



▶ M&A market report 1H 2019

# Artificial Intelligence





# ARTIFICIAL INTELLIGENCE: BREAKING THROUGH

Artificial intelligence has shaken off its experimental mantra and fully launched into the developmental phase of the innovation cycle. As the application of AI grows increasingly widespread across almost all verticals, several industries are now dependent on the advancements of AI to ensure their growth and competitiveness. For instance, autonomous vehicle technology, IoT, healthtech, e-commerce, insurance and smart cities are all hot industries hungry for artificial intelligence that can propel their next technology push, improve efficiency and productivity, streamline business models, and reduce latency and fragmentation.

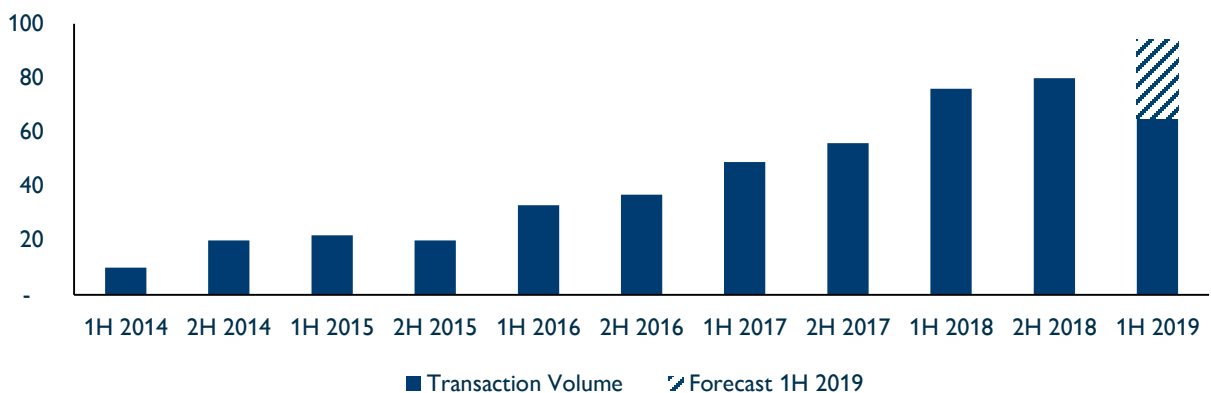
Fundamental to all technology developed under the AI banner are infrastructure technologies such as open source frameworks and edge AI. As they grow more successful, these technologies become springboards for the development of the sub-sector technologies they support. Open source frameworks provide the necessary ecosystem for the development of new technologies as they are lightweight and flexible, and their source codes are available to the general public – meaning that anyone can add to, improve and enhance the software for themselves and for other

developers. Meanwhile, edge AI runs on an edge device and, using edge data inputs, can access and process high volumes of unfiltered, full-fidelity local data that is otherwise impractical to share and store in the cloud. This technology provides the local processing speed and offline capabilities fundamental to IoT, allowing devices to stay connected while transferring substantial data and analysis.

In terms of market value, AI is forecast to grow from \$21.46 billion in 2018 to a whopping \$190 billion by 2025, according to a 2018 study by PR Newswire. In other words, market value is destined to grow nine fold over the next seven-year period. Accordingly, the volume of AI-related M&A deals has shown impressive growth year-on-year, hinting at a record-breaking result for the first half of 2019.



## Total number of Artificial Intelligence M&A deals 2014-2019





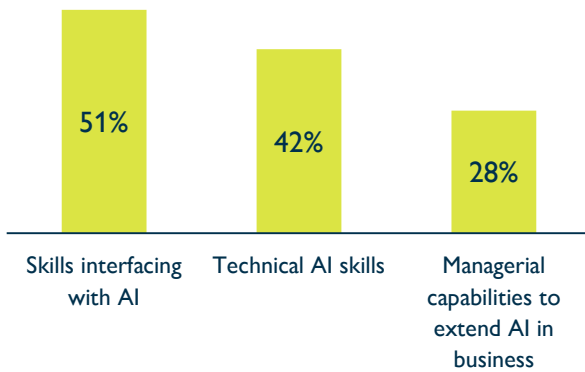
# HIGHLIGHTS

## Employment skills in Europe

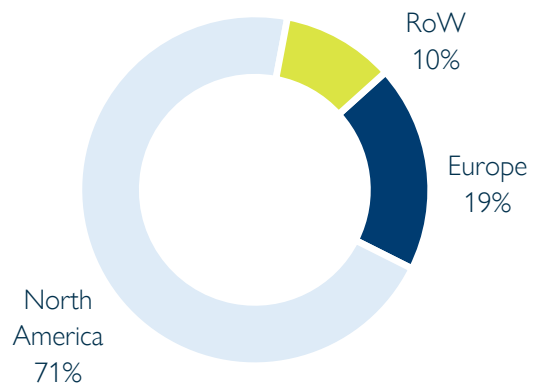
Europe currently trails behind North America in terms of number of AI targets acquired. This is chiefly due to its shorter supply of skills, capabilities and resources needed to drive AI innovation and adoption, which is a result of lower levels of investment in new technology

