

A Work Project, presented as part of the requirements for the Award of a Master's degree in Finance from the Nova School of Business and Economics.

THE FUTURE OF ADDITIVE MANUFACTURING: MATERIALISE'S LBO – VALUE CREATION

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Abstract

The Future of Additive Manufacturing: Materialise's LBO – Value Creation

This investment paper reviews the potential Leveraged Buyout of Materialise, a service provider and software producer operating in the Additive Manufacturing industry. An analysis of the company and market was conducted, facilitating the assessment of key market trends that enabled the creation of investment strategies set to improve the company in various areas and aspects. The result of this work presented Materialise as an attractive investment, with strong returns across a multitude of possible scenarios in the upcoming future.

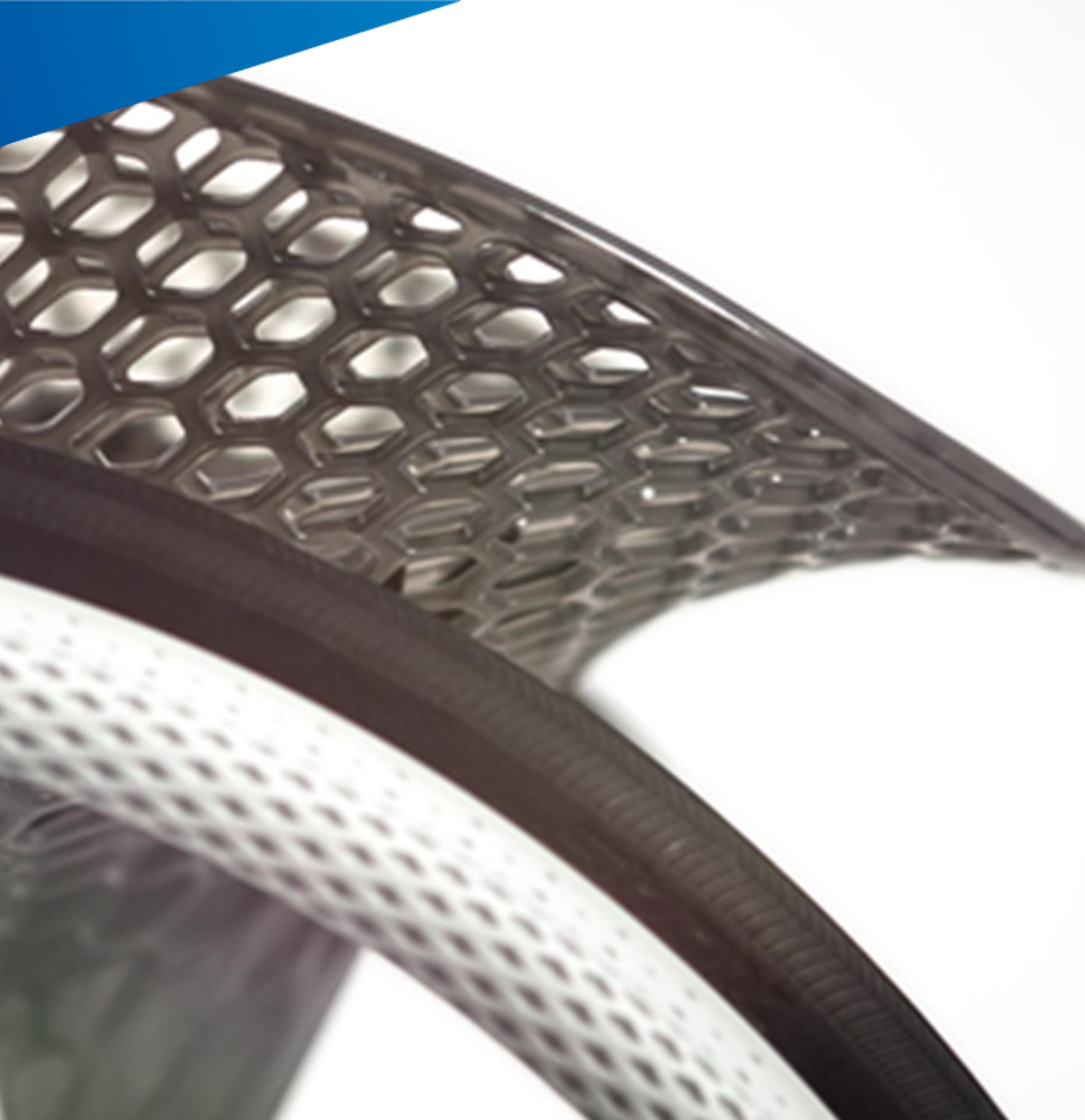
Keywords

3D Printing, Additive Manufacturing, Materialise, Stratasys

Disclaimer

This report was developed for academic purposes, using non-verified publicly available information. As so, we take no responsibility for any action that might derive from the use of this paper for anything other than information.

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Group Paper

Executive Summary

Company Overview

Materialise NV (NASDAQ: MTLN) is a **global provider** of software tools, medical solutions and sophisticated 3D printing services in the Additive Manufacturing (AM) market.

Incorporated in 1990 and headquartered in Leuven, Belgium, Materialise currently has over 2,000 employees and is present in **over 20 countries**.

The company is subdivided in three main segments: **Manufacturing, Software** and **Medical**, which combined offer products to over 8 different industries, including: Automotive, Aerospace, Consumer goods, Healthcare, Machinery, among others.

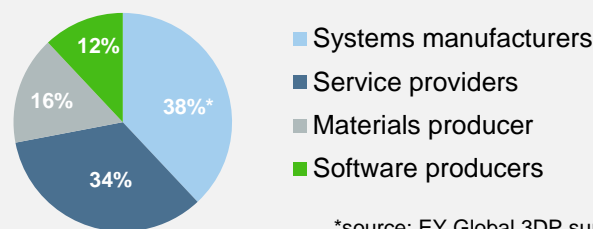
Deal Rationale

- 1 **Strong Competitive Positioning**
Pioneer in 3DP, global reach and disruptive tech.
- 2 **Successful Acquisition History**
6 acq. in the past decade with successful integration
- 3 **Growing Market**
7-Year CAGR estimates vary between 18% to 27%
- 4 **Strong Financials**
Increasing profitability and operating efficiency
- 5 **Highly Skilled Workforce**
3DP expertise both in management and engineering

Market Overview

The Additive Manufacturing market is divided into four industries. Within this division, Materialise is both a **software vendor** and a **service provider**. The overall AM market is estimated to grow from \$10.4bn in 2019 to **\$45.7bn** in 2027 at a **CAGR of 20.3%**.

Share of Companies by Industry



*source: EY Global 3DP survey 2019

Value Creation Plan

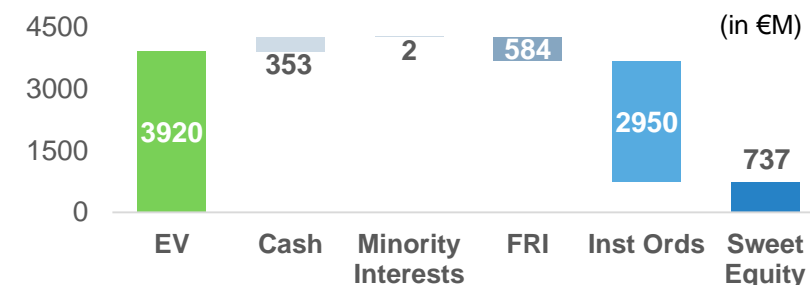
Investment thesis relies on 3 strategies to derive growth:

- A. **Organic Growth** by increasing focus in the APAC region through strategic partnerships, by strengthening Materialise's offer of metal-based printing which is a growing AM area and by expanding the customer base in the Americas and Middle East.
- B. **Optimizing Operations** by reducing SG&A and R&D costs as a result of the synergies generated by the strategic acquisition.
- C. **Strategic Acquisition** of a Systems Manufacturer to strengthen Materialise's position in the AM value chain. This vertical integration would allow the company to become an all-in-one supplier.

Exit Strategy & Returns

Materialise's transaction value (EV) is € 671M with an entry multiple of 25.1x EBITDA. The deal will be financed by 39% of Debt and 61% of Equity.

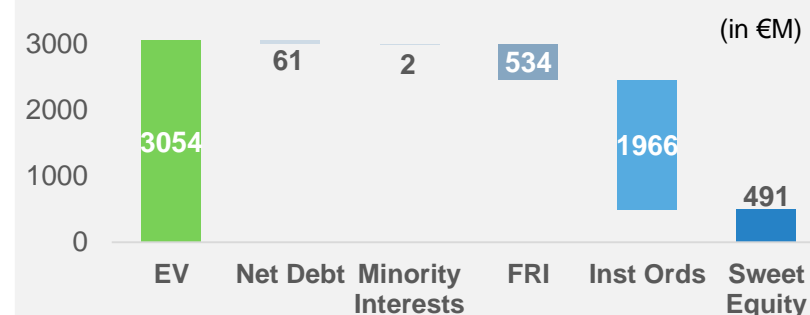
The exit will be performed in **2026**, with a multiple of 12.1x. The Fund's return is **7.0x MM** and **35% IRR**.



Contingency Plan

In case the Strategic Acquisition is not successful, a **standalone scenario** of Materialise was performed with a capital structure of 45% of debt and 55% Equity.

In this scenario, exit will occur in **2027**, with a multiple of 25.1x. The Fund's return is **5.0x MM** and **24% IRR**.



