell damage. The therapy has several key components:

- **NanoTherm** consists of super paramagnetic iron oxide nanoparticles (SPIONs) that have a patented, bioinert coating which ensures systemic translocation does not readily occur. These SPIONs are suspended in a liquid (ferrofluid) that can be instilled directly into either tumour tissue or pasted into a resection cavity. These are then activated with an alternating magnetic field (AMF), which generates heat and kills or sensitises the tumour cells to concomitant radio- or chemotherapy.
- **NanoPlan** is a software package that calculates the strength of magnetic field needed for the magnetic nanoparticles to reach the required temperature. The software takes into account the size and location of the tumour and the distribution of nanoparticles to determine the strength of the magnetic field. This proprietary software is critical for the correct usage and is fed in from either magnetic resonance imaging (MRI) or positron emission tomography (PET) data.
- **NanoActivator** is a freestanding, room-sized device that generates and applies an alternating magnetic field (AMF) to a patient. This AMF induces an oscillation in the iron oxide nanoparticles, which in turn generate heat. To measure the exact temperature change, a thermometry catheter is inserted into the tumour via a minimally invasive surgical procedure alongside the administration of the SPIONs. MagForce has now created a portable solution to quickly install devices across Europe which will aid in accelerating roll-out, and has also developed a smaller pNanoActivator which it aims to roll-out in the US for the focal ablation of prostate lesions.

Exhibit 3: NanoTherm therapy

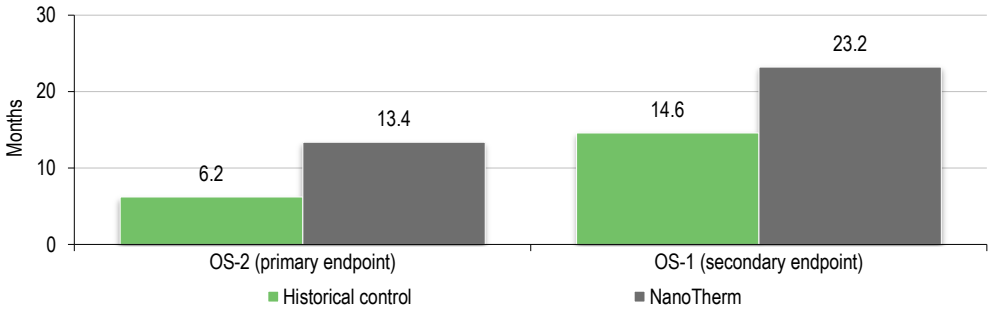
Source: MagForce

Trial data has highlighted the potential in glioblastoma patients

GBM is the most common brain and central nervous system malignancy in adults, accounting for c 50% of all primary tumours. The standard of care for newly diagnosed glioblastoma is surgical resection to the extent feasible, chemotherapy with Temodal (temozolomide) given concomitantly with and after adjuvant radiotherapy. Recurrence rates are high and treatment options limited resulting in poor survival rates, between 5–10% after five years from initial diagnosis. Data from the largest trial to date using NanoTherm therapy were published in 2010, although the data are now slightly dated and the technique has evolved, they highlighted that NanoTherm could provide meaningful clinical benefit to patients with GBM.

The trial enrolled 66 patients (59 with recurrent glioblastoma) in a single-arm study which used a combination of thermal ablation with NanoTherm (6×1 hour semi-weekly sessions, median peak temp 51.2°C) and adjunct radiotherapy (BED: 30 Gy; 5×2 Gy/week). The primary endpoint was overall survival following diagnosis of tumour recurrence (OS-2), with the secondary endpoint being overall survival after primary tumour diagnosis (OS-1). As highlighted in Exhibit 4, the primary endpoint demonstrated an OS-2 of 13.4 months (95% CI 10.6–16.2 months), while secondary endpoint data demonstrated an OS-1 of 23.2 months (95% CI: 17.2–29.2 months).

Exhibit 4: Comparative trial data for NanoTherm in GBM



Source: Edison Investment Research, MagForce presentations

No control arm was present in the study so it is difficult to compare both these outcomes to other treatments; a trial cited by MagForce has been used as a historical control, which demonstrated that the median overall survival for 573 newly diagnosed patients, utilising a combination of radiotherapy and temozolomide, was 14.6 months (OS-1). This indicates that NanoTherm could extend median survival rates by c 7–9 months when compared to historic controls, which is impressive as treatment paradigms for glioblastoma have not progressed significantly. We caveat this and note that comparisons of trial data should be made with caution as variability in patient demographics, disease states and previous lines of treatment could distort any observations. Importantly, this clinical data warranted the European approval of NanoTherm via a CE mark in 2010.