in Europe than in North America. In fact, a 2018 survey of 430 European firms carried out by McKinsey & Co. revealed that the most important skill barriers to AI adoption and innovation are a lack of “Skills interfacing with AI”, “Technical AI skills” and “Managerial capabilities to extend AI in business”.

### Most important skills barriers in Europe

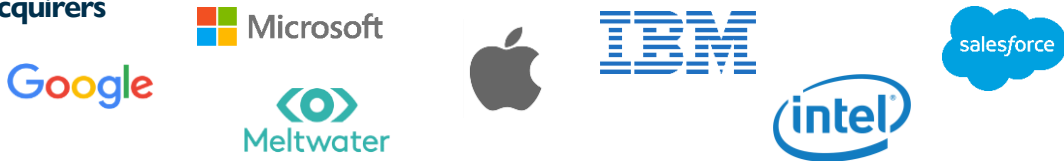


### Headquarters of AI targets



Source: McKinsey & Company

### Top acquirers



## Apple acquires Silk Labs

In 2018, Apple CEO Tim Cook publicly stressed the importance of on-device AI in safeguarding data and improving privacy, avoiding the purported insecurity of cloud-based resources. Not long thereafter, in November 2018, Apple acquired Silk Labs, a machine learning company whose on-device AI platform enables real-time visual and audio recognition using the latest advances in deep neural networks. The acquisition amount was undisclosed. Apple’s decision to develop on-device machine intelligence is shrewd –

and not just on grounds of privacy. Cloud-based AI demands devices that are always connected to the network, but bandwidth, network congestion, interference, and even physical hindrances such as being underground can impact performance. To develop machines that work effectively when offline – and safeguard privacy – it is mandatory to maximise on-device intelligence: smart machines must be intelligent on the edge, not just in the cloud.



# MARKET ADOPTION

Market impact and adoption of AI vary considerably depending on the industry and technology in question, as application is dependent on the development of infrastructure available. For instance, automotive vehicle technology can only advance once the edge computing technology infrastructure is sufficiently developed to support the industry application, given the large volumes of data and the processing speed necessary to respond to real-time, high-speed situations in or around automotive vehicles.

In general, the pace of AI development has increased through the availability of open-source frameworks. In fact, the software ecosystem supporting deep learning research has been evolving quickly and has now reached a healthy state, where open-source software is the norm. As illustrated below, open-source frameworks and edge computing have a strong market adoption rate, as they are simultaneously a necessity and a threat.

## Global AI Market Trends



Source: CB Insights



# MACHINE DATA ANALYSIS

## On the edge

AI processed entirely in the cloud can lead to latency caused by bottlenecks in network connections and availability. Therefore, running AI algorithms on edge devices – e.g. smartphones or cars – rather than communicating with a central cloud or server, allows devices to process information locally and respond more quickly. This is a fundamental boost for the development of IoT and autonomous vehicles technology in which immediate reaction and response are a necessity; for example, when autonomous vehicles process their surrounding environment in real-time and need to react to emergency brake situations instantly.

Thus far, the first quarter of 2019 has proven a record period in M&A transaction volume for machine data analysis, with edge AI clearly acting as a driving force in this peak period.

## Real-time analytics to the edge

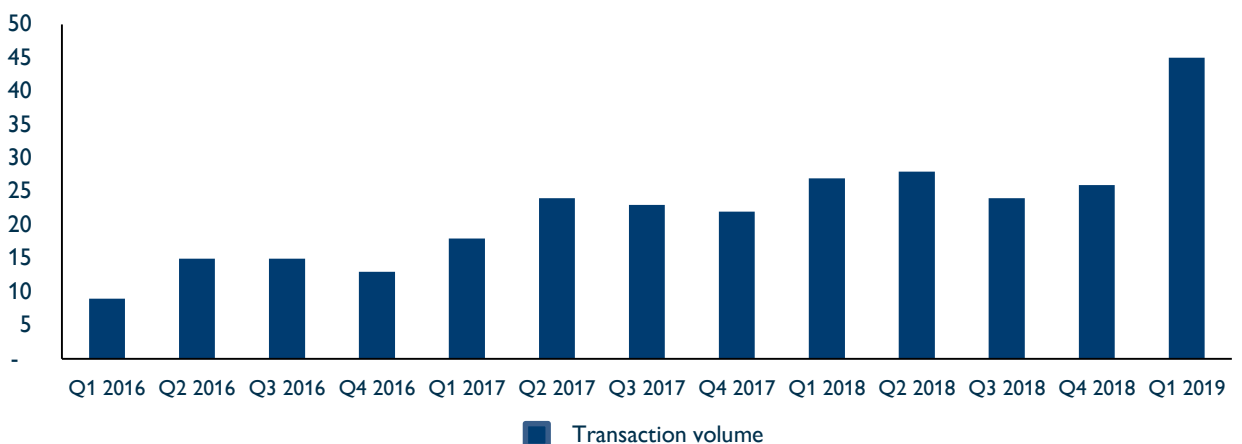
Edge computing is spawning its own ecosystem of start-ups. In July 2018, Swim.ai raised \$10 million in a

Series B round which included strategic investor and chip design firm arm, and brought total funding for Swim.ai to around \$18 million. Swim.ai’s product offering combines both local data processing and analytics with local machine learning which effectively “trains” the models on the edge device by pulling in data from all connected devices.

Demand for Swim.ai’s software is driven by its unique ability to analyse and reduce data, and share new insights instantly peer-to-peer – all locally at the edge on existing equipment. According to Rusty Cumpton,



co-founder & CEO of Swim.ai, “efficiently processing edge data and enabling insights to be easily created and delivered with the lowest latency are critical needs for any organisation” – a mantra that more firms will be surely adopting soon.





# COMPUTER VISION

Although it previously lagged behind its AI peers, computer vision experienced a stellar half-year in 2H 2018. This is mainly due to hot trends such as facial recognition, check-out-free retail or motion analysis, which enable the collection of more insights and provide information for future market opportunities. In fact, Q1 has already recorded the same transaction volume as the whole of 1H2018 – a trend we expect will speed ahead in the months to come.

## Facial recognition

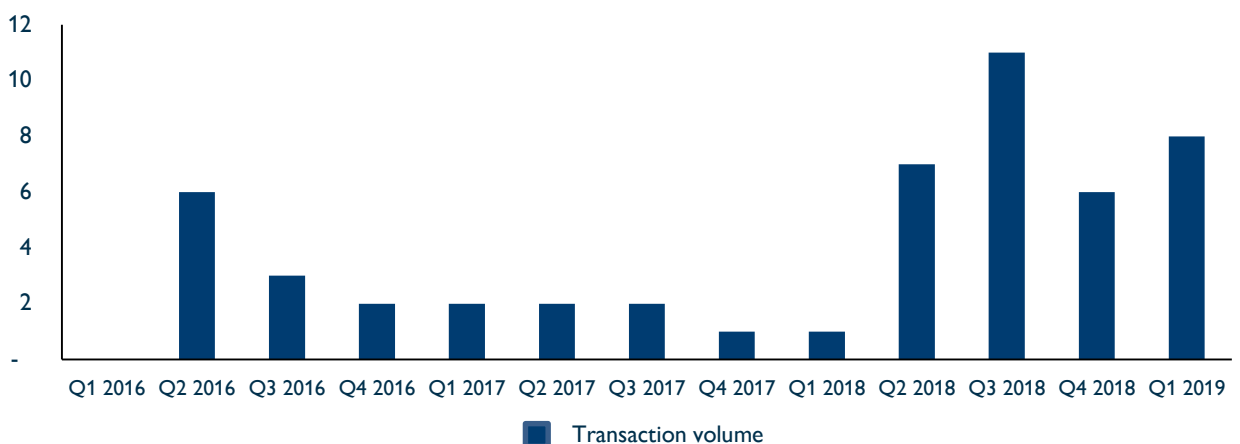
This technology is fast becoming a dominant form of biometric authentication. Thus far, early commercial applications in facial recognition have flourished in security, retail, payments and consumer electronics – Apple’s latest smartphone technology for Face ID logins and payments being one of the commercially popular use-cases. Retailers are also adopting the technology to recognise returning customers – a strategy used to offer special discounts as part of loyalty programmes. Furthermore, as increasingly smart urban infrastructure adopts security cameras, video analytics can be widely applied using facial recognition to detect and track offenders or suspects in public spaces.