Company Overview | Company Profile & History

Company Profile

- Materialise NV (NASDAQ: MTLN) is a **global provider** of software tools, medical solutions and sophisticated 3D printing services in the Additive Manufacturing market.
- One of the largest and most long-established independent company in this sector, Materialise was incorporated on the **28th of June 1990** under the Belgian company law.
- The company currently holds **over 250 patents**, including 160 specifically related to medical applications.
- Multinational company established through a combination of **organic growth** and **acquisitions**.
- Materialise's main subsidiaries include **Engimplan**, **ACTech** and **RapidFit**



a materialise company



a materialise company



a materialise company

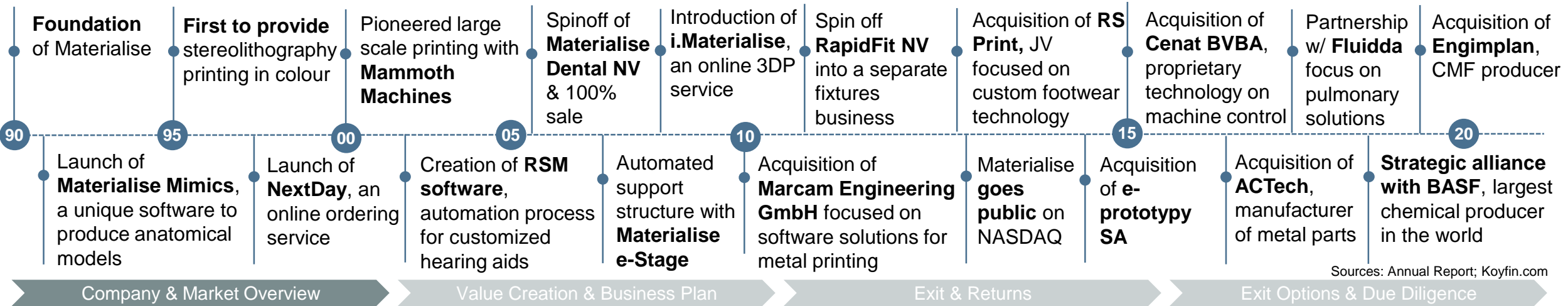


Company Description

Corporate Headquarters: Leuven, Belgium
Market Segments: Manufacturing; Software; Medical
Number of Employees: 2,177

Financial Highlights (2019)

Metrics	5Y CAGR
Sales €196.7M (+ 6,5% vs. 2018)	≈ 16%
Gross Profit €109.7M (+ 7,1% vs. 2018)	≈ 15%
Net Profit €1.7M (- 43,0% vs. 2018)	n.a.
EBITDA €26.7M (+ 13,3% vs. 2018)	≈ 52%



Company Overview | Business Model

Manufacturing Segment

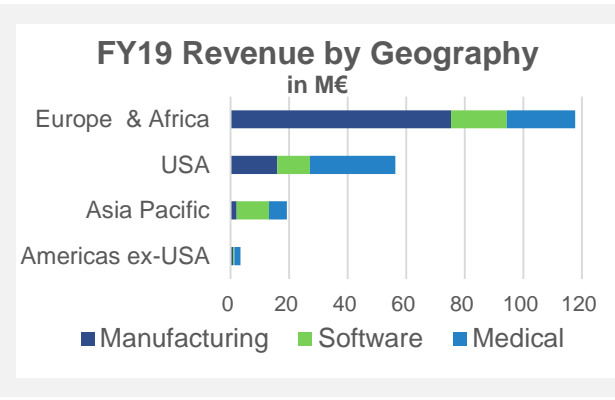
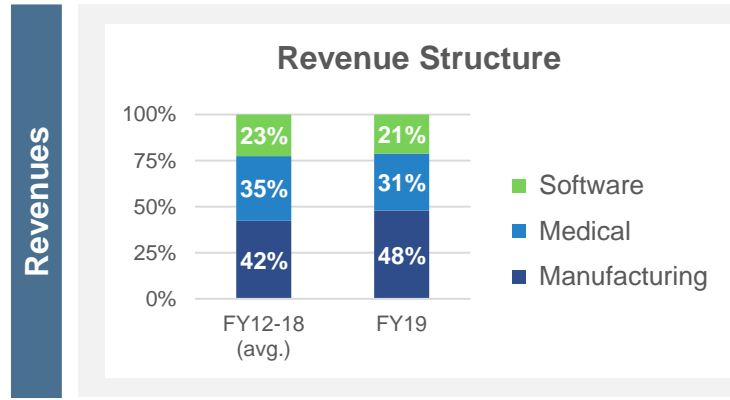
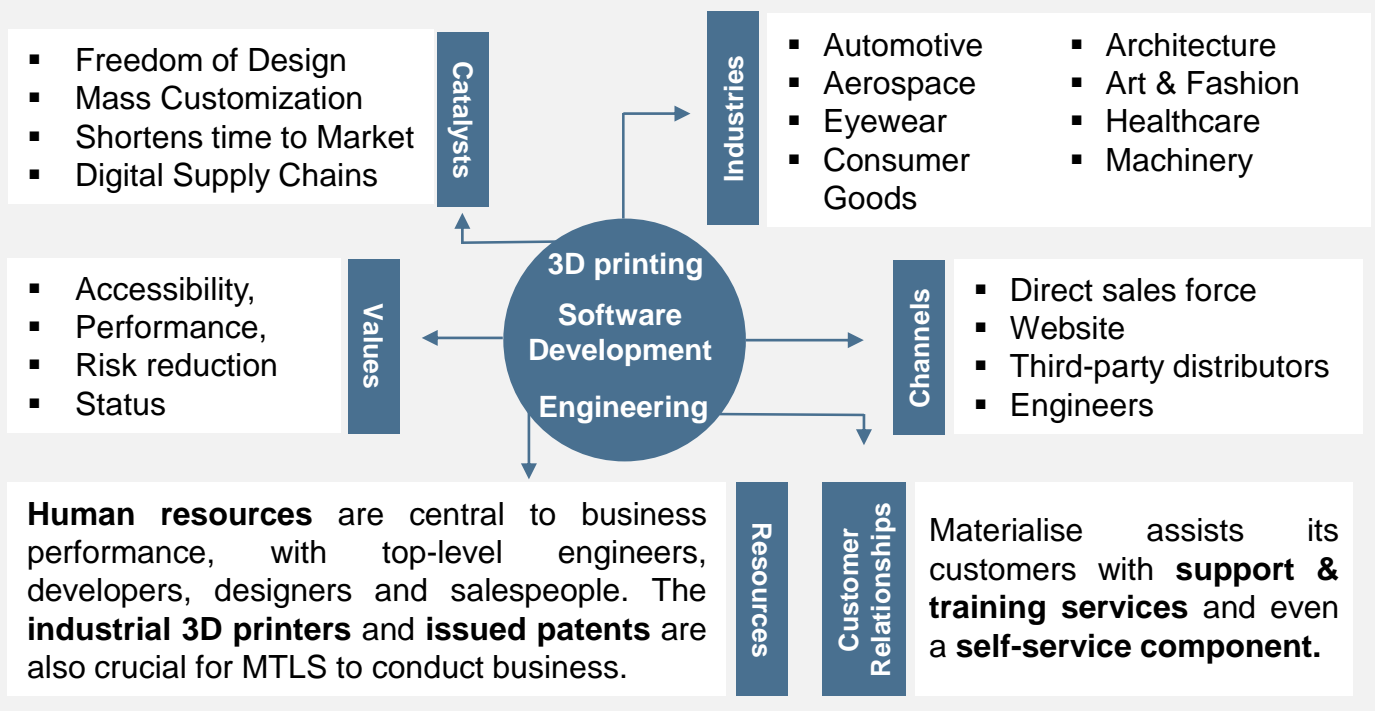
B2B service provider of **3D printing solutions through the co-creation, prototyping and consultancy services** with Materialise's engineers and designers, enabling the production of very complex parts or products using various materials and technologies, on demand.

Software Segment

Provides the necessary **sophisticated software tools** to use additive manufacturing to produce the highest standards' products regardless of complexity levels. It specializes in **workflow software** and is the backbone of 3D printing. It also provides **training and consulting services** for its products. It can also be sold as a standalone product.

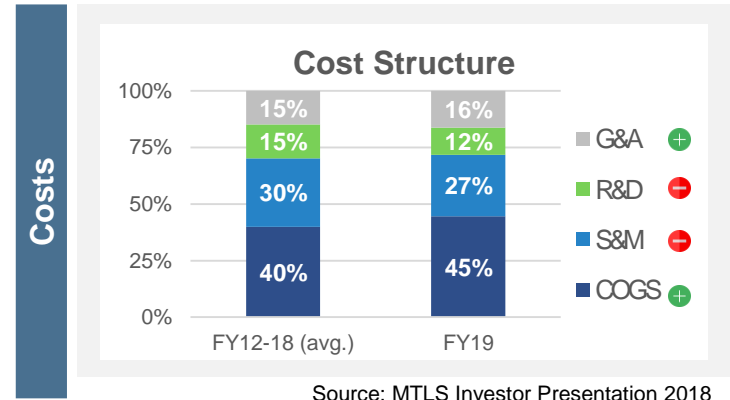
Medical Segment

Provides customers with **medical devices** printed in-house such as **surgical guides and implants, licenses to medical software packages and software maintenance contracts** to ensure the level of precision and accuracy required in Certified Medical Printing. Pioneering segment that revolutionizes the care for patients' lives.



Revenue is generated primarily by (i) the sale of software; (ii) 3D printed & complex manufactured products and services

Changes in revenue structure have been heavily affected by the acquisition of ACTech, boosting manufacturing's share of total revenue.



Source: MTLs Investor Presentation 2018

FY19 Highlights

Revenues
€94M

Revenue Share
48%

Growth rate
16.4%

EBITDA
€12M

EBITDA mg
13%

Employees
775 FTE

Revenue Model: The 3D Printing Process

1 Rapid Prototyping

- **Prototypes are essential** to verify the product design with a model that matches the real product, or **to perform form, fit and function** tests, in order to meet the customer's requirements.
- Rapid Prototyping allows designers and engineers to **execute fast and frequent revisions of their designs**. Thanks to a variety of available technologies and materials, 3D-printed prototypes work for both visual and functional testing.

2 Additive Manufacturing

- **Printing of 3D products** to industrial and commercial customers.
- **Co-creation:** Materialise works together with customers during the 3D printing process to solve complex design challenges and to discuss how the introduction of 3D printing can affect product development, manufacturing workflow, business models and customer experiences.
- **i.materialise:** Online service where customers can buy 3D printed products or create their own and offer them for sale to others through this platform.

