



STOXX



The future of investing and investing in the future

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27 September 2018

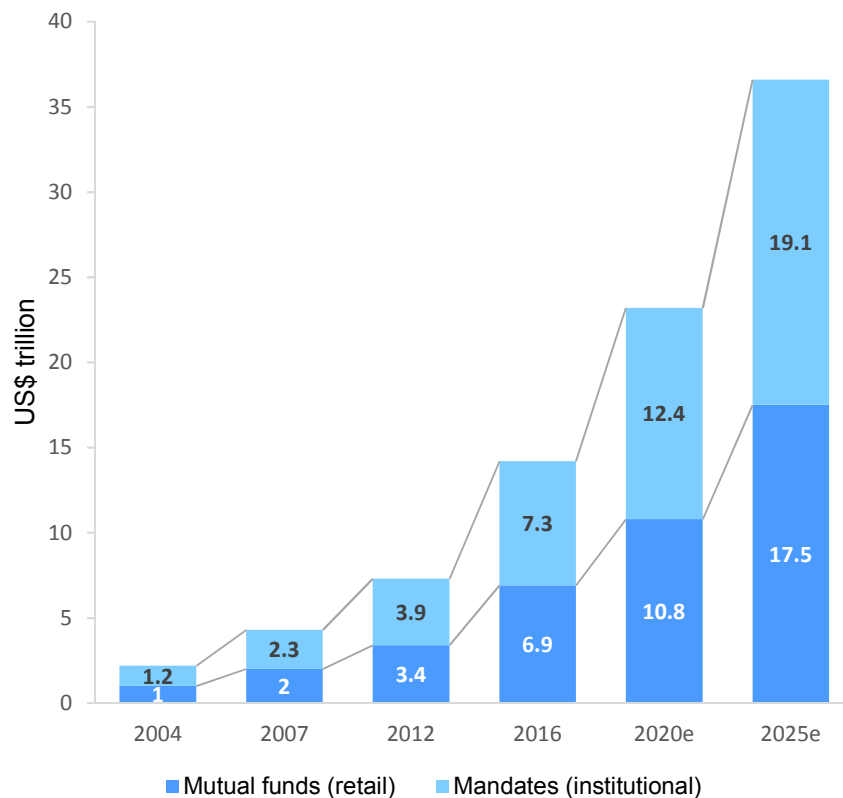


Total passive assets expected to increase to US\$36 trillion

Extensive adoption of and spending on big data and Artificial Intelligence (AI)

The growth in retail is expected to be partly driven by the emergence of ETFs.

Passive investment estimation



Source: PWC (Asset & Wealth Management Revolution 2017)

- Buy- and sell-side investments related to controlling and exploiting the plethora of data will exceed US\$7 billion by 2020.
- In 2017, financial firms are expected to spend more than US\$1.5 billion on AI-related technologies and US\$2.8 billion until 2021, representing an increase of 75 per cent.

Source: OPIMAS



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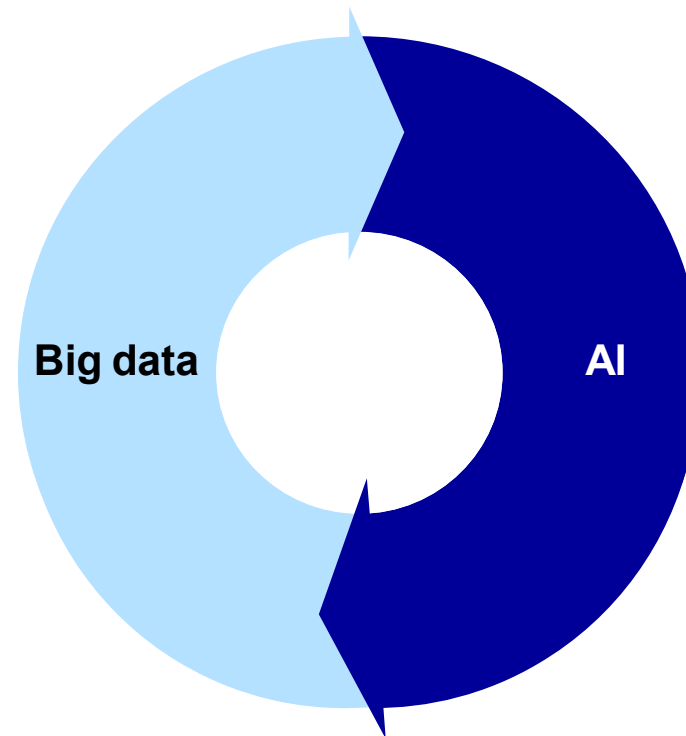
How to deal with big data
and complexity in
indexing?

