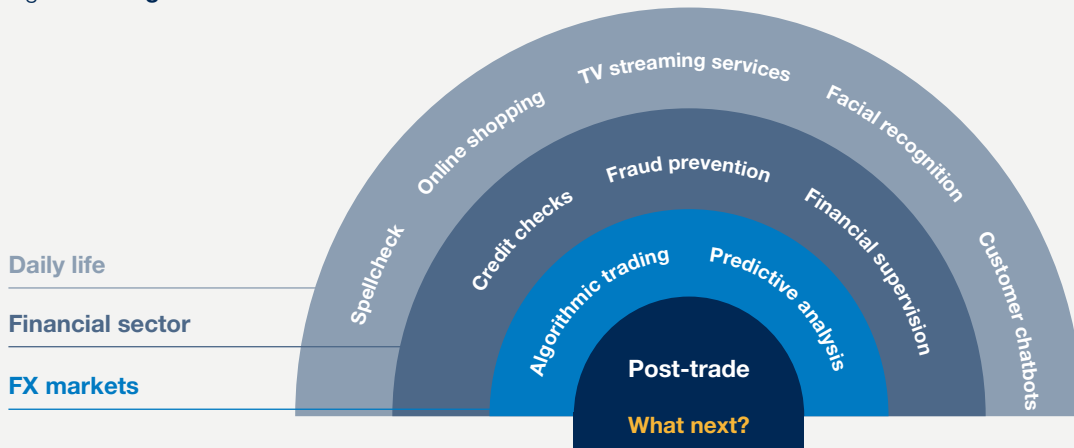CLS
trusted market solutions

AI for FX:

Igniting the ecosystem

Artificial intelligence (AI) has transformed our daily lives. So too has it disrupted the financial services industry. The FX market has been slower than most in their uptake of AI, but thanks to the growing availability of that magic ingredient – data – we are now experiencing an AI revolution in the trading space. This paper offers insights into AI's increasing role in the FX market, explains CLS's involvement in aggregating FX data and considers what comes next.

Figure 1: **Integration of AI**

Daily life

Financial sector

FX markets

TV streaming services
Online shopping
Facial recognition
Fraud prevention
Spellcheck
Credit checks
Financial supervision
Algorithmic trading
Predictive analysis
Customer chatbots
Post-trade
What next?

What, where, when and wh(AI)?

"Artificial intelligence", or "AI",[1] has become a ubiquitous term in recent years with use cases arising in many facets of life.[2] Although often considered nascent technology, particularly in the financial sector, AI's origins can be traced back over half a century.[3]

In the early days of computing, AI was more narrowly defined as "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings."[4] Today, the idea that a machine can learn our habits and adapt to suit our needs is no longer a scary thought but a reality many of us take for granted – from spell check to targeted recommendations on TV streaming platforms and mobile devices. In fact, what was considered AI in the past is now commonplace technology many of us carry in our pockets.[5]

Over time, AI's capabilities moved beyond solving simple data analysis tasks to skills such as identifying causes in system behavior and drafting code.[6] Generative AI (GenAI) platforms have become increasingly popular. These platforms use deep learning algorithms[7] to perform tasks more complex than distinguishing between sets of classifications.[8] Instead, they can identify patterns and structures in data to produce their own data, and even their own whitepapers.

One notable development was the launch of ChatGPT in November 2022, a chatbot that provides human-like text responses to natural language user prompts. It was reported in February 2023 that within two months of launch, ChatGPT had amassed one hundred million users, making it the fastest-growing consumer application in history.[9]

What does ChatGPT know about FX settlement risk?

Putting its skills to the test, we asked the platform a key question at the heart of what we do at CLS: how best to mitigate settlement risk in the FX market. In less than a minute ChatGPT described several key areas of focus for global initiatives, such as greater adoption of PvP settlement and the use of netting. The AI-generated response proved to be more nuanced than a Google search response, recognizing the difficulties in mitigating settlement risk such as the lack of a simple one-size-fits-all solution:

"It's important to note that while these measures can significantly reduce settlement risk, they may not completely eliminate it. Market participants should carefully evaluate their strategies and choose appropriate risk management techniques." (ChatGPT, 2023)

The increasing development of AI for everyday applications already benefits many. However, it is important that new technology be harnessed in a way that recognizes relevant risks so that existing processes and populations can more safely adapt.[10]