3 Design and Engineering

- Services provided by highly specialized designers and CAD engineers that offer design and software support for additive manufacturing, including **remodeling and file preparation**, as well as **3D scanning and measuring**.
- These services are intended to add value to the product design, ranging from **improved performance to lowered cost**.

Strategy

"Printing on demand in one of the world's largest 3D printing factories while improving software solutions and acting as incubators for new verticals through the host of co-creations with industry leaders." - Materialise Investor Presentation

Sales and Marketing

The distribution of the **manufacturing services** is carried out by:

- Sales force
- Online portal
- Complex product offerings are addressed directly by specialized sales managers
- Straightforward products can be ordered directly through the automated system "**Materialise OnSite**".

Customer Segments

The customer base for the manufacturing segment are included in the following industries:

- Automotive
- Aerospace
- Healthcare
- Industrial machining art and design
- Consumer products






Ecosystem Partners



Sources: Annual Report, MTL Investor Presentation 2018

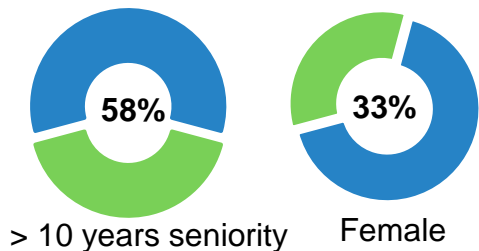
FY19 Highlights	Main Products			
<p>10 > customers 22% of Revenue</p>	<p>MAGICS Revenue Model</p> <ol style="list-style-type: none"> Sources of revenue in this segment are maintenance contracts, software licenses, and hardware controller sales along with custom software development services. Licensing software products can be done perpetually or on a time-basis, along with annual maintenance contracts for software updates or support <p>Magics' applications include:</p> <ul style="list-style-type: none"> repairing and optimizing 3D models & analysing parts designing support structures making process-related design changes on STL¹ files process planning & documenting customer projects nesting multiple parts in a single print run 	<p>Further offerings help complement the Magics' Platform that provide automation and other productivity improvements.</p> <ol style="list-style-type: none"> <i>Magics Essentials</i>: entry-level package offering premium data preparation functionality which is used together with machine build preparation software. <i>Magics Print</i>: conglomerates the key build preparation tools and straightforward build file generation technology (offered to machine manufacturers as a product enhancement to their machines' sale). Upgrading to the expert Materialise Magics provides full data and build preparation functionalities in one package: <ul style="list-style-type: none"> <i>Streamics</i> <i>3-maticSTL</i> <i>e-Stage</i> <i>Build Processors and Machine Control Software</i> <i>Materialise Controller</i> <i>MiniMagics and MiniMagicsPro</i> 		
<p>Revenues €42M</p>			<p>Revenue Share 21%</p>	<p>Growth rate 11.5%</p>
<p>EBITDA €14M</p>	<p>Strategy "Offer proprietary software worldwide through programs and platforms that enable and enhance the functionality of 3D printers and 3DP operations" – Materialise Investor Presentation</p>	<p>Sales and Marketing</p> <p>The distribution of the software is carried out by:</p> <ul style="list-style-type: none"> OEM Partner Sales Direct Sales Third-Party Distributors <p>Local offices offer technical help before and after the sale. OEMs and dealers often distribute software products combined with 3D printers to enhance the printers' value proposition and application.</p>	<p>Customer Segments</p> <p>The customer base includes:</p> <ul style="list-style-type: none"> 3D printing OEMs Manufacturers in other industries: consumer goods, automotive, aerospace, and hearing aid industries R&D departments Internal & External 3D printing service offices. 	<p>Ecosystem Partners</p>
<p>EBITDA mg 33%</p>		<p>Employees 303 FTE</p>		
<p>1 See glossary for the definitions</p>	<p>Sources: Annual Report, MTLs Investor Presentation 2018</p>			
<p>Company & Market Overview</p>	<p>Value Creation & Business Plan</p>	<p>Exit & Returns</p>	<p>Exit Options & Due Diligence</p>	

FY19 Highlights	Subsegments	
<p>Revenues €61M</p>	<h3>Medical Software</h3> <ul style="list-style-type: none"> Materialise's software allows medical-image based analysis, engineering and 3D printed customized designs of surgical guides, implants and other anatomical models. Materialise generates revenues in this sub-segment by selling licenses to its medical software packages (eg. <i>Materialise Mimics/ 3-matic/ OrthoView/ ProPlan CMF</i>) and software maintenance contracts. Materialise Mimics is a medical software that allows 3D models to be printed accurately from medical imaging-data eg. CT or MRI's. Currently, there are over 250 hospitals worldwide that use Materialise Mimics Technology, especially in the Cardiac, Orthopedic, Vascular, Neurological and Hepatobiliary areas. 	<h3>Clinical Services</h3> <ul style="list-style-type: none"> Materialise provides customers with 3D printed surgical guides and patient specific medical implants, allowing doctors to pre-operate in models with the exact scenario they will face in the actual surgical intervention. The procedure to develop a customized implant involves: 1) Sending Materialise a CT scan; 2) Materialise's clinical engineers to organise a plan and design a proposal; 3) Doctors evaluating the proposal and give feedback; 4) Materialise producing and shipping the personalised implant, custom instruments and bone models to support the surgery. The 3D printed surgical guides include: shoulder, osteotomy, knee and hip replacement surgeries, whilst the 3D printed implants are for shoulder, hip and CMF implants.
<p>Revenue Share 31%</p>	<h3>Strategy</h3> <p><i>"Offer products and services that address long-term trends in the medical industry towards personalized, functional and evidence-based medicine"</i> - Materialise Investor Presentation</p>	
<p>Growth rate 16%</p>	<h3>Sales and Marketing</h3> <p>The distribution of medical software is carried out by:</p> <ul style="list-style-type: none"> Direct sales force Website PACS partners <p>The distribution of 3D printed medical devices is executed through agreements with collaborative partners. Clinical services may also be carried out by Materialise's own engineers that developed close connection with key customers.</p>	<h3>Customer Segments</h3> <p>The customer base for the Medical Segment products and services include:</p> <ul style="list-style-type: none"> Medical Device Companies Hospitals Universities Research Institutes Industrial Companies
<p>EBITDA €11M</p>	<h3>Ecosystem Partners</h3>	
<p>EBITDA mg 18%</p>		
<p>Employees 763 FTE</p>	<p>Sources: Annual Report, MTLs Investor Presentation 2018</p>	
<p>3D Printing Machines 32</p>	<p>Company & Market Overview Value Creation & Business Plan Exit & Returns Exit Options & Due Diligence</p>	

	KEY MEMBERS	EXPERIENCE	CAPABILITIES	FIT VALUATION
Executive Committee	 <p>Wilfried Vancraen Founder & CEO 30 years</p>	<p>Prior experience: engineering and consulting. Founded Materialise in 1990 and since then has been recognized with several awards as the most influential person in Additive Manufacturing and one of the biggest contributors to the industry (RTAM/SME Industry Achievement Award, 2013 Visionaries! Award) </p>	<p>Product and Industry expertise: Vision, Technical Know-how, Passion.</p>	
	 <p>Peter Leys Executive Chairman 7 years</p>	<p>Prior to being appointed director and Executive Chairman in 2013, Mr. Leys was a Corporate Finance Partner at Baker & McKenzie CVBA. He holds a Candidacy Degree in Philosophy from KU Leuven and Master of Law degrees from the University of Georgia and the KU Leuven.</p>	<p>Financial expertise: M&A knowledge, capital markets understanding, contract building & negotiation, philosophy and law.</p>	

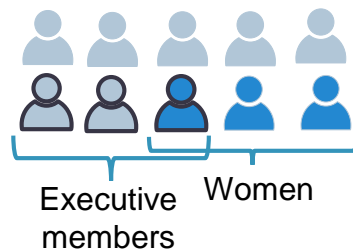
Key Metrics

EXECUTIVE COMMITTEE



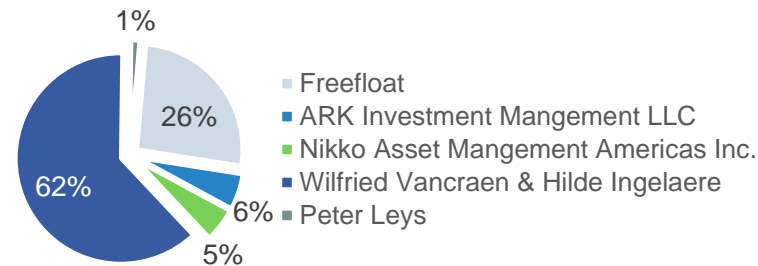
The Executive Committee is composed by 12 members

BOARD OF DIRECTORS



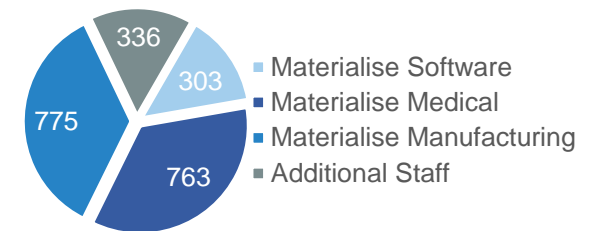
The BoD is composed by 7 fully independent members. There are 2 committees: 1) Audit & 2) Remuneration and Nomination Committee

SHAREHOLDER STRUCTURE



The above graph refers to the beneficial ownership of Materialise's ordinary shares as of April 24th 2020.

EMPLOYEES



Materialise employed 2,177 people in 2019, growing the team by 8.4% YoY.

