

BANKING

ISSUE NO. 109
NOVEMBER-DECEMBER 2019

T H K B DAY

www.hkib.org

JOURNAL OF THE HONG KONG INSTITUTE OF BANKERS

香港銀行學會會刊

KNOWLEDGE PLUS

AI PAVES THE ROAD TO SMART BANKING

Gauging the Value of AI Companies

THOUGHT LEADERS

MARY HUEN

Executive Director and
Chief Executive Officer
Standard Chartered Hong Kong

CHINA WORLD

NAVIGATING THE FINANCIAL STABILITY AND WELLNESS

The Purpose of the Various Policies
Undertaken by the Chinese Government



**Hong Kong's
Role in BRI Financing**
香港作為「一帶一路」
投融资平台的機遇

AI Paves the Road to Smart Banking

人工智能為智慧銀行鋪路

Today AI is transforming the banking and financial services industry, allowing institutions to better understand individual customer needs and offer innovative products and services as well as improve customer experiences through “hyper personalisation”.

人工智能正在轉變銀行及金融服務業的運作模式，令各機構可以更了解個別客戶的需求，並通過「超個性化」提供創新的產品和服務，並且改善客戶體驗。

To bankers and investors, the term artificial intelligence (AI) may be a source of great excitement or great confusion. Most executives agree that AI has the power to radically change and transform how companies do business. PwC's Global AI Study projects AI to contribute US\$15.7 trillion to the global economy by 2030. Practically most, if not all, tech companies and new startups nowadays claim that they are using or working with AI in one form or another. Some may indeed be genuine AI innovators, while others may be using the term in hope of a significant increase

in valuation. In fact, in a recent study by VC investor MMC Ventures of 2,830 European companies that claimed to be “AI startups,” only 60% had some evidence of AI that is material to company's value proposition. A July 2018 Guardian article highlighted the rise of “pseudo-AI” chatbots where tech firms quietly use humans to do bots' work, basically “faking it until they make it.” For non-technical bankers and investors, it is indeed a challenge to see through the marketing spiel to properly understand the true underlying value of AI startups.

Applications of AI to Banking/ Finance

Today AI is transforming the banking and financial services industry, allowing institutions to better understand individual customer needs and offer innovative products and services as well as improve customer experiences through hyper personalisation. AI proves insights into operations so that institutions can rethink, redesign, and optimise processes and flows to improve productivity.

AI is the heart of digital

對於銀行家和投資者來說，人工智能 (AI) 可能會令他們感到極度興奮或困惑。許多高層人士都認為，人工智能可以徹底改變行業的運作模式。羅兵咸永道的《全球人工智能研究》報告預測，到了2030年，人工智能將會為全球經濟貢獻15.7萬億美元。如今大部分的科技公司和初創企業都表示它們正在使用某種形式的人工智能。當中確實包括真正的創新者，但亦有公司只是利用「人工智能」作幌子來提高估值。實際上，在風險投資機構MMC Ventures最近對2,830間聲稱「人工智能初創企業」的歐洲公司進行的研究中，當中只有60%可以證明人工智能對其價值主張的重要性。《衛報》在2018年7月發表的一篇文章中強調，「假AI」聊天機械人的背後其實是以人手操作。對於沒有科技背景的銀行家和投資者來說，他們會有困難看穿這營銷技倆，並體會AI初創企業的真正價值。

銀行及金融業的AI應用

人工智能正在轉變銀行及金融服務業的運作模式，令各機構可以更了解個別客戶的需求，並通過「超個性化」提供創新的產品和服務，並且改善客戶體驗。AI為營運提供洞察，讓機構可以重新考慮、設計及優化流程，從而提升生產力。

人工智能是數碼轉型 (DX) 的核心。它利用數碼技術為產品和服務，以及提供方式帶來創新和改變，同時亦可以增強客戶中心性及營運效率。舉個例子，機器學習 (ML) 可以識別模式及預測未來的事情。在客戶層面，這種AI功能可以讓機構更加了解及準確預測客戶需求，並在適當的時間即時向客戶推薦價格合適的產品，以超個性化的方式大幅度改善客戶體驗 (CX)。在業務方面，AI會令機構更了解自己、其業務運作，並提高營運效率。至於投資方面，AI可以更