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1   This article uses the term AI to refer to a subset of computing tools related to artificial intelligence including machine learning, natural language processing and robotics.
2   Fintech Times (2023), How Will Generative AI Revolutionise Digital Payments in MENA?
3   AI research dates back to Alan Turing's work in the first half of the 20th century. britannica.com/technology/artificial-intelligence/Alan-Turing-and-the-beginning-of-AI
4   Artificial intelligence (AI) | Definition, Examples, Types, Applications, Companies, & Facts | Britannica.
5   thecadenceteam.com/the-changing-definition-of-artificial-intelligence/
6   Gartner: Emerging tech that will accelerate AI automation | AI Business.
7   Deep learning algorithms are a method in AI that teaches computers to process data in a way that is inspired by the human brain. See aws.amazon.com/what-is/deep-learning/
8   Discriminative models of AI are built to learn about the boundary between classes within a dataset. Their goal is to identify the decision boundary between these classes. These models can be distinguished from more recent developments in GenAI.
9   Forbes (2017), Artificial Intelligence Will Enable 38% Profit Gains By 2035.
10 The recent growth of technology in the GenAI space has also brought legal and compliance risks that need to be properly identified and mitigated. For example, by inputting data into generative tools, users risk improper disclosure or use of confidential information. There can also be a lack of transparency or fairness in the models and datasets that drive AI models, risking outputs that are biased or factually incorrect, or that contain proprietary content from a third-party source leading to potential intellectual property infringement.

Taking the finance world by storm

The integration of AI into finance began in the early days of computing, with the new millennium bringing rapid growth in AI research fueled by increasing availability of data and advancements in computing power.[11]

Today, AI has become a tangible reality within the financial sphere. A survey carried out by the World Economic Forum in 2020 found that 85% of the global finance sector was using some form of AI in their business, with 77% believing that AI would become essential to their role within two years.[12] It was reported that by 2035, global financial services would see the third highest AI-driven value-add of all industry sectors (4.3%).[13]

The financial industry is seeing a multitude of benefits such as automation, increased efficiency, fraud prevention and improved customer experience from AI tools.[14] Current use cases range from chatbots available 24/7 to credit worthiness tools that predict the default probability of a potential borrower.[15] AI-driven algorithms also identify anomalies and unusual patterns in transactions in order to flag potential fraud or money laundering.[16] Recently, financial institutions have started developing GenAI tools similar to ChatGPT that harness their vast datasets, e.g., to provide more accurate and nuanced answers to customers.

AI proliferation has not been confined to private institutions; central banks are increasingly using AI[17] to monitor price and financial stability[18] and to assist supervisory roles.[19] According to a recent report from the Bank for International Settlements (BIS), AI can help central banks adapt to the increasingly complex environments in which they operate.[20] However, Central Banks should not overrely on AI for algorithms and models that humans have performed reliably.[21]

Cyber and fraud are key risks in the financial space, and they are increasing in scale and sophistication.[22] This means that as AI is further adopted, there will be a growing need to review and adapt the existing regulatory and resilience frameworks to allow new technologies to benefit the financial sector without causing harm.

11 weforum.org/agenda/2019/04/dont-be-scared-of-ai-its-going-to-change-humanity-for-the-better
12 World Economic Forum in collaboration with Cambridge University Judge Business School and Cambridge Centre for Alternative Finance (2020), Transforming Paradigms: A Global AI in Financial Services Survey.
13 Based on economic growth rates across all industry sectors. Weighted average of 1.7% across all industry sectors. Forbes (2017), Artificial Intelligence Will Enable 38% Profit Gains By 2035.
14 techtarget.com/searchenterpriseai/feature/AI-in-banking-industry-brings-operational-improvements
15 How Artificial Intelligence is Transforming the Financial Services Industry: deloitte.com
16 Bates (2023), The Power of AI in Finance.
17 The Hong Kong Monetary Authority published a new Fintech Promotion Roadmap in August 2023 outlining the key initiatives that it will undertake over the next 12 months to further encourage Fintech and AI adoption in the financial services industry.
18 Speech by Luiz Pereira da Silva, Deputy General Manager of the BIS, at the Asia School of Business (ASB), Master of Central Banking, Kuala Lumpur (2023), Central banks at the crossroads: bis.org
19 The European Central Bank has recently developed an AI tool to assist supervisors in their regulatory duties. By analyzing large volumes of documents, this tool can help to identify regulatory blind spots. Artificial Intelligence Initiative: European Central Bank – Central Banking.
20 BIS, Irving Fisher Committee on Central Bank Statistics (2021), Machine learning applications in central banking.
21 Pereira da Silva (n.18, above).
22 Nikhil Rathi (2023), Our emerging regulatory approach to Big Tech and Artificial Intelligence (speech delivered at The Economist July 2023).