Sources: See Appendix 1 for further information on the Management Team

Sources: Annual Report, Investor Relations

Company & Market Overview

Value Creation & Business Plan

Exit & Returns

Exit Options & Due Diligence

Company Overview

Additional Executive Committee members



Hilde Ingelaere Education: 2 Masters - Bioengineering and Business Administration; Experience: Cardiovascular clinical research and business analyst; Materialise: Joined in 1990, became a director in 1997 (managed HR, legal and finance departments) and became Executive VP of MTLN Medical in 2011;



Bart Van Schueren Education: Master in Mechanical Engineering and PhD in SLM Sintering; Experience: Worked as a liaison engineer & set up research activities of a Co. Materialise: Joined in 1995 and ran the 3D printing service bureau. Became Executive VP in 2011 and CTO in 2016;



Johan Pauwals Education: Master in Electro-Mechanical Engineering w/ Stereolithography; Materialise: Joined in 1990 and worked as a software sales manager, Director of Sales and in 2011 became Exec. VP being responsible for global software;



Johan Albrecht Education: Master in Corporate Finance; Experience: CFO & member of the Executive Committee (EC) & Director of a global laboratory (BARC NV); EC of Cerba European Lab (acquirer of BARC); Materialise: Joined in 2015 in representation of Alfinco BVBA;



Steaftaan Motte Education: 2 Master - Mathematics and Applied Informatics; Experience: Software architect and project manager of NXP Semiconductors; Materialise: Joined in 2010 for the cranio-maxillofacial business, in 2012 became the Director of the Clinical Business Unit and in 2015 was VP & General Manager of MTLN Software;



Brigitte de Vet-Vei Education: Master in Business Administration majoring in Engineering; Experience: VP at Cordis Neurovascular and GM. Became CEO of Acertys group (provider of medical devices and software); Materialise: Joined in 2016 in representation of De Vet Management BVBA as a VP for the Medical segment;



Jurgen Laudus Education: Master in Engineering; Materialise: Joined in 2001 as a project manager, Rapid Tooling sales support and production management, International Production Manager for the AM services and Sales Manager. Became VP of the manufacturing segment;

EXECUTIVE COMMITTEE

Name	Age	Gender	# years at Materialise NV	Position
Wilfried Vancraen	58	Male	30	Founder, Director & CEO
Peter Leys	55	Male	7	Executive Chairman
Hilde Ingelaere	58	Female	30	Director & Executive VP - Medical
Johan Pauwels	52	Male	30	Executive VP - Software
Bart Van der Schueren	53	Male	25	Executive VP & CTO
Johan Albrecht	56	Male	5	Executive VP & CFO
Stefaan Motte	43	Male	10	VP & Materialise Software segment
Brigitte de Vet-Veithen	49	Female	4	VP & Materialise Medical segment
Jurgen Laudus	41	Male	19	VP & Materialise Manufacturing segment
Eduard Crits	61	Male	2	CIO
Conny Hooghe	54	Female	3	VP & Human Resources
Carla Van Steenberghe	44	Female	17	VP & CLO

BOARD OF DIRECTORS (BOD)

Name	Age	Gender	# years at Materialise NV	Position
Wilfried Vancraen	58	Male	30	Founder & CEO
Peter Leys	55	Male	7	Executive Chairman
Johan De Lille	57	Female	14	Independent Director
Hilde Ingelaere	58	Female	30	Director & Executive VP - Medical
Pol Ingelaere	84	Male	9	Independent Director
Jurgen Ingels	49	Male	7	Independent Director
Jos Vander Sloten	57	Male	13	Independent Director
Lieve Verplancke	60	Female	5	Independent Director
Bart Luyten	43	Male	3	Independent Director
Volker Hammes	56	Male	2	Independent Director

Source: Annual Reports; Materialise's Website

Market Overview

Political

- 3DP requires political intervention as it could threaten people's security. Governments may need to control the dispersion of 3D printers by developing a database with all the locations and holders of 3D printers.
- Government may need to intervene in order to prevent the production of **illegal products** that could lead to the creation of black markets.
- Finally, another issue that requires political intervention is the 3DP of designs that have **intellectual property rights**.

Economic

- Given the current economic outlook, **subsidies and grants** for research and development are likely to fall, which will surely impact the 3DP market.
- Likewise, **taxation** is expected to rise in the overall economy both direct and indirect.
- Finally, the private sector will also face great challenges accessing **debt markets** at reasonable conditions.

Social

- 3DP allows companies to run their production in any part of the world. This will create **pressure on the “traditional” manufacturing market** as there is great concentration of production and employment in industrial regions.
- The rising trend for the use of **social networks** may play a crucial role in the evolvement of 3DP. People will want to share their own customized 3D printed designs with friends, family and society as if they were sending photos or videos.

Technological

- 3DP is considered a **disruptive technology** in the manufacturing market, as it allows for the production and sharing of customised products and designs.
- However, the 3DP market has **not yet reached its peak** or maturity, as new technologies arise allowing people to model even more their designs and use different materials.

Legal

- The 3DP market highly relies on **intellectual property (IP)**. Manufacturers and software designers are protected by patents for a limited number of years. However, with the growth of the 3DP market new legislation will be required.
- As it was mentioned in the political factors, the breach of IP rights and contraband production are issues that put constrains on the development of the 3DP market and that call for heavy legislation.

Environmental

- When it comes to **mineral resource consumption** and **water waste**, 3DP is considered more sustainable than the traditional industrial manufacturing process.
- On the other hand, researchers claim that the 3DP process has high **energy demands**, which can contribute to the emissions of Greenhouse Gases (GHG's).

Source: Corporate Finance Institute

Historical Financials | Income Statement

Income Statement (in €m)	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Software	11	13	18	26	30	36	37	42
Medical	25	28	30	35	38	43	52	61
Manufacturing	23	27	33	41	46	64	95	94
Total Revenue	59	69	81	102	114	142	185	197
Growth %	-	17%	18%	25%	12%	24%	30%	7%
Gross Profit	35	42	49	59	68	80	102	110
Gross Margin %	60%	60%	60%	58%	59%	56%	55%	56%
Research and development expenses	(9)	(11)	(15)	(18)	(18)	(20)	(22)	(23)
Sales and marketing expenses	(20)	(22)	(28)	(37)	(36)	(39)	(46)	(53)
General and administrative expenses	(8)	(9)	(12)	(15)	(20)	(25)	(32)	(32)
EBITDA (unaudited)	5	8	5	3	8	13	22	26
Adjustments to EBITDA	0	0	1	1	1	2	1	0
Normalized EBITDA (unaudited)	5	8	6	4	9	15	24	27
EBITDA margin %	9%	11%	7%	4%	8%	10%	13%	14%
Net profit	1	3	2	(3)	(3)	(2)	3	2
Profit Margin %	2%	5%	2%	-3%	-3%	-1%	2%	1%

Comments

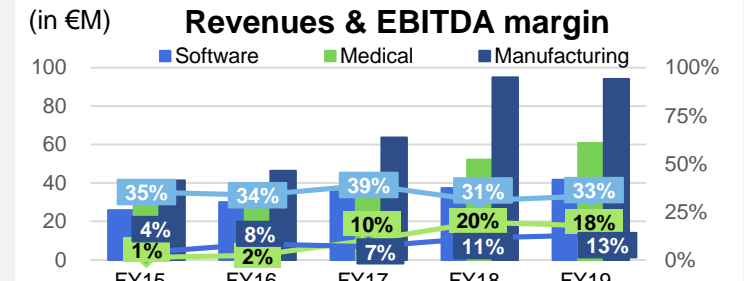
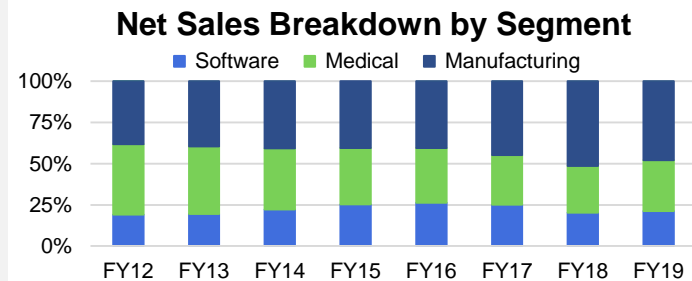
The Medical Segment revenue growth from FY17-18 was entirely due to an increase in partner sales, especially in the business lines of CMF, shoulder and knee devices. From FY18-19, the acquisition of **Engimplan** contributed with **€2.4m additional revenue** and while observing continued growth from partner business sales (especially CMF).

The acquisition of **ACTech** resulted in **€43.4m additional revenue** from the sale of printed industrial and consumer products, causing the manufacturing segment to weigh 51.4% of revenues compared to 44.7% in FY17.

The stagnation of growth in manufacturing revenues due to a less favorable economic scenario in FY19 (i.e. trade war) broke the revenue trend, although partially offset by increases in other segments.

Increase in costs mainly reflect the acquisition of ACTech. Increasing operation costs mainly driven by S&M and G&A expenses, both largely composed by payroll expenses.

Materialise reaches profitability after increases in revenues from ACTech more than offset increase in costs.

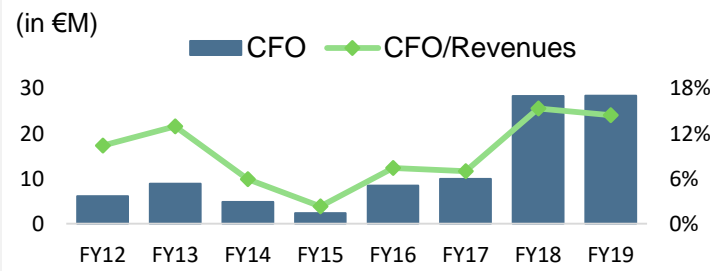
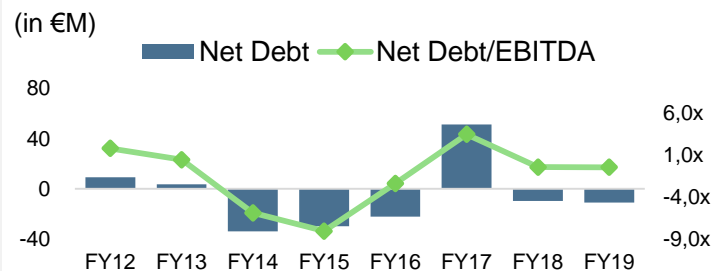