準確地把握市場狀況及預測市場趨勢。簡而言之，AI可以令公司掌握革新的能力，從而提供嶄新的價值，以及重塑營運模式。

AI流程機器人 (RPA) 可以將傳統以人手輸入數據的重複工作自動化，從而削減櫃檯、中台及行政部門的人手。AI聊天機械人和對話代理人可以簡化客戶服務。人工智能也正在簡化和自動化公司治理、風險管理及合規審查 (GRC) 活動，例如協助合規審查、監控監管變化，以及評估風險狀況的變化等。自然語言處理 (NLP) 和機器學習有助找出監管、要求／義務，以及業務流程和控制之間的聯繫，它還可以從過往的風險案例中學習及識別未來潛在問題的早期跡象。AI深度學習和圖形分析可以即時檢查所有數據點，對反洗錢 (AML) 和欺詐進行自動化檢測。借助從多個接觸點收集的大量用戶數據，AI亦可以優化「

“Possible applications of AI in asset, wealth, and investment management are also endless and impact the entire value chain, ranging from portfolio construction and optimisation, development of investment and risk strategies, to predictive forecasting of long-term price movements.”

transformation (DX) – using digital to innovate and transform what products and services are offered and how to offer them, while at the same time enhancing user centricity and operational efficiency. For example, machine learning recognizes patterns and anticipates future events. For customers, this AI ability allows institutions to better understand and accurately predict customer needs, and recommend the right product to the right person, at the right time and

price, and right now without friction, hence greatly improving customer experience (CX) in a hyper-personalized manner. On the business end, AI allows institutions to better understand itself, its business operations, and improve operational efficiencies. On investments, AI has a much better gripe for market conditions and better at predicting market trends. In short, AI enables firms to dramatically deliver new kinds of value and reshape operating modes like never before.

AI robot process automation (RPA) can eliminate human intervention in front/mid/back office processing by automating repetitive tasks that are traditionally done manually due to siloed systems that require manual data entry. AI chatbots and conversational agents can streamline customer service. AI is also streamlining and automating governance, risk, and compliance (GRC) activities, such as assisting with compliance reviews, monitoring regulatory changes, evaluating changes in risk profiles, etc. Natural language processing (NLP) and machine learning can help discover linkages between regulations, requirements/obligations, and business processes and controls. AI can also learn from past risk cases and identify early signs of potential future issues. AI deep learning, and graph analysis can

“現代AI系統現時可以在許多範疇中超越人類，例如檢查醫學影像以檢測癌症或在人群中識別特定人士。”

automate anti-money laundering (AML) and fraud detection by examining all data points in real-time. With abundance of user data collected from multiple touchpoints, the field of KYC is also being transformed by AI, allowing institutions to create precise customer profiles and automatically vet new or existing customers.

Possible applications of AI in asset, wealth, and investment management are also endless and impact the entire value chain, ranging from portfolio construction and optimisation, development of investment and risk strategies, to predictive forecasting of long-term price movements. It is quite impossible for human asset managers to analyse years of financial statements and investment data in detail for all companies in their portfolios. But this critical mass of data is exactly what AI machine learning needs to develop accurate insights. Furthermore, AI recommendations are personalized based on specific investor's short- and long-term goals. In addition, fund managers are also using NLP in asset selection, uncovering insights and relationships in unstructured data.

Automated, algorithmic, quantitative or high-frequency

trading, all can benefit from AI to monitor and analyse structured (databases, spreadsheets, etc.) and unstructured (social media, news, etc.) data to make split-second decisions. AI combines real-time market data with machine learning to identify patterns in price movements for highly accurate market predictions. Furthermore, accuracy of AI trading algorithms can be tested and verified with historical data.

Why the Sudden Interest in AI?

The interest in AI skyrocketed over the past few years after DeepMind's AlphaGo program beat humans at Go; a game that was previously thought to be impossible for AI to solve. Modern AI systems can now routinely outperform humans at many tasks, such as examining medical images to detect cancer or recognizing people in crowds. Current AI systems are many orders of magnitude more powerful than their predecessors in terms of functionality, performance and accuracy. What has caused this explosive growth in capabilities? Humans have not gotten better nor faster at programming. So, what has changed?

Turns out AI algorithms are very CPU-intensive and data-intensive. The main hindrance in creating smarter AI systems in the past was

the lack of affordable processing power and the ability to store and process enormous amounts of data. With the advent of highly scalable cloud computing as well as infrastructure for big data processing, AI programs can now perform to their maximum potentials and at scale. What this means is that instead of performing machine learning with small sample subsets, AI can now learn from entire datasets, sometimes involving hundreds of millions or even billions of data points, and within acceptable response time. The need for faster AI processors, have propelled

認識你的客戶」(KYC) 程序，從而讓機構建立精確的客戶資料，並自動審查新客戶或現有客戶。

人工智能在資產、財富和投資管理方面的應用可說是無窮無盡，並會影響整個價值鏈，例如投資組合構建和優化、投資和風險策略的開發，以及長期價格變動的預測性。人力資產經理根本沒有可能對投資組合中所有公司的年財務報表和投資數據進行詳細分析。不過，AI機器學習就是需要這批龐大的數據以得到準確的洞察。此外，AI會根據特定投資者的短期和長期目標提供個人化的建議。另外，基金經理亦會在資產配置方面使用NLP，從而發現非結構化數據中的洞察和關係。

自動化、演算法、定量或高頻交易亦會受

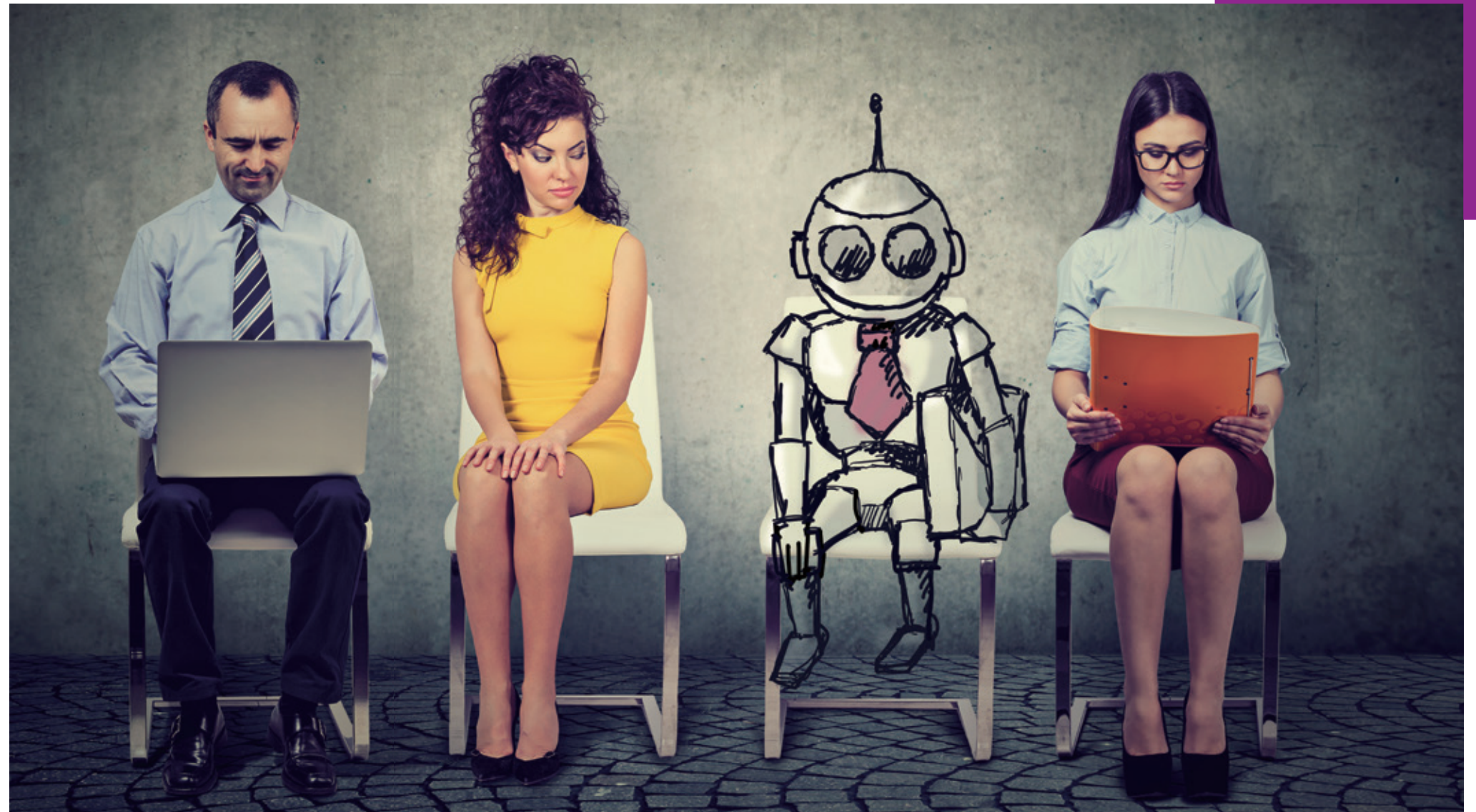
惠於AI，並利用監控及分析結構化（數據庫及電子試算表等）和非結構化（社交媒體及新聞等）數據，從而做出瞬間決定。AI會結合即時市場數據及機器學習，以識別價格波動的模式，並提供高度準確的市場預測。此外，歷史數據亦可以測試和驗證AI交易演算法的準確性。

