THE FOURTH INDUSTRIAL REVOLUTION
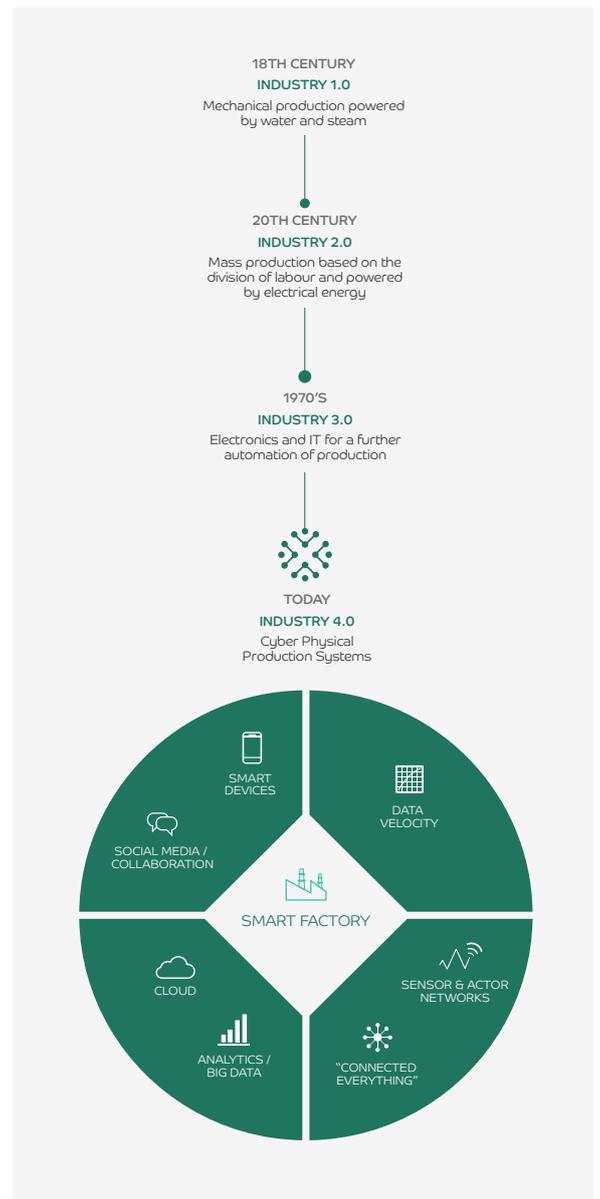
What is Industry 4.0?

The industrial world is on the brink of its fourth revolution – Industry 4.0. A term coined by the German Government, in 2011, to reflect the digitalisation of information across consumer and producer value chains.

The size of the prize is substantial – estimates by commentators vary – but all of them expect it to be compelling: a market worth $3.9 to $11 trillion per year by 2025 (McKinsey), fuelled by the connectivity of 50 billion connected devices.
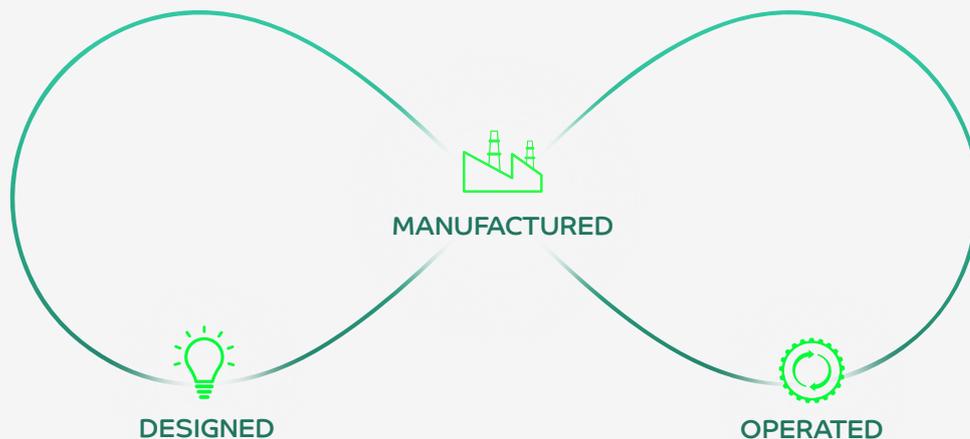
The advent of mechanisation, electricity and automation marked the first three industrial revolutions. Now, Industry 4.0 is ushering in the next revolution, where both human and machine talent can be brought together on frictionless platforms, to create new business models and unlock new frontiers of efficiency.