Sources: Annual Report, Investor Relations

Historical Financials | BS & CFS

Balance Sheet (in €m)	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Cash and Cash Equivalents	6	13	51	51	56	43	116	129
NWC w/ Cash	4	7	53	46	48	35	96	107
Equity	13	18	85	83	79	77	136	143
Net Debt	9	4	(34)	(30)	(22)	51	(9)	(11)
Net Debt/EBITDA	2x	0x	-6x	-8x	-2x	4x	0x	0x
ROE	11%	19%	2%	-3%	-4%	-3%	2%	1%
ROA	3%	6%	1%	-2%	-2%	-1%	1%	0%

Cash Flow Statement (in €m)	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Normalized EBITDA	5	8	6	4	9	15	24	27
Income tax paid	0	0	(0)	(0)	(1)	(2)	(1)	(2)
CFO	6	9	5	2	8	10	28	28
Purchase of PPE	(4)	(2)	(10)	(9)	(12)	(28)	(18)	(13)
Acquisition of Subsidiary (net of cash)	0	(0)	(10)	(2)	0	(27)	0	(6)
CFI	(5)	(3)	(31)	(3)	(13)	(59)	(22)	(26)
Net Proceeds of Loans & Borrowings	3	1	(1)	1	12	42	14	17
Capital Increase in Parent Company	(1)	0	70	1	0	0	60	1
CFF	2	1	62	(2)	9	38	65	11
CFO/Revenues	10%	13%	6%	2%	7%	7%	15%	14%
CFO/Assets	13%	16%	4%	2%	5%	4%	9%	8%
CFF/CFO	39%	8%	1282%	-76%	109%	382%	230%	38%



Comments

1 In June 2014, Materialise went public and sold around 8 million ADS's at a price of \$12.00 per ADS. According to Materialise's financial reports, the company received net proceeds from the **IPO** of approximately \$88.3M.

2 In July 2018, MTLs closed a **private placement** of around 2M ordinary shares to BASF Antwerpen. One week later the company performed a **secondary public offering** of over 3M ADSs at a price of \$13.00 per ADS. Collectively, these capital increases rendered approximately \$65.2M in net proceeds for MTLs.

3 Usually in possession of more cash & eq. relative to its financial obligations, we can see a temporary switch in 2017 given a major increase in Loans & Borrowings to fund ACTech (€27.2M) and PPE (€27.7M).

4 In 2014, MTLs acquired **OrthoView**, an Orthopedic Pre-Operative Planning Software Co. In 2017, acquired **ACTech**, full-service manufacturer of complex metal parts. On August 2019, Materialise concluded the acquisition of **Engimplan**, a Brazilian company specialized in manufacturing of orthopaedic and CMF implants and instruments.

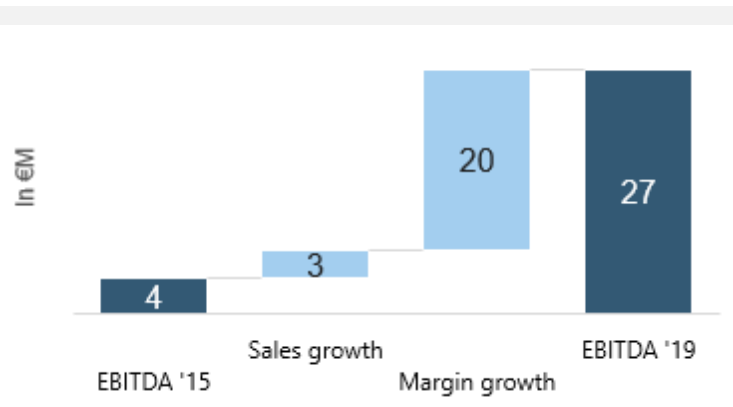
5 This increase in Loans & Borrowings reflect the financing of ACTech's acquisition, expansion of PPE and R&D projects.

Sources: Annual Report, Investor Relations

Historical Financials | FCF

CAPEX (in €M)	FY15	FY16	FY17	FY18	FY19	Free Cash Flow (in €M)	FY15	FY16	FY17	FY18	FY19
Purchase of PPE	(9)	(12)	(28)	(18)	(13)	EBITDA	4	9	15	24	27
Proceeds from of PPE & intangibles	0	2	0	0	0	Depreciation & Amortization	(7)	(8)	(13)	(17)	(19)
Purchase of intangible assets	(2)	(2)	(4)	(2)	(2)	EBIT	(3)	1	2	6	7
Acquisition of subsidiary (net of cash)	(2)	0	(27)	0	(6)	Operating Taxes	0	(2)	(1)	(0)	(3)
CAPEX	(12)	(13)	(59)	(20)	(22)	Maintenance CAPEX	(7)	(8)	(13)	(17)	(15)
Maintenance	(7)	(8)	(13)	(17)	(15)	Expansion CAPEX	(5)	(4)	(46)	(3)	(6)
Expansion	(5)	(4)	(46)	(3)	(6)	Change in NWC	1	2	(7)	10	3
						FCF	(6)	(3)	(52)	13	5

EBITDA Growth



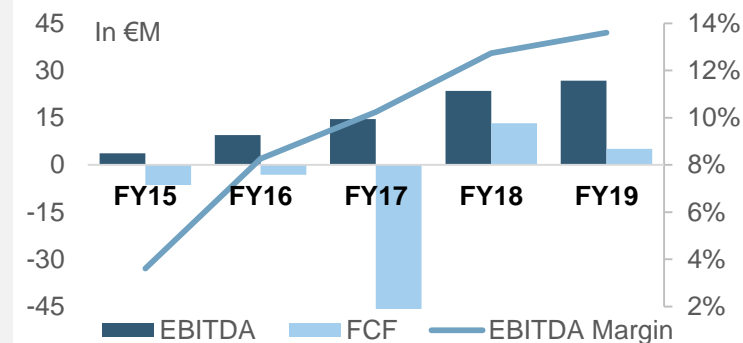
1 EBITDA experienced a constant growth since 2015 with a **CAGR of 73%**. The rise in EBITDA is mainly explained by the **EBITDA Margin improvement** and a smaller part driven by revenue growth.

CAPEX & NWC

2 In 2017 Materialise acquired ACTech, a German full-service manufacturer of complex metal parts, for a total of €28M in cash. This acquisition led to a drastic change in the expansion CAPEX and consequently a very negative FCF in 2017 of around €52M.

3 The Net Working Capital has been changing steadily over the period of 2015 to 2019. These changes are mainly explained by the acquisitions and strategic partnerships that Materialise established over the past few years. Not only ACTech in 2017 but also Engimplan in 2019.

Free Cash Flow

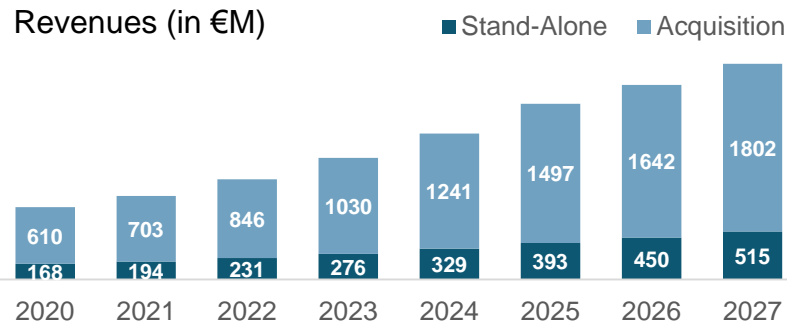


4 The FCFs have been unstable mainly due to the CAPEX, which includes acquisitions of subsidiaries. However, since 2018 the cash flows have been increasing driven by the EBITDA growth.

Sources: Annual Report, Investor Relations

Business Model | Overall Business Plan

Top Line



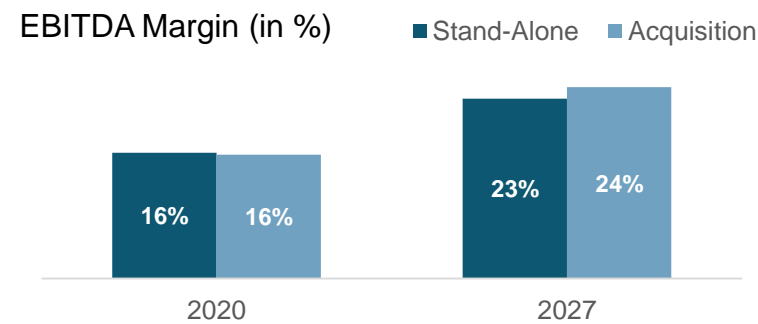
1 Standalone Scenario

Increasing focus in the **APAC** and **US** regions by engaging in strategic partnerships. Special focus in Workflow & CAD Software, in order to enable customized mass-production. Expand the offer of **metal-based printing**, key growth area with increasing demand in the AM industry. In terms of revenues, the period 2020-2027 has a **CAGR of 17.3%**.

2 Acquisition Scenario

This growth can be explained by the revenue synergies arising from the vertical and horizontal integration of Stratasys into Materialise's business. Post-acquisition the company becomes an **all-in-one supplier** which allows for the target of a larger customer base. In terms of revenues, the period 2020-2027 has a **CAGR of 16.7%**.

Bottom Line



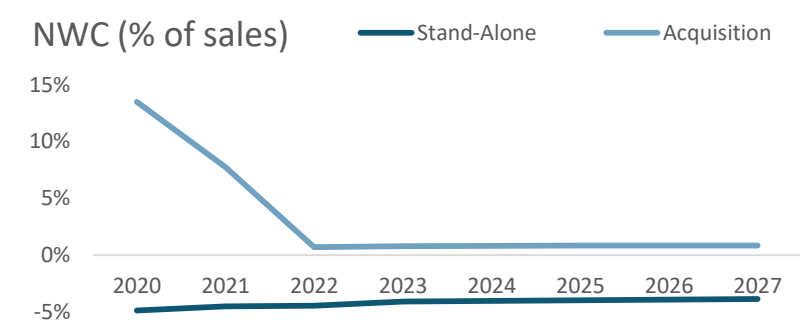
1 Gross Margin (GM)

Materialise already possesses a strong GM when compared to its top competitors. In 2019 Materialise's GM was 61% while Stratasys had a GM of 49%. Post-acquisition, Materialise's **operational efficiency** will contribute to the improvement of Stratasys margins. In addition, the company will also benefit from a **higher bargaining power** with suppliers.