為什麼突然對AI產生興趣？

隨著DeepMind的AlphaGo在圍棋擊敗人類，各界對AI的興趣在過去幾年有激增的現象。現代AI系統現時可以在許多範疇中超越人類，例如檢查醫學影像以檢測癌症或在人群中識別特定人士。相比其前身，目前的AI系統在功能、性能和準確性方面都有幾何級的提升。究竟是什麼引發這種爆炸性的增長？人類在編程方面並沒有變得特別快和好。那麼，當

中究竟發生了什麼變化？

實質是，AI演算法會佔用大量CPU及數據。AI發展在過去的主要障礙是缺乏價格便宜的處理能力，以及儲存和處理大量數據的能力。隨著高度可擴增的雲端計算及大數據處理的基礎架構的出現，人工智能程式現在可以大規模地發揮其最大潛力。這個大躍進代表AI現在可以在短時間內，利用涉及數億甚至數十億個數據點的數據集，進行機器學習，而並非較小型的樣本子集。人類對AI處理器的需求帶動了圖形處理單元（GPU）及AI專用芯片公司的崛起，當中包括Nvidia、Intel、華為、亞馬遜，以及Cerebras等。以人工神經網絡（ANN）為基礎的機器學習演算法，例如深度學習，需要大量的浮點數運算，亦即AI處理器的強項。





hardware companies that manufactures graphics processing units (GPUs) and specialized AI chips, such as Nvidia, Intel, Huawei, Amazon, Cerebras, etc. Machine learning algorithms that are based on artificial neural network (ANN), such as deep-learning, requires a tremendous amount of float-point computations, which AI processors are good at.

Another reason for the explosive growth is the commoditisation of AI. Over the years, AI algorithms have become readily available as open source and/or open APIs. In addition, cloud-service providers such as Amazon, Google, IBM, and Microsoft, are offering AI-as-a-service, allowing natural language understanding, computer vision,

face recognition, chatbots, machine learning, data analytics, etc. to be as easy to access as simple URLs and with very little programming. What that means to investors is that even if a company produces seemingly amazing AI capabilities, they might not have the IP rights to the technology. If so, the barrier of entry will be very low, as another company can easily replicate the AI functionality with minimal effort using the same cloud service.