## Qualcomm invests in AnyVision

In 2H2018, Qualcomm Ventures announced the launch of its \$100 million fund dedicated to investing in device-based AI. In December 2018, the first beneficiary was AnyVision, a developer of face, object and human recognition software that uses on-device AI technology to process data gathered from cameras for end-devices, including smartphones, IoT and robotics. In July 2018, the company had raised \$28 million in a round led by Bosch Ventures.

## ZF Friedrichshafen acquires Simi Reality Motion Systems

Most recently, global automotive supplier ZF Group acquired Simi, a leading developer of fully markerless video-based motion capture and analysis software, with Hampleton acting as sell-side advisor. Simi’s technology is able to capture, track and identify human motion to ultra-high precision, and is able to calculate object physics using image-based systems. Simi joined a global leader in autonomous development, while ZF Friedrichshafen added mission-critical computer vision systems for its vehicles to enhance safety, reliability and passenger ride experience.





# LANGUAGE ANALYSIS

## Conversational AI

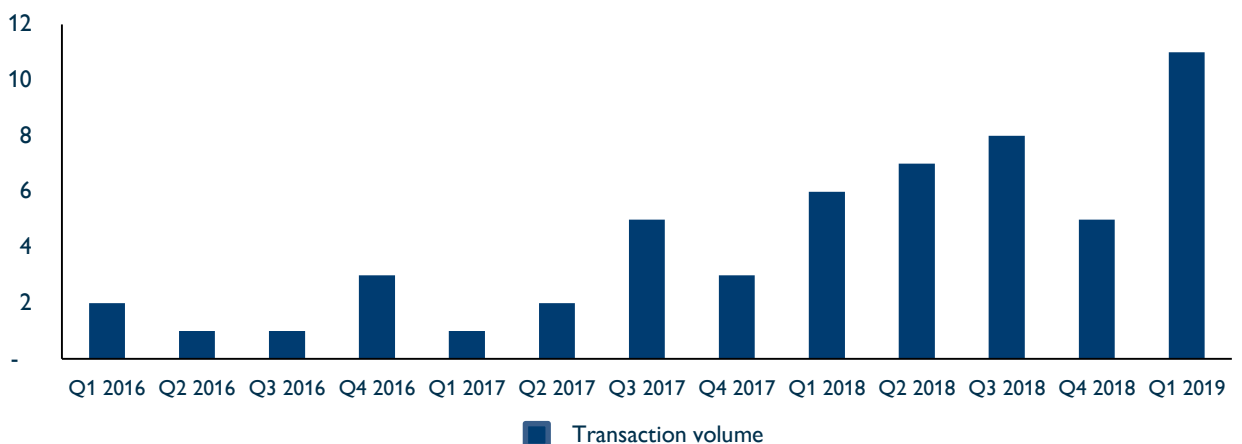
The language analysis sub-sector has experienced impressive growth over the last 30 months, seeing its application extend to and grow into new verticals. Global Big Tech companies east and west have focused heavily on conversational AI. For instance, Google's integration of Duplex – its new AI-driven automated reservation-making system – into the Pixel 3 smartphone has transformed the Google handheld device into an AI powerhouse. However, the premise of Duplex has sparked some ethical concerns, namely over whether conversational agents speaking in a human voice should identify themselves as such when speaking to humans.

Apple's Siri lags far behind Amazon's Alexa and Google's Assistant in terms of voice recognition ability and development. It was no surprise, therefore, that in February 2019 Apple acquired PullString, a speech recognition software development SaaS which enables businesses to build interrelated applications for IoT devices. The transaction amount was undisclosed; however, the target had completed four funding rounds totalling over \$44 million.

## Intent, not just content

Many companies believe the problem is not the speech recognition technology itself, but the lack of focus and reasoning within these systems. As a result, intent detection – i.e. the ability to determine from context what the user wants – has become the new research focus area for all speech recognition developers and players.

Start-ups are aiming to inhabit this space and fill the gaps in big tech AI. For instance, London-based start-up Wluper claims to have developed a goal-driven technology by turning its AI into a subject matter expert. Meanwhile, start-up Rasa has built an open-source platform for third parties to design and manage their own conversational AI chatbots. In April, Rasa raised \$13 million in a Series A fundraise led by Accel, and since inception have accumulated a blue chip customer base which includes the likes of Adobe, Zurich and Allianz.





## CONCLUSION & CONTACTS



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Q1 2019 has set the pace for the rest of the year, with record-breaking M&A transaction volumes in two of three artificial intelligence sub-sectors. With the growth and competitiveness of many industries now dependent on the development of these AI technologies, strategic investors across all sectors and continents are stepping up their acquisitions and investments.

Artificial intelligence is one of the fastest-moving sectors, thriving off great momentum and yielding game-changing outcomes.

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