2 EBITDA Margin

In the Stand-Alone scenario Materialise is expected to be able to improve its EBITDA margin at a **CAGR of 5.2%** between 2020 and 2027. With the acquisition of Stratasys, the company will benefit from **R&D and SG&A synergies**, mainly in the Service Provider segment. This will result in a **CAGR of around 6.4%** of the EBITDA margin between 2020 and 2027.

Investments



1 Net Working Capital (NWC)

In 2019, Materialise's **NWC** was **-4%** of revenues, meaning a quick generation of cash from operations, while Stratasys had **32%**. Post-acquisition, the company will hold a stronger bargaining power with its customers and suppliers. In the acquisition scenario, from 2020 to 2022 the NWC will fall steadily, until it remains constant at around 1% from 2022-onwards.

2 CAPEX

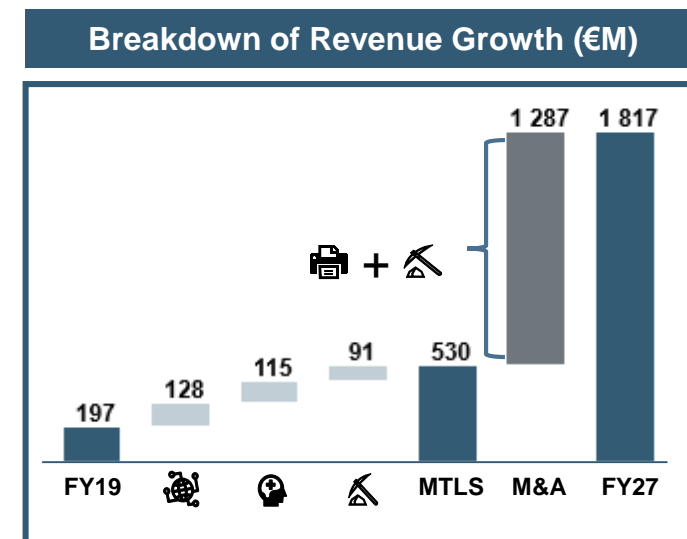
In the stand-alone scenario CAPEX will slightly decrease from 8% to 3% of sales until 2027. In the acquisition scenario, the CAPEX will require **larger investments** in order to streamline operations across countries. On the other hand, there will also be **divestures** in the geographical areas where both companies are present.



Individual Paper

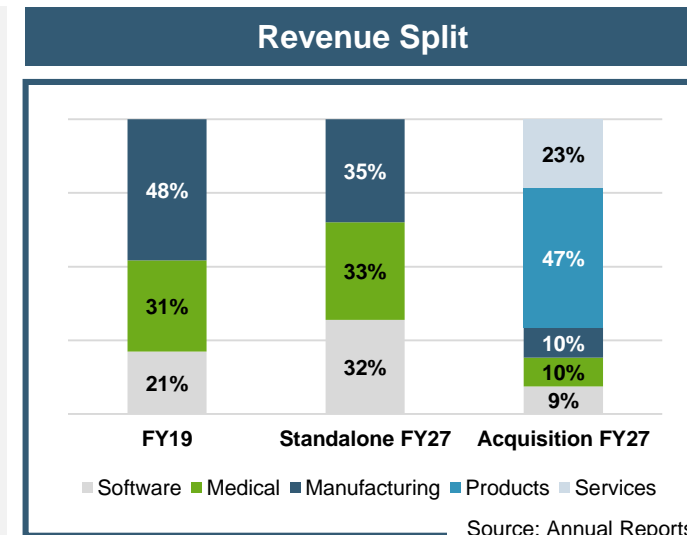
Business Model | Revenue Breakdown and Growth Analysis

Revenues (in €M)	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	CAGR 20-27
Software	42	43	52	65	81	101	126	146	170	22%
Medical	61	60	68	80	93	109	128	150	175	17%
Software	19	21	24	29	35	41	49	58	69	18%
Devices & Services	41	39	43	50	59	68	79	91	106	16%
Manufacturing	94	71	80	94	110	129	150	167	185	15%
Materialise - Standalone	197	174	200	238	284	339	404	463	530	17%
Products	383	279	330	406	498	613	753	803	856	17%
Services	183	161	183	214	250	292	342	379	421	15%
Stratasys	566	440	513	619	748	905	1 094	1 182	1 277	16%
Synergies (cross-selling, recognition, etc.)		1	4	5	6	7	9	10	10	
Combined Revenues		615	717	863	1 038	1 251	1 508	1 654	1 817	17%



Growth Drivers

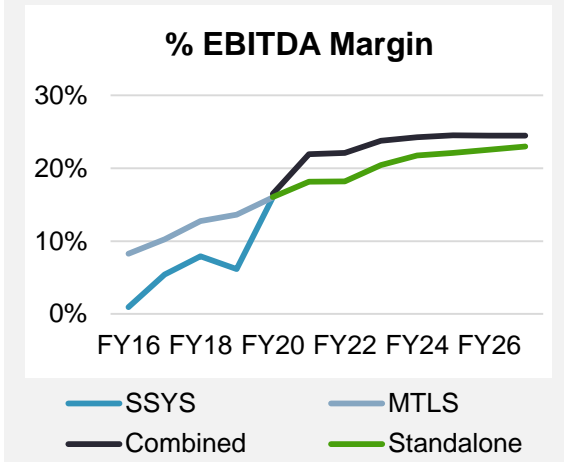
- 3DP solutions are set to become game changers for companies in the 2020s, with innovation at its peak, we will see **players tackling adoption barriers such as the high cost of AM materials and machines**, while information about this technology becomes widespread.
- With Asia surging ahead and the west losing some ground, Materialise's **investment in APAC** will help the company be one of the leading services provider. Additionally, in an acquisition scenario, Stratasys' presence will help reduce the investment needed while providing a more complete package of solutions to consumers.
- Software** will benefit from a growing demand for scalability by address the problem of mass production for large manufacturers who are switching their production methods and adopting 3D solutions. This segment will be at the core of the escalation of 3DP use, hence the more optimistic forecasted growth rates across reports.
- Niche end-markets** such as the Medical segment will continue benefitting from the tailor-made solutions 3D printing is able to provide for special medical conditions.



Business Model | Margin Improvements & Cost Synergies

M€	MTLS		MTLS + SSYS							SSYS		
Margins	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY19 Rate	Haircut	New rate
Gross Profit	121	356	419	506	625	756	914	1,003	1,102			
% margin	61%	58%	59%	59%	60%	60%	61%	61%	61%	56%	7%	59%
SG&A	(80)	(208)	(214)	(257)	(305)	(362)	(434)	(476)	(523)			
% SGA/ Sales	41%	34%	30%	30%	29%	29%	29%	29%	29%	35%	31%	24%
R&D	(22)	(52)	(54)	(65)	(79)	(96)	(116)	(127)	(140)			
% R&D/ Sales	11%	8%	8%	8%	8%	8%	8%	8%	8%	15%	25%	11%
Other Op. Income	8	5	5	5	5	5	5	5	5			
EBITDA	26.8	101	155	189	247	304	370	405	445			
% EBITDA margin	14%	16%	22%	22%	24%	24%	25%	24%	24%	6%	-	-

A 75% realization rate was applied, considering McKinsey's study of average rates observed in the market



With a **22.6% CAGR**, EBITDA rose steadily as a result of:

- Higher gross margins with increased procurement negotiation power due to size increase;
- Increasing cost efficiencies in overheads;
- Leveraging on horizontal integration in 33% of SSYS' business regarding physical structures and personnel;
- Advantages from productivity best practices;

Source: Deloitte; McKinsey

Cost Synergies

1 COGS

Gross Margin improvement is possible due to:

- Increased **negotiation power** with suppliers, enabling capitalizing on **scale** to improve procurement deals thus reducing raw materials' costs.
- The boost in market power resulting from the business combination can lead to Stratasys' services margin improvement to levels similar to main competitors. Additionally, tapping into new markets will likely result in higher bargaining power as supplier choice increases and transportation costs reduced due to a larger global presence.

2 SG&A

For MTLS, 35% of SG&A costs relate to G&A costs and the remaining 65% to S&M. We have assumed similar proportions to SSYS. With M&A, **shared service centres** and the development of concise marketing efforts will lead to significantly lower SG&A expenses. Adding to this, with **strategic sourcing** and scaling on one of the **Enterprise Resource Planning systems** we also reduce 10% the S&M costs with the products' segment, overall shrinking our SG&A/Sales ratio by roughly **31%** during the forecasted period.

3 R&D

Spending in R&D will be cut to **11%** as per MTLS' level and the amounts reserved for the services segment will disappear as there is already R&D being done for MTLS equivalent segment.

Business Model | Cannibalization & Restructuring Costs

Cannibalization

Vertical integration may potentially lead to a loss of sales in specific customer groups, as some client segments turn into competitors.

1 **Products' Risk**
 Stratasys' **hardware segment** may be at risk after the merger as a considerable portion of their customer base are companies alike Materialise that operate as service providers. Materialise's direct competitors that are also Stratasys clients may dislike seeing their supplier joining efforts with their main rival and wish to switch suppliers, leading to a loss of business to this segment. Nonetheless, in Stratasys' case this effect is mitigated since 32% of its current business (services segment) is already competing with Materialise and its hardware clients, and so it is expected that if any customers were to decide changing suppliers of 3DP machines they would have already done so. Moreover, given that all machines are patented and only a handful of companies provide each type of technology, as the M&A consolidates, there is a higher chance of providing more competitive prices and thus increasing customer retention. As a result, and although hard to estimate, we are assuming a cannibalization effect around **1% to 3% of the products' segment** for forecasting purposes.

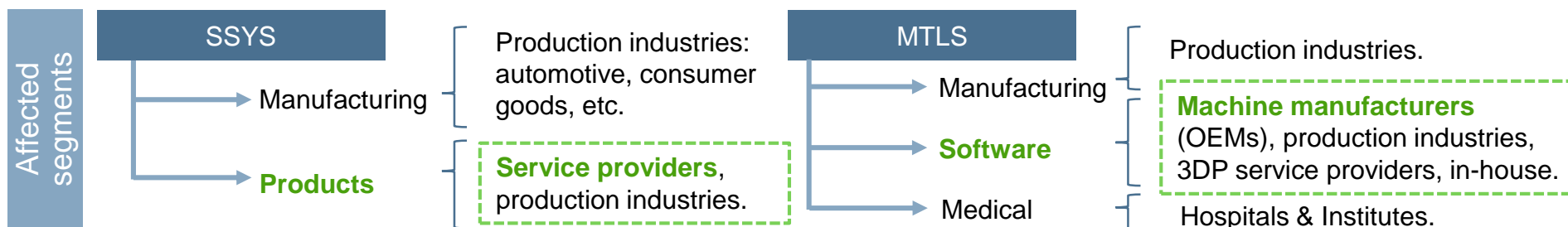
2 **Software's Risk**
 Likewise, Stratasys' competitors who are customers of Materialise, specifically in the **software segment**, may choose to switch suppliers. However, most consumers are only end-users in the value chain, which means that there is little incentive to switch vendors as there is no direct competition between producers and consumers in this market. Additionally, software solutions are often tailor-made and based on licensing, which further reduces switching incentives. Although this figure is also hard to estimate, we are accounting for this effect through a cannibalization effect of **2% to 3% in the software segment**.

Restructuring Costs

One-time costs resulting from the **acquisition of Stratasys** are likely to occur. These could relate to 1) Sell-offs of the target's assets; 2) Conversion of different information technology platforms; 3) Severance packages from contract termination as certain departments will be reduced; 4) Early retirement incentives and 5) Facility combination costs regarding the reallocation and reorganization of the business, and other integration costs.

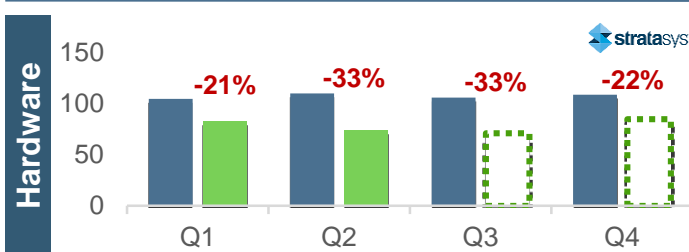
We have estimated these costs to be a percentage of the synergies achieved in SG&A expenses. After analysing past acquisitions done by Materialise, we assumed a restructuring cost rates higher than past acquisitions due to the dimension of the business combination.

Source: Annual Reports

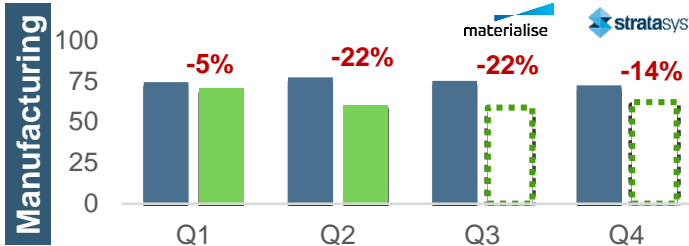


Business Model | COVID-19 Impact

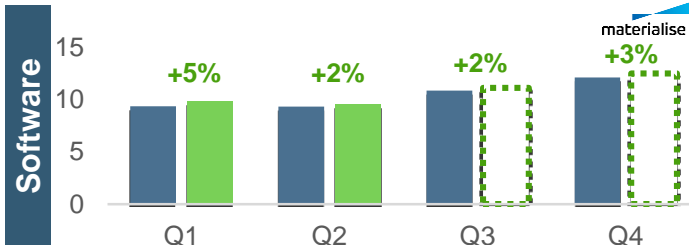
Sales Volume in €M: 2019 vs 2020



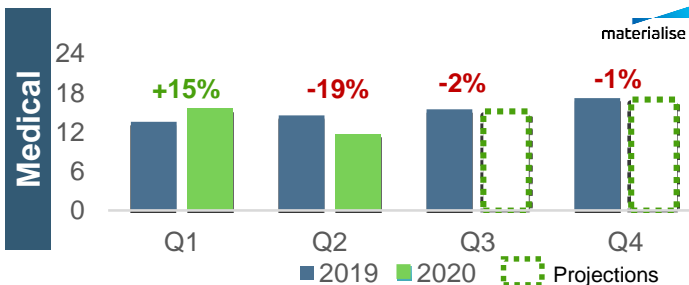
Negative Impact: Stratasys suffered a decrease in sales volume of printers of more than 25% in the first 6 months of 2020, compared to the same period in 2019. The absence of positive indicators on the recovery in the industrial sector led us to predict for Q3 and Q4 similar levels of demand to those of the last quarters.



Negative Impact: In this segment, both companies saw their sales decline sharply in 2020, driven by the halt in the overall industry as a result of the lockdown and travel bans. Just as in the Hardware segment, the estimated impact for Q3 and Q4 was in line with the last semester.



Positive Impact: Leveraging from online shared designs and developing software capabilities, companies can produce critical parts with any decentralized 3D-printing facility. **Negative Impact:** Sales of software products and services that are tied with manufacturing segment were strongly affected.



Positive Impact: Despite the downturn in Q2, this segment has potential to recover mainly due to 1) allocation of 3D printers to hospitals and transportation hubs to serve the emergent needs of the medical profession, avoiding disruptions in supply chain; 2) production of personal and protective equipment for protection against the pandemic

Customers

Estimated drop in sales in 2020 (vs 2019)



Aerospace
-50%



Automotive
-20%



Manufacturing
-10%

Most of the industries that Additive Manufacturing segments supplies to have been strongly affected by the measures put in place because of COVID, namely travel bans and lockdowns.

Outlook beyond 2020

Opportunities: After an increase in demand for 3D printed products by some customers, these are expected to reevaluate their long-term supply chain strategy based on the experience now gained.

Economic Crisis: After the pandemic crisis, it is still unpredictable how fast can the economy recover, and especially which companies and sectors will survive after the end of financial support schemes provided by governments. 3D Printing is still an expensive option of production and requires large capital requirements that might be an unviable choice in this context.

2021 Forecasts: When projecting revenues for 2021 it was assumed a discount factor of 20% for the pre-COVID expected CAGR. Despite the pandemic being controlled in 2021, the economic crisis will prevent major disruptions in the AM industry.

Source: AMPower Report; Aerospace Market: IATA; Automotive Market: Counterpoint Research; Manufacturing: Institute for Supply Management (ISM)

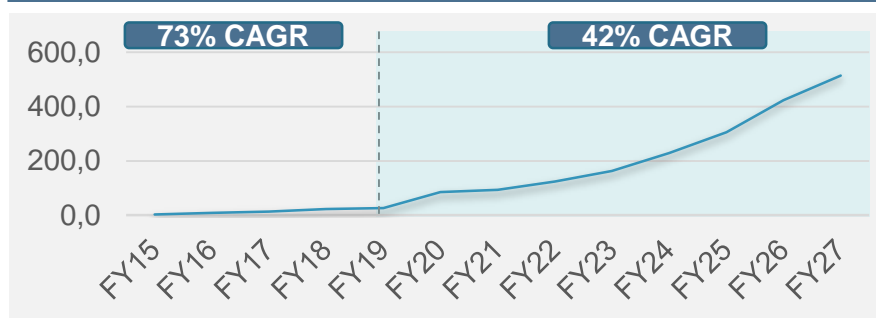
Business Model | Cashflow Statement – Acquisition Scenario

Free Cash Flow (in €M)	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
EBITDA	98	155	189	247	304	370	405	445
Depreciation & Amortization	(54)	(62)	(69)	(78)	(86)	(96)	(95)	(93)
EBIT	43	94	119	169	217	274	310	351
Operating Taxes	(13)	(28)	(35)	(50)	(64)	(81)	(92)	(104)
Maintenance CAPEX	(45)	(48)	(54)	(61)	(68)	(75)	(74)	(73)
Expansion CAPEX (organic)	0	(13)	(13)	(13)	(13)	(13)	0	0
Expansion CAPEX (inorganic)	(424)	0	0	0	0	0	0	0
Divestitures	14	3	0	0	0	0	0	0
Change in NWC	91	28	49	(2)	(2)	(2)	(1)	(1)
FCF	(279)	98	135	120	157	199	238	267

Free Cash Flow

Free Cash Flows to the firm, at the beginning of the holding period, reflect the expansion investment in the acquisition of Stratasys. This negative cashflow will be compensated by a facility contracted to finance the acquisition. After this investment, with stronger profitability and market presence, Materialise's cashflows start to be notably high.

EBITDA Growth (€M)



EBITDA has been constantly growing since 2015 driven by both revenues increase and margins' improvement. In this business plan, the goal is to continue this path, not only leveraging from the overall market growth, but also focusing on growing in new geographies and on creating synergies with Stratasys.

CAPEX

Maintenance Capex will grow in line with the projected increase in sales volume. As it refers to the capital necessary for the company to continue operating, it will be proportional to the firm's productive capacity. However, due to the scale effect, these expenses should gradually start to represent a smaller percentage of sales.

Expansion Capex (organic) is related to the growth strategy of Materialise for the APAC market where new offices and production centers will be opened.

Expansion Capex (inorganic) is the value that will be paid for Stratasys acquisition in the first year of the holding period.

Divestitures in PP&E are made in some locations where Stratasys and Materialise are both operating.

NWC

Net Working Capital

Both companies have considerable working capital requirements. However, through M&A, increases in bargaining power will help reduce the Cash Conversion Cycle, as shown in the changes in NWC until 2022. Thereafter, the conversion cycle are expected to remain stable.

Source: Annual Reports

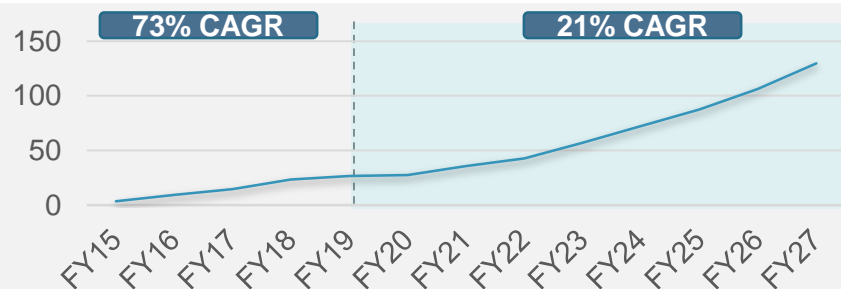
Business Model | Cashflow Statement – Standalone Scenario

Free Cash Flow (in €M)	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
EBITDA	28	36	43	58	74	89	104	122
Depreciation & Amortization	(15)	(15)	(16)	(17)	(18)	(18)	(17)	(16)
EBIT	13	21	27	41	56	71	87	106
Operating Taxes	(3)	(5)	(7)	(11)	(16)	(20)	(25)	(31)
Maintenance CAPEX	(15)	(15)	(16)	(17)	(18)	(18)	(17)	(16)
Expansion CAPEX (organic)	0	0	0	(10)	(10)	(6)	0	0
Expansion CAPEX (inorganic)	0	0	0	0	0	0	0	0
Divestitures	0	0	0	0	0	0	0	0
Change in NWC	0	1	2	1	2	2	2	2
FCF	10	16	21	21	32	47	64	78

Free Cash Flow

Free Cash Flows to the firm in the standalone scenario gradually increase as operating profits rise. After 2023, the company is then in conditions to invest in its expansion into other markets, which leads to greater cash inflows thereafter.

EBITDA Growth (€M)



EBITDA has been constantly growing since 2015 driven by both revenues increase and margins' improvement. In the business plan for the standalone scenario, the goal is to continue this path, leveraging from the overall market growth within certain followed strategies and from efficiency improvements.

CAPEX




Maintenance Capex will grow in line with the projected increase in sales volume. As it refers to the capital necessary for the company to continue operating, it will be proportional to the firm's productive capacity. However, due to the scale effect, these expenses should gradually start to represent a smaller percentage of sales.

Expansion Capex (organic) reflects the growth strategy to penetrate the APAC market through the opening of new offices and production centers. Cash generation levels in this scenario only allow for the expansion plans to start when market conditions become more stable, after the expected economic recovery post-pandemic to enable the necessary production for the increased demand and to reduce investment risks.

NWC

Net Working Capital –
In contrast with the acquisition scenario, no major changes occur in the cash conversion cycle throughout the holding time period. Materialise will continue managing its working capital cycle in line with the previous years, roughly at a constant percentage of sales.

Source: Annual Reports

Exit Overview		Likelihood				
IPO	<ul style="list-style-type: none"> Both Materialise and Stratasys have already been listed in the stock market, alike the very few large players operating in this industry. Driven by the increasing demand for 3D printed products, stock prices in this industry have been trending, and more private and institutional investors are being attracted to invest in this sector. The success of this IPO will be sustained by the positive financial indicators that Materialise presents, such as revenue growth, EBITDA growth, profitability, as well as other non-financial factors like quality of management, corporate strategy and market presence. Despite these internal factors, the outcome will be also dependent on the underlying capital market conditions that cannot be evaluated at this stage. 	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>				
Strategic Sale	<ul style="list-style-type: none"> Typically, a strategic sale is the most desirable exit option, since the buyer is willing to pay a premium for the acquisition. In the case of Materialise, which is aiming at leading the 3D Printing market, there will be few or no competitors in conditions to acquire such a large corporation. The main potential buyers could be, instead, large companies that do not operate strictly in the AM industry, and that would leverage from Materialise as to increase their expertise and presence in the market: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #1a3d4d; color: white;">Buyer</th> <th style="background-color: #1a3d4d; color: white;">Rationale</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">  </td> <td> HP is a multinational technological company with a market cap of €31.5bn. Its 3D Printing segment is still residual comparing to its other business lines, but the company is increasing its focus on this market. In 2019, HP opened a 3D Printing and Digital Manufacturing, expanding HP's global 3D printing and digital manufacturing footprint. HP management has already pointed out their commitment with betting in the AM industry considering that COVID-19 has highlighted the importance of having the capability to quickly manufacture products onsite. Leveraging from its brand reputation and from Materialise's market presence, HP could become the main player in 3D Printing. </td> </tr> </tbody> </table>	Buyer	Rationale		HP is a multinational technological company with a market cap of €31.5bn . Its 3D Printing segment is still residual comparing to its other business lines, but the company is increasing its focus on this market. In 2019, HP opened a 3D Printing and Digital Manufacturing, expanding HP's global 3D printing and digital manufacturing footprint . HP management has already pointed out their commitment with betting in the AM industry considering that COVID-19 has highlighted the importance of having the capability to quickly manufacture products onsite. Leveraging from its brand reputation and from Materialise's market presence, HP could become the main player in 3D Printing .	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Buyer	Rationale					
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Secondary Sale	<ul style="list-style-type: none"> Given the exit valuation of Materialise, a secondary sale is unlikely in the European market. Conversely, the US private equity market has seen deals with considerably larger sizes compared to Europe, making it a viable option. However, at the time of our exit, we believe there will be fewer opportunities for value creation through synergies as the company scales and matures internationally. Moreover, we expect organic growth rates to be significantly lower given the market conditions after our exit that are not expected to be as auspicious as in the next 5-7 years. Hence, it would be difficult for a private equity firm to generates similar returns in a typical LBO investment horizon. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>				

Source: HP's Website

A full due diligence is required to validate the key points of the commercial, operational and financial areas

Exit Strategy | Due Diligence

	Key Points	Rationale	Relevance
Commercial	▪ Market Analysis	1. Analyze the main growth drivers of the AM market globally and by segment.	■ ■ ■ ■ ■
	▪ Consumer Behaviour	2. Assess Materialise’s geographical presence with special focus on the Asia-Pacific and Americas regions.	■ ■ ■ ■ ■
	▪ Competitive Landscape	3. Understand the current trends of the overall manufacturing segment and why consumers are shifting from “traditional” manufacturing towards 3D printing solutions.	■ ■ ■ ■ ■
	▪ M&A Deals	4. Deep analysis of the major AM players per segment with special focus on their strategy, product offering and geographical presence.	■ ■ ■ ■ ■
Operational	▪ Cost Structure	5. Evaluate how top competitors will react to Materialise’s acquisition of Stratasys and how they will adjust their strategy.	■ ■ ■ ■ ■
	▪ Oper. Improvements	6. Analyze past M&A deals in the AM market, the challenges faced during the integration process and the benefits attained in terms of profitability.	■ ■ ■ ■ ■
		1. Understand Materialise’s cost structure and how it will adjust to the acquisition of Stratasys in terms of COGS, SG&A and R&D.	■ ■ ■ ■ ■
Financial	▪ Financial Risks	2. Study Materialise’s contracts with key suppliers and clients and evaluate if they can be restructured to improve the company’s NWC.	■ ■ ■ ■ ■
	▪ Potential Deal Breakers	3. Deep analysis of the acquired company and how the integration process will generate synergies and create added value.	■ ■ ■ ■ ■
Management	▪ Corporate Governance	1. Full comprehensive analysis of Materialise’s financials and the correctness of the reported data. Special focus on the company’s cash flow generation, earnings and CAPEX estimation.	■ ■ ■ ■ ■
		2. Study the company’s long-term liabilities and how the repayment schedule is structured.	■ ■ ■ ■ ■
		3. Analyze off-balance sheet assets and liabilities and if they might be understated or overstated.	■ ■ ■ ■ ■
		4. Search for potential deal breakers of the acquisition in terms of compliance, taxes, financing, valuation and price.	■ ■ ■ ■ ■
		1. Analyze Materialise’s current management, the incentive mechanisms and how to structure the management team in order to successfully implement the proposed strategy.	■ ■ ■ ■ ■



Individual Reflection

Context

The Additive Manufacturing (AM) industry is divided in 4 key areas that are interdependent. **1) Hardware Manufacturers** build the 3D printers and design them according to specific materials and technologies. **2) Software Producers** are considered the backbone of the AM industry and depending on their specialty (eg. Simulation, CAD or Workflow software) they focus more on production towards customization or mass-production. **3) Service Providers** operate across multiple industries including Automotive, Healthcare and Construction. Companies within these industries hire Service Providers for special projects, such as the production of a prototype for testing or the production of complex parts. **4) Material Suppliers** work directly with Service Providers or large corporations that already have their own 3D printers for in-house production. The two main materials for used 3D printing are polymers and metal.

Key Trends

- The industry is moving closer together. Through **M&A activity** or **Strategic Partnerships** the top players are starting to become **all-in-one-suppliers**, which enables them to target a larger customer base and to control the whole supply chain.
- Large corporations are investing greatly in 3D printing for **in-house production**. The process starts by hiring service providers for one-time projects and working together with them to co-create prototypes and complex parts. This way the company starts to gain expertise and capability to acquire their own 3D printers and start producing in-house. However, there will always be some degree of dependency for AM companies, not only in terms of software licenses and maintenance contracts, but also in more challenging projects where service providers still play a key role.
- **Metal** is stepping ahead polymers and other composite materials in the Automotive and Construction industries. The ability to withstand high temperatures, resistance and low cost makes it a clear investment target for top AM players.
- 3D printing is moving towards **mass-production**. Conventionally, 3D printing is associated with the production of customized products, since the traditional manufacturing industry has less flexibility to switch production lines. However, through the development of workflow and CAD software, a clear tendency trend towards mass-production in 3D printing is being noticed.

Opinion

Although the Americas region is still the number one user and producer of 3D printing, AM players are moving slowly into the **ASAP** region. In my opinion, this movement is explained by the key trends above. The Asia-Pacific region, especially China, are investing greatly in 3D printing solutions, which will allow them to be pioneers in the use of 3D printers for mass-production specially through metal-based materials. Thus, I believe the future of the Additive Manufacturing industry is in the Asia-Pacific region and that top players will become even larger through M&A activity and strategic partnerships, creating great barriers to entry in this market. In the future, it is expected that 3D printers will become available all over the world and China will definitely play a key role in this process.



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