More recently preliminary findings have been published (December 2018) in the Journal of Neuro-Oncology, highlighting how the utility of NanoTherm has now evolved beyond its use in the initial study, with a pioneering 'NanoPaste' technique emerging that might improve on the previous survival rates. During the resection of recurrent tumours, the resection cavity is coated with magnetic nanoparticles and patients underwent cycles of intracavity thermotherapy with concurrent radiotherapy. Although the sample size from this initial study is too small to draw any reliable conclusions, it highlighted a potent immune response was trigged, with 2/6 patients having long-lasting responses to treatment (OS-2 >23 months). Subsequent clinical studies are now warranted to confirm these preliminary findings.

Sensitivities

In Europe, delivering revenues from the treatment of brain tumours will help to increase confidence in management's targets. Any further delays in the roll-out could affect expected revenue generation and this could translate into further funding requirements, although we highlight that MagForce can draw down additional tranches from its loan facility with the EIB. We only value the opportunity for the treatment of GBM in Europe. However, we recognise that should the ongoing prostate cancer trial be successful, MagForce could potentially broaden the use of its European devices. As the standards of care in oncology are evolving, failure to deliver on timelines could have an impact on MagForce's ability to successfully commercialise NanoTherm.

We believe that the key near-term sensitivity for MagForce remains obtaining FDA approval for NanoTherm in treating prostate cancer; successful execution of the trial is critical to this, as is getting the smaller pNanoActivator devices approved via the 510k route (using the NanoActivator as a predicative device). Attaining reimbursement in the US will also be important but as MagForce will be pricing its treatment in line with brachytherapy (radiotherapy), management has guided that it should not be a significant issue to provide the comparable efficacy and tolerability necessary for regulatory approval. Further delays to the US trial would have a material impact on our valuation, given the NanoTherm US prostate indication contributes ~70% (€6.3/share) of our valuation. Although the US subsidiary has secured funding for completion of this study and the installation of pNanoActivator devices necessary to launch initially, should the US trial encounter further set-backs or if sales do not ramp-up as planned, the need to raise additional capital could result further in dilution of its position in the US subsidiary.

Valuation

Our updated valuation is €261.5m or €9.5 per MagForce share, based on a risk-adjusted NPV analysis. It is centred on MagForce's NanoTherm therapy, risk-adjusted to reflect the current development status and the respective core strategies for the EU and US. We value only GBM in the EU and prostate cancer in the US; although we recognise MagForce's future intention to eventually treat additional indications in each region, we do not ascribe value to this in our base case. In each indication and region, our valuation includes our revenue forecasts and estimates for costs, including R&D and S&M. A summary of the assumptions we have made in our peak sales forecasts is outlined in Exhibit 5.

Exhibit 5: Peak sales forecasts

Product	Country	Indication	Launch/peak sales	Assumptions
NanoTherm/ NanoActivators	Germany	GBM	2015 €9m ($10m)	With the installation of a new device in Zwickau expected this year, management guides that three NanoActivator devices will be fully commercial in Germany during 2019; we do not expect any more devices will be installed thereafter as expansion will be outside of Germany. We assume these devices will ramp-up to peak usage in 2025 which we translate to c 150 patients/device/year or 450 patients treated at peak. In Germany we estimate the annual mortality rate from glioblastoma will be c 3,500 in 2025, which is representative of the eligible patients, indicating peak penetration of c 13%. Assuming treatment maintains its pricing at €23k/patient, **we forecast peak sales of €9m.**
	Europe (ex Germany)	GBM	2019 €40m ($45m)	With the installation of the first device in Lublin, Poland, in 2019, one NanoActivator device will be fully commercial during 2019; we expect two more devices will be installed a year (ex-Germany) thereafter. We assume these devices will ramp-up to peak usage in 2025 with 150 patients/device/year treated or 1,950 patients treated at peak. In Europe (ex Germany) we estimate the annual mortality rate from glioblastoma will be c 25,000 in 2025, which is a fair representation of eligible patients; this indicates peak penetration of c 8%. Assuming treatment maintains its pricing at €23k/patient, **we forecast peak sales of €40m.**
NanoTherm/ pNanoActivators	US	Prostate cancer	2020 €233m ($264m)	Assuming a launch in Q420, we expect that MagForce will install 80 devices by 2022 in key urology practices across the US and 150 devices installed by 2026. We assume that these devices will ramp up to peak usage in 2026, which we believe translates to 250 patients/device/year or 37,500 patients treated at peak. We estimate that there will be around 170,000 patients eligible for treatment in the US in 2026, which indicates peak penetration of c 22%. Assuming treatment is priced at $7k/patient, in line with brachytherapy, **we forecast peak sales of $264m.**

Source: Edison Investment Research; Global Cancer Observatory. Note: FX rate $1.13/€.