Industry 4.0 outriders are already proliferating. Examples are smart machines, storage and production facilities that are capable of autonomously exchanging information from a large array of sensors and connected systems, triggering actions and controlling each other independently. Factories are becoming 'smarter', as are products that are uniquely identifiable, may be located at all times, know their own history, current status, origin and alternative routes to achieving their target state and sustainable goals. They are almost intelligent in their own right. Meanwhile, smart cities are currently the subject of much hype and could in the future be interconnected to enable the vision of a 'smarter citizen.'

The conditions for Industry 4.0 to become reality include technical advances in communications infrastructure (WiFi, 4G and 5G), scalable data processing (cloud computing), mobility and open-source software development tools. In the consumer space, the internet giants Uber, Twitter and Netflix are driving the development of foundational infrastructure, allowing rapid ingestion and processing of data and enabling the creation of data science-driven applications.

18TH CENTURY
INDUSTRY 1.0
Mechanical production powered by water and steam

20TH CENTURY
INDUSTRY 2.0
Mass production based on the division of labour and powered by electrical energy

1970'S
INDUSTRY 3.0
Electronics and IT for a further automation of production

TODAY
INDUSTRY 4.0
Cyber Physical Production Systems

SMART DEVICES

DATA VELOCITY

SOCIAL MEDIA / COLLABORATION

SMART FACTORY

CLOUD

SENSOR & ACTOR NETWORKS

ANALYTICS / BIG DATA

"CONNECTED EVERYTHING"

What's the potential?

DESIGNED → MANUFACTURED → OPERATED

HORIZONTAL, VERTICAL AND TEMPORAL (PAST, PRESENT AND FUTURE) VISIBILITY

Industry 4.0 holds huge potential. Smart factories allow individual customer requirements to be met, the cost and time to design and deliver custom products to customer needs now becomes a possibility. Dynamic business and engineering processes enable last-minute changes to production and deliver the ability to respond flexibly to disruptions and supply failures. End-to-end transparency facilitates decision making, enables broad collaboration and results in new sources of value creation and business models. Intelligent, anticipatory analytics significantly enhances process safety and monitors sustainable metrics and productivity management. Maintenance and warranty feedback methods are transformed, leading to novel revenue regimes, cost reduction, design innovation, improved manufacturing efficiencies and production uptime.

Huge supply chains are involved in the journey any product takes from inception, to manufacture and then operation. In the past, a well-established pattern ensured that feedback about an already manufactured product reached the industrial designers or engineers, which served to design the next generation of product, manufacture it more efficiently with better workmanship, and then operate it so that it consumed less energy.

The change that QiO wants to champion in this process is the notion of continuous communication, which companies must do within their own walls horizontally before they can reach vertically. In addition, the temporal aspect of when this communication occurs underpins this change.

This communication loop between design, manufacture and operation can be brought into near real time so that designers and engineers can get feedback about the conditions in which their pumps or engines fail, after how much use and at what temperatures. They can then adjust the design or manufacturing process or make new operating recommendations. Taking this continuous loop of communication beyond the company, up- and downstream in the value chain, can be considered vertical integration. What if you could give your suppliers real-time information about operations of an asset they manufacture that is central to your product?