How AI is transforming FX trading

The large and fragmented nature of the FX ecosystem has in the past made it hard for market participants to obtain comprehensive trade data. The FX market lagged the wider financial system in reaping the benefits of AI,[23] though this has changed in recent years, especially in FX trading. Front office activities have adopted AI in numerous ways: AI algorithms can swiftly process vast quantities of market data to gain valuable insights on trends and patterns that may prove elusive for human analysis, empowering traders to identify more opportunities and make more informed decisions. The use of algorithms has become increasingly prevalent in carrying out 'automated trading execution', which helps to ensure more accurate and reliable trading decisions, minimizing costly mistakes and freeing up traders' time to focus on strategic analysis.[24] In fact, it is now believed that as much as 90% of FX trading uses AI tools.[25]

In middle offices, AI is playing a crucial role in improving risk management systems. Tools have been developed to spot pitfalls and address them. AI algorithms detect fraudulent or suspicious market activity, helping to safeguard traders from manipulative practices. Technology has also transformed previously time-consuming data processing and reporting activities, removing manual operations to drive efficiency. These developments have been possible due to one key ingredient: data.

Data of increasing volume and quality are driving the AI revolution globally, including in the FX space. The key to success of any AI tool or platform lies in the 'magic dust' of high-quality data that models process to produce useful and accurate output.[26] As the FX market has grown, its ecosystem has similarly evolved to make vast quantities of data available. Steps taken to aggregate and standardize large volumes of data have driven the success of AI technology in the currency trading market.

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AI algorithms can swiftly process vast quantities of market data to gain valuable insights on trends and patterns... "

23 CLS (2019), Why big data matters: using smart data and artificial intelligence to enhance FX trading.
24 businesscloud.co.uk/news/forex-trading-with-ai-does-it-actually-work/
25 How Has Artificial Intelligence (AI) Changed the Forex Market? – Fintech News
26 Ravenpack (2023), What's fueling the AI revolution? The magic dust behind ChatGPT. ravenpack.com/blog/magic-dust-behind-chatgpt
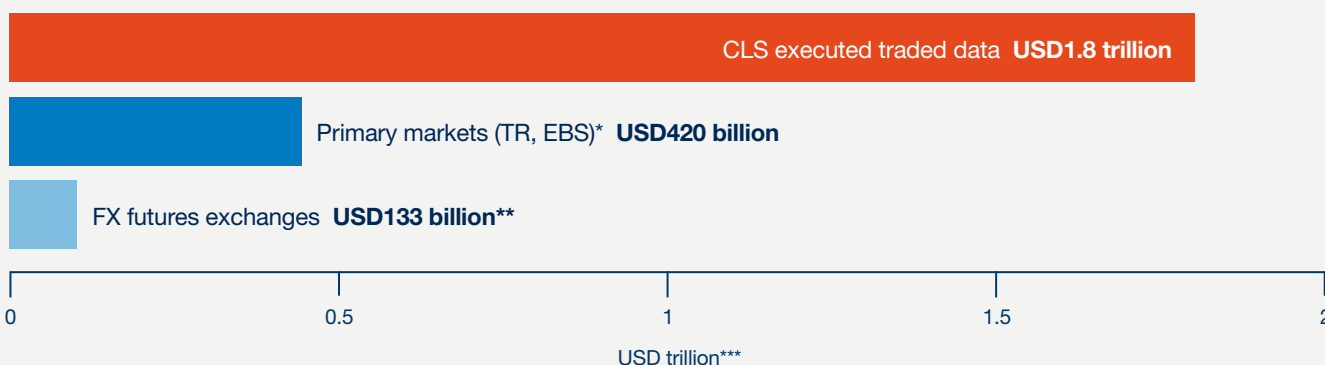
CLS's contribution, the largest single source of FX executed trade data

CLS plays a unique role at the center of the FX ecosystem, providing the primary post-trade settlement engine for the market. CLS settles over 50% of global FX trade volume by processing and matching on average USD1.8 trillion of payment instructions per day. This has allowed CLS to warehouse the details of over 3 billion trades since 2011, creating the largest single source of FX executed trade data available to the market.[27]

CLS leverages the power of this information to help market participants understand market dynamics and improve decision making. CLS collects settlement data and aggregates and anonymizes it before packaging it for customers into several different types of high-quality suites of data – FX volume, FX flow, FX pricing and FX outstanding.[28]

Figure 2: **Average daily volume by source**

CLS executed traded data **USD1.8 trillion**

Primary markets (TR, EBS)* **USD420 billion**

FX futures exchanges **USD133 billion****

| 0 | 0.5 | 1 | 1.5 | 2 |

USD trillion***

How CLSMarketData is collected

We receive trade data primarily via Swift XML direct from our settlement members, when FX transaction data is booked in the members' back office systems, flowing through their CLS API link.