Big data and AI – two sides of the same coin

“[...] large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions”

Source:

https://en.oxforddictionaries.com/definition/big_data



“The theory and development of computer systems are able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.”

Source:

https://en.oxforddictionaries.com/definition/artificial_intelligence

Step 1: finding the right partner

Yewno

The logo for Yewno, featuring the word "Yewno" in a bold, black, sans-serif font on a light gray rectangular background.

- Yewno builds knowledge discovery software and services, leveraging machine learning, computational linguistics and a vast reservoir of information from the most respected content providers in the world.
- Their technology began as academic research in applied mathematics. The goal was to better understand political, economic, financial and social data.
- Headquartered in Redwood City, California, and with offices in New York and London

Step 2: setting the stage – the development of knowledge graphs

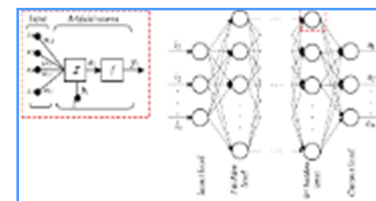
The use of “knowledge graphs” to understand and identify Artificial Intelligence

- Interpreting **Artificial Intelligence (AI)** as a **concept**
- **A concept** is an abstraction of an idea, a thought, a theme or an expression portrayed in various forms.

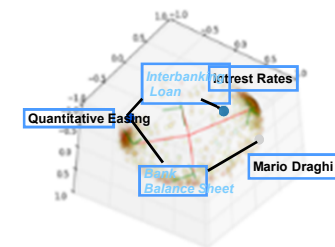
- Yewno’s **knowledge graph** is able to recognise a concept amongst an enormous volume of unstructured data and to project its significance into an inferential semantic space. In this space, such a concept is correlated with others so as to create a mesh of potential inferences.



Identification and extraction of concepts



Analysis of correlation and construction of inferential space



Projection of knowledge space and elaboration of inferences

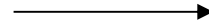
Step 3: putting knowledge graphs to use

Asset universe

AI patents

AI producers and consumers¹⁾

Global universe of assets
constituents of the
STOXX Developed and
Emerging Markets Total
Market Index



Knowledge graph assists
decision-making process
on determining patents
that are related to AI



US and international patents
database



Portfolio of companies with
International Patent (IP) in AI,
i.e., with granted patents that
are related to AI

List of
International
Patent
Classification
(IPC) codes
relevant for AI



1) The analysis is repeated on a quarterly basis based on a three-year historical timeframe.

Step 4: defining AI IP exposure and AI IP contribution

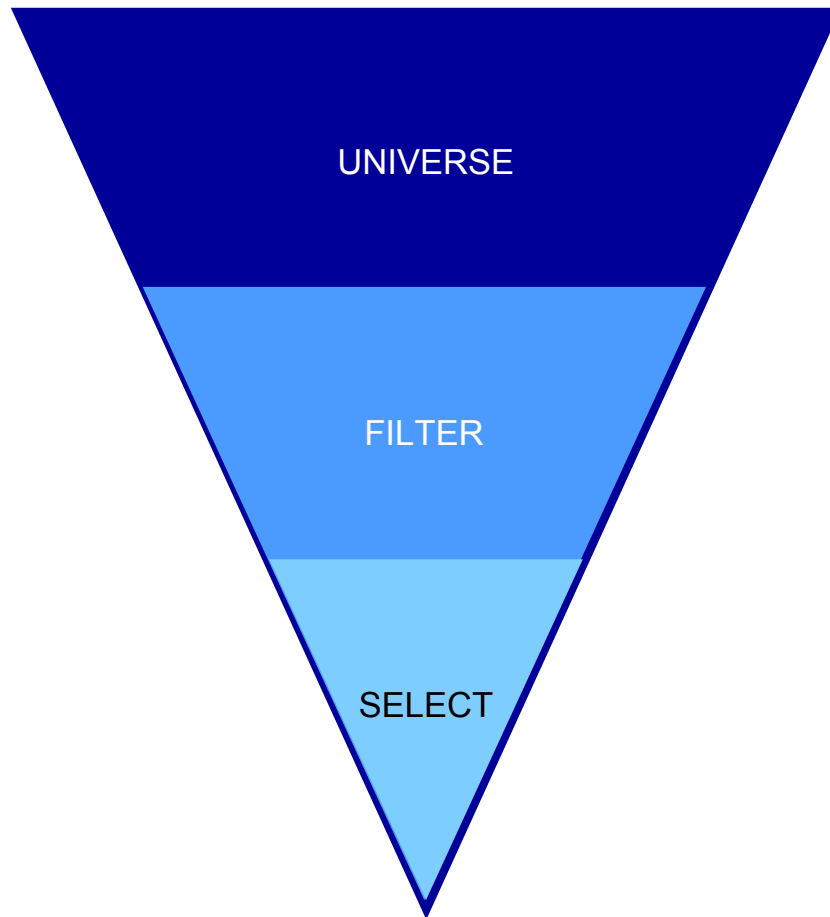
AI IP exposure

- This measure indicates the **percentage of total AI patents** granted to a company vs the total number of patents granted to that company over the same period.
- Indicates the significance of AI intellectual property to the company's business activities