This is especially true with deep learning. What once took an army of developers coding hundreds of millions of lines of program over years of time, now might take only a few pages of code while letting AI learn by itself

from millions of examples. That's why we hear amazing stories of high school students creating incredibly powerful AI programs that outperforms humans, such as the story of 15-year old Abu Qader who used AI machine learning cloud service and open source data, to develop a program that was better than doctors at detecting breast cancer from mammogram images.

Another factor for AI growth is the availability of high-quality private, commercial and public datasets for machine learning. In the age of AI/ML, data is still king. Without at-scale data to learn from, AI algorithms will not be able to make accurate predictions. For the financial services industry, they are at a tremendous advantage as they have access to

AI商品化亦是其增長原因之一。經過多年的發展，AI演算法已經成為開源軟件及／或開源應用程式介面。此外，亞馬遜、谷歌、IBM和微軟等雲端服務供應商亦會提供AI服務，令自然語言理解、電腦視覺、臉部識別、聊天機械人、機器學習，數據分析等可以容易取用，並且只需很少編程。對投資者來說，即使一間公司可以提供優質的AI技術，他們並不擁該技術的知識產權。在這情況下，進入障礙將會非常低，因為另一間公司可以使用相同的雲端服務，並輕鬆地複製相同的技術。

深度學習就是最佳例子。開發人員過往需要花費多年時間去編寫數億行的程式碼，現在可能只需要幾頁便可，而AI亦可以從數百萬個例子中自行學習。由於這個原因，現在即便是中學生，也可以建立超越人類能力的AI程式，例如15歲的Abu Qader便是利用AI機器學習的雲端服務，以及開源數據來開發一個利用乳房X線片檢測乳癌的程式，而其準確性還比醫生診斷更高。

人工智能的發展還受惠於機器學習的

高質私人、商用及公共數據集。在AI及ML橫行的時代，數據仍然是王道。如果沒有大量數據，人工智能演算法根本無法作出準確的預測。對於金融服務業來說，它們坐擁強大的優勢，就是大量客戶財務的歷史數據，例如信用卡的消費行為，以及儲蓄和投資模式。大多機構都會利用外部數據集來補充客戶數據，例如納斯達克股票交易所、世界銀行、國際貨幣基金組織、金融時報、谷歌，以及替代數據。借助全面的金融數據集，機構現在可以更好地利用機器學習來預測經濟指標、股票價格，以及客戶的投資行為。

結論

綜上所述，無論一間公司的AI技術是多麼複雜或先進，最重要是AI可以怎樣協助公司實現其核心價值主張，即是為客戶提供更多創新及優化的產品和服務。實際上，許多AI項目都是關於如何改善客戶體驗及提供順暢的客戶旅程。在採用AI之前，首先要撫心自問：你是因為科技（或是估值）的緣故才使用科技，還是真正希望利用科技去為業務轉型？

“No matter how sophisticated or how advanced a company's AI technology might be, the most important consideration is how AI helps the company achieve its core value proposition, which usually translates to more innovative and better products and services to its customers.”

the most important data, a vast amount of historical financial data on customers, such as credit card spending behaviours and savings/investment patterns. Most institutions supplement customer data with external datasets, such as those from Nasdaq, The World Bank, IMF, Financial Times, Google, etc., as well as alternative data. With comprehensive financial datasets, institutions are now better equipped to use machine learning to predict economic indicators, stock prices, etc. as well as predict customer investment behaviours.

Conclusion

Having said all the above, no matter how sophisticated or how advanced a company's AI technology might be, the most

important consideration is how AI helps the company achieve its core value proposition, which usually translates to more innovative and better products and services to its customers. In fact, many AI projects are on how to improve customer experience

and making the customer journey as frictionless as possible. It is important to always remember the age-old question: Are you just using technology for technology's sake (or valuation's sake) or are you using technology to truly transform business?

ABOUT THE AUTHOR | 關於作者



Andy CHUN
Council Member and Convener of AI Specialist Group,
Hong Kong Computer Society
Adjunct Professor, City University of Hong Kong

陳漢偉
香港電腦學會理事會成員及人工智能專家小組召集人
香港城市大學客席教授