*   Thomson Reuters/Refinitiv and EBS/CME
**   2021 BIS report
*** Implies amount of activity by data publisher used to extrapolate estimated FX market metrics such as volume and flow

Source: CLS Market Data 2023

CLSMarketData, adding volume and value

By aggregating and standardizing large volumes of executed trade data, CLS has been able to collaborate in various projects across the industry and academia.[29] Either alone or in conjunction with other datasets,[30] CLS's data empowers its users to gain unique insights into market share and trends, enhancing their understanding of evolving dynamics and facilitating informed decision-making.

In recent years market participants have used CLS's aggregated data to develop AI models to gain insights into changing trends and evolve their trading strategies to reflect changes in market dynamics. In the immediate aftermath of the Covid-19 pandemic, CLS produced insights in collaboration with market participants concerning the shift in liquidity profiles between normal and stressed market conditions caused by the global pandemic, which coincided with changes in how and where people work.[31]

Though AI has brought operational benefits and streamlined processes in FX, an overreliance on such technology can raise risks around system malfunctions and unforeseen market conditions that AI tools are ill equipped to address. In the complex FX trading world, AI is generally perceived by FX stakeholders as a tool to complement – but not replace – skilled traders with a deep understanding of their markets.[32]

CLSMarketData value add

- Unique insights
- Increased transparency
- Technological innovation

27 cls-group.com/products/data/
28 cls-group.com/products/data/clsmarketdata/
29 A recent collaborative project with University of St. Gallen (2023) to undertake analysis into the liquidity of the global FX swap market. See Kloks et. al (2023), Foreign Exchange Swap Liquidity.
30 Recent work with the Bank for International Settlements (BIS), combining CLS and BIS statistics to evaluate how dollars flow in the FX swap market, (2023), Bank positions in FX swaps: insights from CLS: bis.org
31 CLS worked with Mosaic Smart Data and Mitsubishi UFJ Financial Group (MUFG). Mosaic Smart Data provides end-to-end software to capture, analyze and act upon voice and electronic transaction data in Fixed Income, Currencies and Commodities (FICC) markets. MUFG is a leading global financial services group and one of the largest banking institutions in Japan.
32 Golden (2023), AI and FX – what does the future hold?

What's next for AI in the FX market?

In the post-trade environment, AI developments are not yet as mature as they are within trading. Some back-office processes are manual, requiring larger networks of participants across more functions (e.g., clearing, trade reporting, aggregation, compression and regulatory functions) than those on the market execution side.[33]

The complexity of the post-trade environment, often underpinned by legacy architectures, partially explains why AI is less prevalent than it is in the wider financial sphere. In recent years, the public and private sectors have worked together to remove some post-trade inefficiencies.[34] Still, there is a need for more standardization and greater adoption of best practice models and technologies[35] to lay a better foundation for future AI developments to fully take hold.

How firms adopt AI in their own post-trade processes requires careful consideration and an incremental approach.[36] Recently, frameworks have been developed to help firms select the right AI tools to deliver benefits such as removing manual interventions and supporting straight-through processing.[37]

As advancements in AI continue to progress, the technologies may catalyze new developments that improve the post-trade environment. However, AI implementation should be supported with careful application and appropriate regulation to ensure the associated risks are identified and properly mitigated.

AI is a rapidly evolving field that continues to transform our daily lives and the financial sphere. As leading computer scientist Professor Andrew Ng put it, "AI is the new electricity. Just as 100 years ago electricity transformed industry after industry, AI will now do the same."[38]
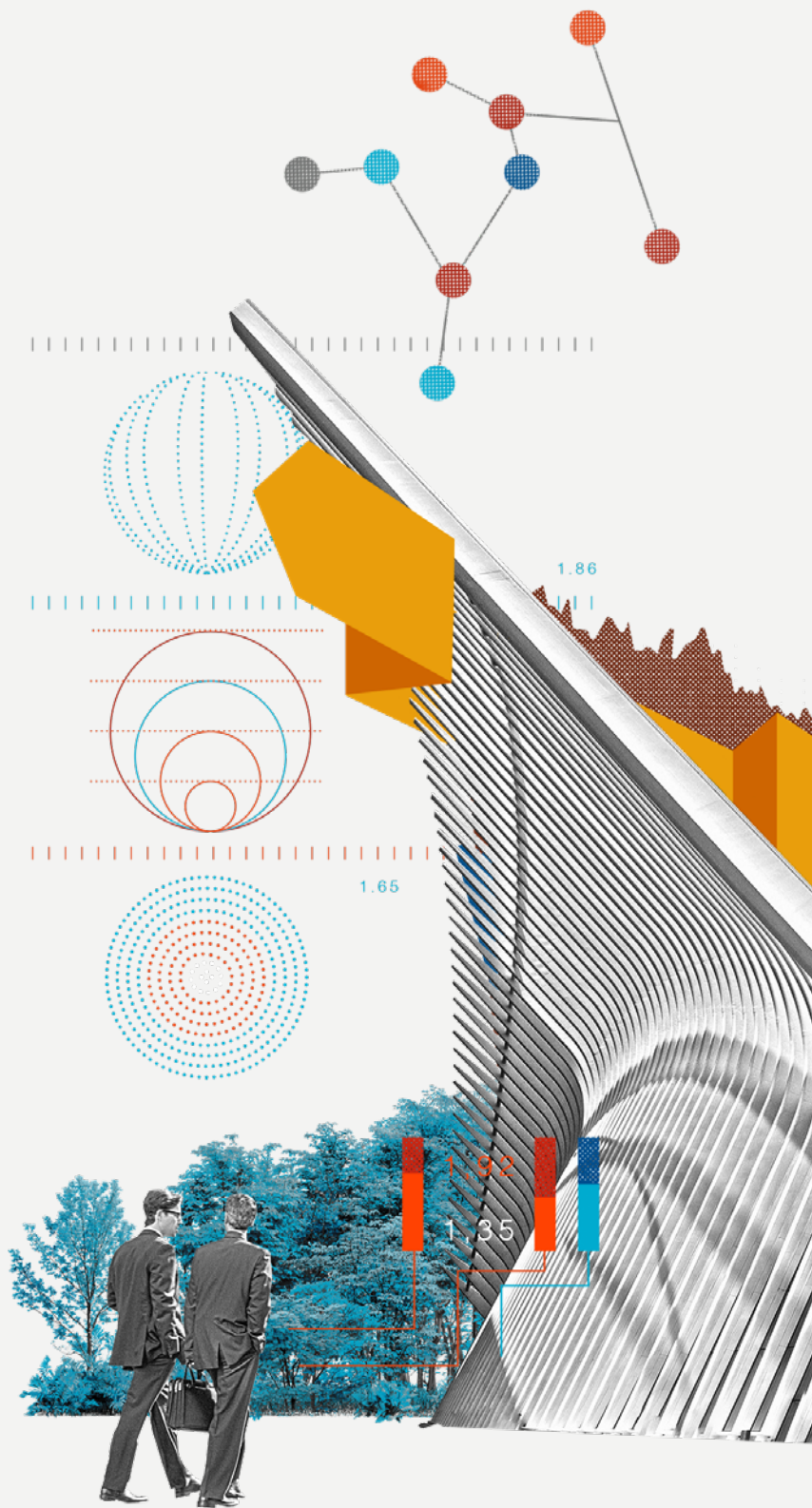
33 Artificial Intelligence in Post Trade: The Dawning of a New Era? (finextra.com)
34 bankofengland.co.uk/-/media/boe/files/research/charting-the-future-of-post-trade.pdf
35 Steps have been taken. In the payments space, the global move to adopt ISO 20022 messaging standards will bring enhanced standardized data – laying the foundations for a more efficient post-trading world.
36 Omahen (2021), Applying AI for Endless Possibilities in Post-Trade, SIFMA.
37 Deloitte (2021), Artificial intelligence in post-trade processing.
38 gsb.stanford.edu/insights/andrew-ng-why-ai-new-electricity

For more information please email info@cls-group.com

FX Global Code
Using CLS products and services plays an integral part in helping you comply with the FX Global Code. Find out more at cls-group.com

Trusted by thousands of counterparties within the global FX ecosystem, CLS makes FX safer, smoother and more cost effective. Trillions of dollars' worth of currency flows through our systems each day.

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