AI IP contribution

- This measure indicates the percentage of total AI patents granted to a company vs the total number of AI patents granted globally over the same period.
- Indicates the significance of each company in the AI space

Step 5: constructing the index



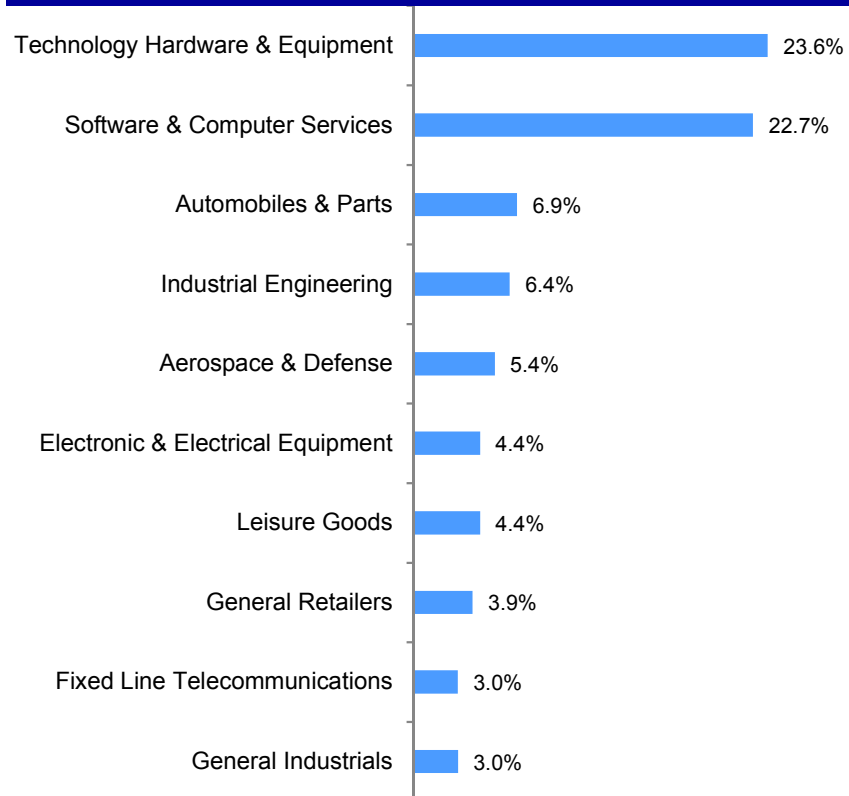
- The universe of companies consists of the constituents of STOXX Developed and Emerging Markets Total Market Index.

-
- Companies are included in the index if they own significant AI-related AI IP indicated by having an ...
 - AI IP exposure as well as an
 - AI IP contributionwhich fall above the twenty-fifth percentile in both dimensions.

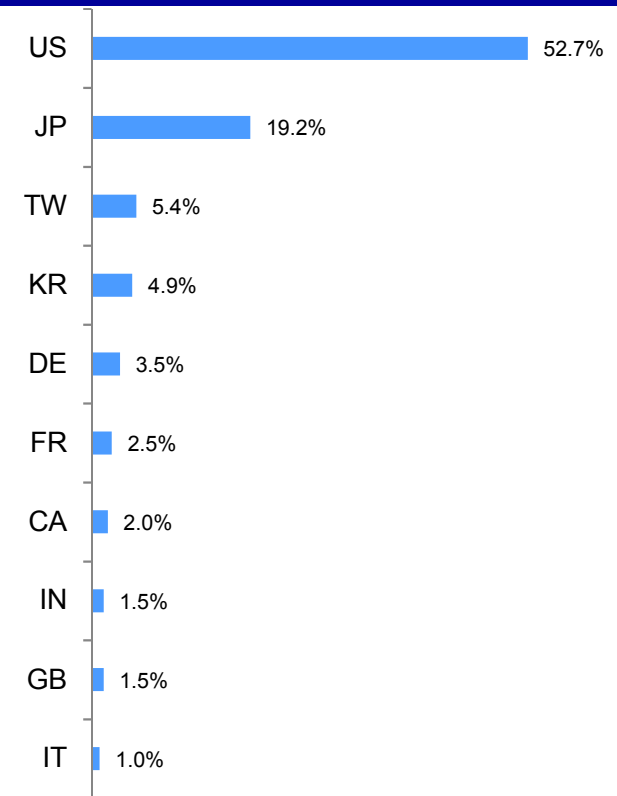
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- Companies are equally weighted.