No matter the industry, it will become important to develop horizontal, vertical and temporal awareness. No matter the industrial model, costs are integrated into the value chain. In other words, performance over time matters. Every millisecond counts. An ability to see trends in performance and operations is crucial to making this continuous communication loop occur in real time right now and to projecting it into the future through predictive analytics.

Ultimately, Industry 4.0 releases workers from routine tasks, allowing them to focus on creative, higher value-added activities. As an example of the reduced wastage and the utilisation that could be improved - the global Airline industry spends $73k per minute on maintenance, repair and overhaul.*

Imagine yourself as an Industrial Engineer in charge of highly complex industrial systems that produce masses of data, and you are curious to explore that invaluable resource for new performance insights, new products and new ways to keep everyone safe, harnessing the talent not only of your people but also your machines.

Traditionally your only option was a complex, slow, costly, IT-led, outsourced, big data project that delivered answers to your questions long past their best before date.

Think what a difference it would make to your role if you were able to give the engineering team a trustworthy toolkit that allowed them to explore the data at will, fast, on any device, at low cost and with other domain experts; that gave them a suite of modular, reusable applications that allowed them to follow their own curiosity; all supported, where required, by 'agile development' coaches who help raise the ambition, ability and pace of business teams while facilitating the transition of today's large IT teams from gatekeepers to lean cloud and data science expert functions.

Who are the Industry 4.0 Pioneers?

The catalyst for Industry 4.0 has been the convergence of big data, analytics, machine learning, mobility and cloud technologies. Notable proponents have been the German industrial community (the term was originally coined at the Hanover Fair in 2011) and big US software houses that typically refer to the movement as the 'Industrial Internet' or 'Internet of Everything.'

However, these first movers have big legacy issues to contend with. They are not particularly nimble and are motivated to sustain their existing business revenue stream and struggle with service-heavy business models. Ultimately, these incumbents were not born in the Cloud and will struggle to deliver cloud-native solutions.

Meanwhile, cloud-computing companies around the world have exploited these converging technologies to develop easily scalable platforms and applications. In so doing, they have developed new approaches to software development that have dramatically accelerated product delivery cycles,

cut design costs and brought innovative functionality to market. One such cloud-computing company, QiO, is catching the attention of a number of FTSE 100 clients for its innovation, pace and style of partnership.

These market entrants are

- Speeding up the conversion of ideas and data into products and insight through 'fast fail' agile software development techniques;

- Demonstrating that open-source technologies and cloud are compatible with industrial-strength security;

- Delivering significant improvements in data processing cost and performance;

- Eliminating the need for costly 'lock-in' with legacy software platforms and greatly accelerating development of each new application (months down to weeks); and

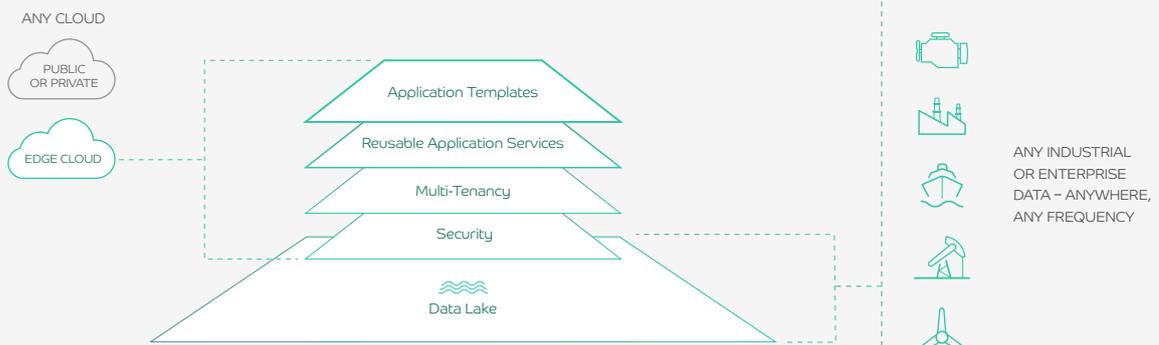- