

3D-printing

The next **industrial revolution?**

For marketing purposes only

Open End PERLES on the Solactive 3D Printing NTR Index

I. 3D Printing – an industrial revolution

For many years now three-dimensional printing methods have been mesmerizing the whole world without losing any of their appeal. 3D printing involves the process of creating real-world objects layer by layer, on the basis of digital models. Soon, in the ideal case, pretty much every consumer should be able to print out just about any object simply and quickly in the required size and with the right dimensions, on pretty much any material. "3D printing will remain a long-term opportunity," according to the analysts of UBS (UBS study "Longer Term Investments, Automation and Robotics", 01/2016). This positive outlook is also supported by the sales forecasts for the sector. The market research company Wohlers Associates expects revenues in the sector, which amounted to around USD 7.3 billion in 2016, to grow to around USD 21.2 billion by 2020.

Three dimensional printing was originally used in manufacturing for the production of prototypes and temporary models. Yet this technology has rapidly advanced in recent years. The following are some pertinent examples of what 3D printing can do today: custom-fit shoes, ticking clocks, functional batteries and roadworthy cars; all designed on a computer and printed in 3D. It is even possible to reproduce a wide range of complex shapes using scanners. There is also hope of being able to reproduce human organs in future – prostheses and implants are already being printed in 3D.

II. Advantages of 3D printing technology

Much is expected of the relatively new field of 3D printing. The advantages of this technology over standard processes are obvious: Alongside individual, custom-fit design opportunities, objects can be produced at short notice and as needed using 3D printing. It thus cannot be excluded that 3D printing could revolutionize the established model of industry. Existing high-end devices are already capable of scanning objects and reproducing low volume production runs. If 3D printing truly lives up to its potential, it could open up major opportunities for growth in as-yet minor sectors, which could even produce pioneers of the burgeoning economic segment. What's more, it would make devices in the private sector increasingly affordable. So the technology could have significant implications for home use as well as the mass market.



SVSP product type

Tracker certificates (1300)

Currency	Valor	SIX Symbol
CHF	22988011	PRTCH
EUR	21025522	PRT3D
USD	22988010	PRTUS

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Solactive 3D Printing NTR Index



Solactive 3D Printing NTR Index (USD)

Return p.a.	3.2%
Volatility p.a.	27.3%
Sharpe Ratio	0.1

Source: Bloomberg, UBS
Period: 19.03.2013 to 28.04.2017, past performance is not indicative of future performance.

III. Current 3D printing processes

The current 3D printing processes differ primarily based on the materials used. The workpieces produced are generally constructed with the aid of physical or chemical hardening or smelting processes. For example, pulverized metals can be "baked" together layer by layer using selective laser smelting and electron beam smelting. Similarly, objects can also be constructed from polymers and ceramics, not just metal, using a 3D printer. Using stereolithography, structures can be formed from liquid synthetic resins by means of a layered application and hardening process. Fused Deposition Modeling (FDM) works in a similar manner, liquefying plastics and sometimes synthetic resins using heat and applying these on top of each other, layer by layer, at the desired position.

IV. Transparent index process

Based on the specifications of the index provider Solactive AG, the Solactive 3D Printing Net Total Return Indices target the pioneers in the 3D printing industry. Only companies that meet several quality standards are included on the shortlist. Every index member needs to demonstrate that a significant share of its business is focused on the 3D printing sector, or that the company is currently developing its own 3D printing division with the potential to bring in a major share of overall revenue. The concept of the indices also takes account of the dynamic environment of this highly innovative business segment, as at present no-one knows what direction the developments of 3D printing will take and which companies will ultimately dominate. The respective index concept therefore provides for a "fast entry" rule alongside the twice-yearly index adjustments, which take place in March and September: This ensures that stock companies can be incorporated in the index at any time, e.g. immediately after an initial public offering, provided they meet the quality standards.

This also means that the equities of each company have to be listed with an exchange that grants trading access to foreign investors without restrictions. Furthermore, to be included in the index, market capitalization must amount to at least 50 million US dollars and the average daily trading volume for the past three months must amount to at least 250,000 US dollars for reasons of liquidity. When the index is adjusted, all index members are weighted equally, whereas companies with a market capitalization below 250 million US-Dollar are capped at 2.5%.

V. Members of the Solactive 3D Printing Net Total Return Indices

Company	Country	Market capitalization (in USD)	Weighting
3D Systems Corp	United States	1.80 bn	11.48%
Autodesk Inc	United States	20.02 bn	11.11%
ExOne Co/The	United States	0.16 bn	2.24%
FARO Technologies Inc	United States	0.62 bn	11.48%
Materialise NV	Belgium	0.51 bn	14.31%
MGI Digital Graphic Technology	France	0.28 bn	2.34%
Organovo Holdings Inc	United States	0.30 bn	10.49%
Proto Labs Inc	United States	1.55 bn	11.88%
SLM Solutions Group AG	Germany	0.76 bn	10.64%
Stratasys Ltd	United States	1.31 bn	14.02%

As of: 28.04.2017

Source: Solactive (the current index composition and weighting is published daily on www.solactive.com)

VI. The product solutions

The UBS Open End PERLES on the Solactive 3D Printing Net Total Return Indices track the performance of the underlying index, which reinvests any net dividends from index members after deducting the management fee of 1.00 percent without limited maturity.

	CHF-Tranche	EUR-Tranche	USD-Tranche
Issuer	UBS AG, London Branch	UBS AG, London Branch	UBS AG, London Branch
SSPA product type	Tracker certificates (1300)	Tracker certificates (1300)	Tracker certificates (1300)
Conversion ratio	1:1	1:1	1:1
Management fee	1.00% p.a.	1.00% p.a.	1.00% p.a.
Expiry	Open End	Open End	Open End
Underlying (Currency)	Solactive 3D Printing Net Total Return Index (CHF)	Solactive 3D Printing Net Total Return Index (EUR)	Solactive 3D Printing Net Total Return Index (USD)
Issue price	CHF 182.00	EUR 100.00	USD 193.57
Listing date	16 December 2013	28 March 2013	16 December 2013
ISIN / SIX Symbol	CH0229880114 /PRTCH	CH0210255227 /PRT3D	CH0229880106 /PRTUS

VII. Opportunities

- Equity-linked participation in the growth potentials of the 3D printing industry.
- Transparent and targeted index structure that can also add new index members at any time ("Fast Entry" rule) in order to react quickly to the development dynamics in the 3D printing sector.
- The selection of index members from the 3D printing sector, to which special growth potential can be assigned is carried out by the index provider Solactive AG.
- Diversification within the 3D printing sector through several equities with a regular index review twice a year.
- Tradable every trading day under normal trading conditions.
- No fixed term restriction.

VIII. Risks

- No capital protection: investors run the risk of losing their investment if the price of the underlying index worsens.
- The 3D printing sector is a relatively young economic sector and it is not yet certain whether it will fulfil its expectations and which companies will actually succeed.
- Investors bear the issuer risk and could lose their investment if the issuer files for bankruptcy.
- The issuer intends to ensure liquidity in normal market phases on trading days. However, investors should realize that they may not be able to buy /sell the product at any point in time.
- As the stocks included in the index may be listed in different currencies and the product does not have any currency hedges, the investor may also be exposed to an exchange rate risk, which may adversely affect the value of the product.
- The issuer has the right to terminate the product if certain conditions are met.

Investor profile

Solutions for investors with experience in stock market topics and structured products and with a medium to increased risk tolerance who would like to participate in the performance of the equities included in the index at little capital and administrative expense.

For other products and information on opportunities and risks visit: ubs.com/keyinvest

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