Industry and country allocation

ICB industry allocation [top 10]



Country allocation [top 10]



Index constituents (top 10 by FF-MC)

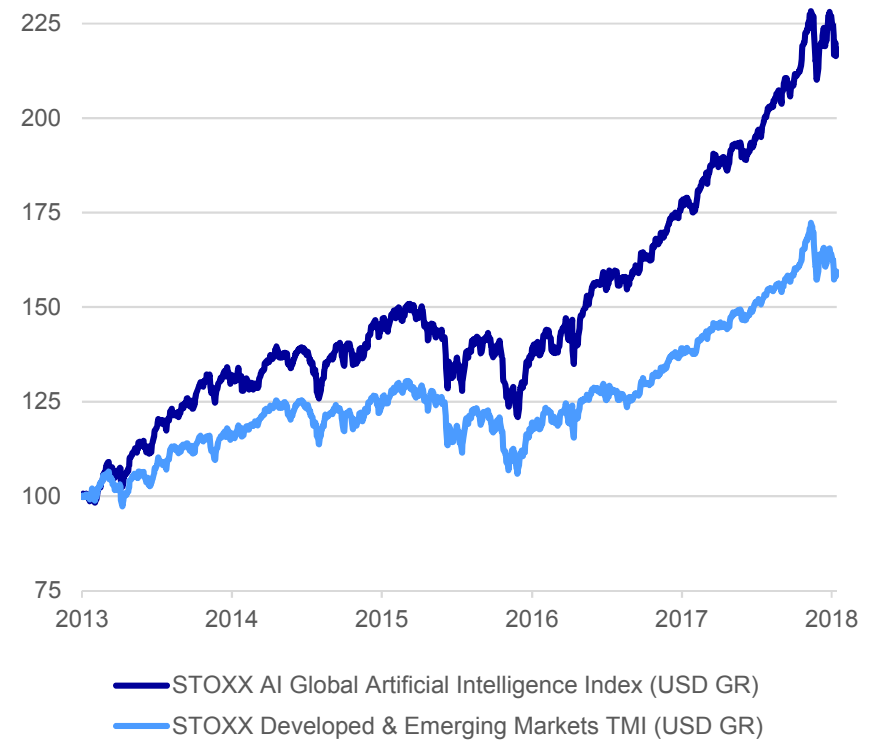
Name	ISIN	FF-MC	3-m ADTV	Weight
Apple Inc.	US0378331005	\$911,249,581,611	\$4,544,241,000	0.49%
Microsoft Corp.	US5949181045	\$666,386,342,703	\$1,733,159,000	0.49%
Amazon.com Inc.	US0231351067	\$477,104,240,669	\$3,851,007,000	0.49%
FACEBOOK CLASS A	US30303M1027	\$428,603,657,802	\$2,892,265,000	0.49%
JPMorgan Chase & Co.	US46625H1005	\$380,007,918,714	\$1,276,939,000	0.49%
ALPHABET CLASS C	US02079K1079	\$331,575,186,963	\$1,396,993,000	0.49%
Bank of America Corp.	US0605051046	\$286,861,628,287	\$1,857,400,000	0.49%
Samsung Electronics Co Ltd.	KR7005930003	\$280,032,240,541	\$512,521,100	0.49%
AT&T Inc.	US00206R1023	\$236,144,414,736	\$1,305,403,000	0.49%
Verizon Communications Inc.	US92343V1044	\$217,226,432,255	\$829,992,800	0.49%

Risk and return – overview

Risk and return characteristics¹⁾

	STOXX AI Global Artificial Intelligence Index	STOXX Developed and Emerging Markets TMI
YTD return	2.8%	-1.0%
1y return	22.5%	15.0%
3y return	14.9%	8.7%
5y return	17.0%	9.8%
1y volatility	9.2%	8.3%
3y volatility	11.8%	11.1%
5y volatility	11.2%	10.5%
Maximum drawdown	-19.9%	-18.8%
5y Sharpe ratio	1.42	0.90

Index performance²⁾



1) STOXX data as of March 2018, USD gross return. Annualised returns and annualised volatility (standard deviation) figures are used for returns other than year-to-date.

2) For the period March 2013 to March 2018



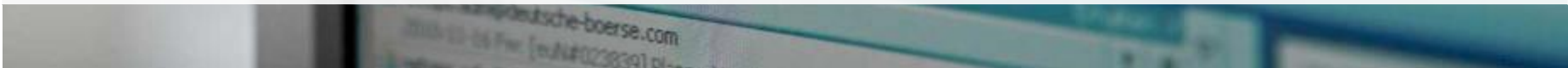
Thank you for your attention

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