We use a 10% discount rate in Europe and 12.5% for the US. We adjust the US opportunity to reflect the 67.9% stake in MagForce USA and attribute an 80% probability of success for approval of the device. Our valuation includes €14.4m net debt reported at 31 December 2018, net proceeds from the capital raise in June 2019 (c €4.9m) and net cash in addition to estimated €8m net cash held in MagForce USA, which is not disclosed in the financial statements but we have assumed from gross proceeds of the capital raise in August 2018. We use a $1.13/€ spot rate.

Exhibit 6: MagForce risk-adjusted NPV valuation

Product	Indication	Launch	Peak sales (€m)	Peak sales ($m)	NPV (€m)	Probability	MagForce beneficial interest	rNPV (€m)	rNPV/share (€)
NanoTherm EU	GBM (Germany)	2015	9	10	17.7	100%	100%	17.7	0.6
	GBM (ex Germany)	2019	40	45	65.4	100%	100%	65.4	2.4
NanoTherm US	Prostate cancer	2020	233	264	336.0	80%	68%	182.5	6.6
Net cash/(debt) (AG)					(9.5)*	100%	100%	(9.5)	(0.3)
Net cash/(debt) (US)					8.0	100%	68%	5.4	0.2
Valuation					**417.6**			**261.5**	**9.5**

Source: Edison Investment Research. Note: FX rate $1.13/€. *€14.4m reported net debt and assumed €4.9m net proceeds.

In revising our assumptions for the US, we have pushed back our peak sales forecast to 2026 (from 2025), but maintained our peak sales forecasts. We now believe that peak device usage will be higher than we had previously thought (250 patients/device vs 200 patients/device previously) and the roll-out of device slower (150 devices vs 190 previously). Given the large weighting of the US opportunity in our valuation, we have performed a sensitivity analysis (Exhibit 7) to highlight how the peak device usage and total number of devices installed in 2026 would affect the contribution from the subsidiary MagForce USA.

Exhibit 7: Upside/downside base-case valuation sensitivity for the uptake/rollout in the US

		Device usage in 2026 (patients/device)				
	rNPV	(150)	(200)	(250)	(300)	(350)
Total devices installed in 2026	80	€116.1m (-56%)	€136.9m (-48%)	€157.2m (-40%)	€177.2m (-32%)	€197.1m (-25%)
	115	€149.5m (-43%)	€179.7m (-31%)	€209.4m (-20%)	€238.4m (-9%)	€267.3m (2%)
	150	€182.8m (-30%)	€222.6m (-15%)	**€261.5m (0%)**	€299.6m (15%)	€337.5m (29%)
	185	€216.2m (-17%)	€265.4m (1%)	€313.7m (20%)	€360.8m (38%)	€407.7m (56%)
	220	€249.5m (-5%)	€308.2m (18%)	€365.7m (40%)	€422.0m (61%)	€477.9m (83%)

Source: Edison Investment Research

Our base case assumes that peak device represents device operating at 250 patients/device. Should usage surpass this (300–350 patients/device), either through increasing the amount of patients treated per shift or the amount of shifts a day, there is 15–29% upside to our base case valuation of MagForce. Additionally failure to fully utilise these devices (150–200 patients/device) represents c 15–30% downside to our base case.

From our perspective, the timelines to achieving treatment sales in the US during the Q420 are somewhat ambitious and will require a timely execution of the trial recruitment, regulatory filing and launch within the next 12–18 months. We have maintained a launch in Q420 in our base-case valuation, in line with company guidance. Should this not be achieved, and commercial treatments pushed back further, this would have a material impact on our base case.

Financials

MagForce AG (MagForce) is the parent company of the MagForce group, which consists of six companies: MagForce AG, MagForce USA, MagForce USA Holding GmbH, MagForce Ventures

GmbH, MT MedTech Engineering GmbH and the recently formed, wholly owned Polish subsidiary MagForce sp. z o.o. The company is not required to report consolidated financial statements under HGB accounting standards; while MagForce USA is not currently consolidated as per company reporting, we do not consolidate its contributions into our financial forecasts, only our valuation. We expect that the company will start consolidating its statements as MagForce USA becomes a profitable operation.

MagForce revenues decreased in FY18 to €67k (FY17: €716k) as growth in treatment sales in Europe continued to be affected by a lengthy reimbursement process in Germany (carried out on a per-patient basis). Difficulties securing cross-border reimbursement has prohibited foreign patients (ex-Germany) travelling for NanoTherm treatment. We have updated our 2019 forecasts to reflect these headwinds and Exhibit 8 summarises how this has affected our financial forecasts; we also introduce our forecasts for 2020.

Exhibit 8: Summary of key forecast changes for 2019

€m	2019e (previous)	2019e (revised)	2020e (new)
Revenue	5.819	0.667	2.898
EBITDA	(7.822)	(9.583)	(5.348)
Operating profit/(loss)	(8.195)	(9.583)	(5.348)
PBT – normalised	(9.070)	(10.475)	(6.558)
EPS (€) – normalised	(0.34)	(0.39)	(0.24)

Source: Edison Investment Research

Other operating income, reported at €14.9m in FY18 (FY17: €3.6m), was largely attributed to the transfer of 975,000 shares in MagForce USA to MagForce USA Holding GmbH and the consequent booking of hidden reserves of €13.9m (FY17: €2.0m) at the parent company level, based on the fair market value from the capital raise in August 2018. We highlight that this is a non-cash item and although this has had a positive impact on reported operating income (FY18: profit of €6.8m vs FY17: loss of €7.4m), we believe this is non-operating in nature and our adjusted operating income represents a loss of €7.1m in FY18 (FY17: €9.4m), in line with the company's previous guidance and our expectations. We expect MagForce will report operating losses until sales pick up after reimbursement has been fully resolved in 2021. After this we forecast sustainable profitability from 2022 with operating margins of c 50%; if MagForce USA is consolidated we believe these margins will improve, to c 60%, as will the top line.

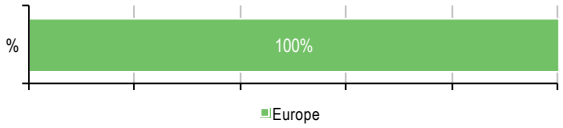
Personnel expenses increased slightly year-on-year to €3.9m (FY17: €3.3m) due to an increase in salaries and the exercise of €308k of employee stock options (non-cash). Cost of materials and services decreased slightly to €455k (FY17: €974k) due to expenses in 2017 from the development of the NanoActivator device for the treatment of prostate cancer. We believe it is likely this will increase in 2019/20 in preparation for the launch in the US. Other operating expenses decreased to €3.2m (FY17: €7.1m) primarily due to a decrease in external financing measures.

MagForce reported cash and cash equivalents at 31 December 2018 of €1.5m. In January 2018, the first €10.0m tranche of the €35.0m loan facility with the EIB (secured in October 2017) was disbursed with a five-year maturity (with interest, €10.4m is owed) and in total MagForce reported liabilities to financial institutions of €10.9m (FY17: €12k), along with a €5m convertible bond issued in March 2017, which has a maturity of three years (interest rate of 5% pa, conversion price of €5/share). As of 31 December 2018, MagForce reported net debt of €14.4m (FY17: €4.3m). Following a private placement of 1.2m shares in MagForce on 25 June 2019, raising gross proceeds of €5m, we believe an additional €15m of financing will be required to fund operations until profitability in 2022; we expect that this will be drawn from the remaining €25m of the EIB loan facility and other loans if necessary.

Exhibit 9: Financial summary

€000s	2016	2017	2018	2019e	2020e
Year end 31 December	HGB	HGB	HGB	HGB	HGB
PROFIT & LOSS					
Revenue	474	716	67	667	2,898
Cost of Sales	(574)	(974)	(455)	(2,058)	(2,252)
Gross Profit	(101)	(258)	(388)	(1,391)	646
EBITDA	(6,555)	(8,763)	(7,068)	(9,583)	(5,348)
Operating Profit (before amort. and except.)	(7,457)	(9,434)	(7,068)	(9,583)	(5,348)
Intangible Amortisation	(4)	(1)	0	0	0
Exceptionals	0	2,024	13,896	0	0
Other	0	0	(877)	0	0
Operating Profit	(7,461)	(7,411)	5,951	(9,583)	(5,348)
Net Interest	231	(53)	(1,591)	(892)	(1,210)
Profit Before Tax (norm)	(7,226)	(9,487)	(8,659)	(10,475)	(6,558)
Profit Before Tax (reported)	(7,230)	(7,464)	4,360	(10,475)	(6,558)
Tax	(1)	(1)	(2)	0	0
Profit After Tax (norm)	(7,227)	(9,488)	(8,661)	(10,475)	(6,558)
Profit After Tax (reported)	(7,231)	(7,465)	4,358	(10,475)	(6,558)
Average Number of Shares Outstanding (m)	26.0	26.3	26.4	27.1	27.6
EPS - normalised (€)	(0.28)	(0.36)	(0.33)	(0.39)	(0.24)
EPS - (reported) (€)	(0.28)	(0.28)	0.17	(0.39)	(0.24)
Dividend per share (€)	0.0	0.0	0.0	0.0	0.0
Gross Margin (%)	N/A	N/A	N/A	N/A	22.3
EBITDA Margin (%)	N/A	N/A	N/A	N/A	N/A
Operating Margin (before GW and except.) (%)	N/A	N/A	N/A	N/A	N/A
BALANCE SHEET					
Fixed Assets	18,742	20,672	34,470	34,402	34,744
Intangible Assets	3	2	91	186	280
Tangible Assets	3,706	3,589	3,401	3,239	3,486
Investments	15,033	17,082	30,978	30,978	30,978
Current Assets	1,536	1,360	2,664	3,999	2,711
Stocks	71	301	291	169	185
Debtors	71	85	95	365	1,588
Cash	614	665	1,493	2,679	153
Other	780	307	785	785	785
Current Liabilities	(4,431)	(3,747)	(3,049)	(2,891)	(3,502)
Creditors	(4,431)	(3,747)	(3,049)	(2,891)	(3,502)
Short term borrowings	0	0	0	0	0
Long Term Liabilities	(197)	(5,091)	(15,926)	(22,926)	(27,926)
Long term borrowings	0	(5,012)	(15,876)	(22,876)	(27,876)
Other long term liabilities	(197)	(79)	(50)	(50)	(50)
Net Assets	15,650	13,194	18,159	12,584	6,026
CASH FLOW					
Operating Cash Flow	(1,079)	(5,286)	(4,636)	(9,307)	(5,335)
Net Interest	231	(53)	(2,468)	(892)	(1,210)
Tax	(1)	(1)	(2)	0	0
Capex	(115)	(553)	(499)	(515)	(982)
Acquisitions/disposals	0	0	0	0	0
Financing	0	5,000	0	4,900	0
Dividends	0	0	0	0	0
Net Cash Flow	(964)	(894)	(7,605)	(5,814)	(7,527)
Opening net debt/(cash)	(1,393)	(614)	4,347	14,383	20,197
HP finance leases initiated	0	0	0	0	0
Other	185	(4,067)	(2,431)	0	0
Closing net debt/(cash)	(614)	4,347	14,383	20,197	27,723

Source: Company accounts, Edison Investment Research. Note: Reported other operating income (non-cash) relating to the transfer of shares between subsidiaries has been booked as an exceptional item in our model.

Contact details	Revenue by geography
Max-Planck-Strasse 3 12489 Berlin Germany +49 (0)30 3083 800 www.magforce.de	

Management team

CEO: Ben Lipps

Dr Lipps joined MagForce in September 2013, having previously been chair and CEO of Fresenius Medical Care since 1999. Dr Lipps led the research team that developed the first commercial hollow fibre artificial kidney at the end of the 1960s. Before joining Fresenius Group in 1985, Dr Lipps held several research management positions in various companies, among them Dow Chemical. He earned his master's and doctoral degrees at the Massachusetts Institute of Technology in chemical engineering.

CFO: Christian von Volkmann

Christian von Volkmann joined MagForce as CFO in May 2012. He was previously at Jerini, successfully contributing to the IPO in 2005, and was promoted to CFO in 2008 during the subsequent acquisition by Shire. Mr von Volkmann has more than 14 years of corporate finance and capital market transaction experience. He studied business administration at the Julius Maximilian University and is also a licensed certified public accountant in the US.

COO: Hoda Tawfik

Professor Dr Hoda Tawfik has been at MagForce since May 2011. She has over 20 years' experience in the field of clinical development and medical affairs within the pharma/biotech industry. Before joining MagForce she worked at Medigene AG as head of the global clinical operations department and medical affairs for nine years. Dr Tawfik completed her pharmacy studies at the University of Cairo, and obtained a PhD in pharmacology and toxicology from the University of Düsseldorf.

Principal shareholders	(%)
Avalon Capital One GMBH	24.2
Coreo AG	9.5
M&G Securities Ltd	3.3
Skagen AS	2.5
Baring Fund Managers Ltd	1.3

Companies named in this report

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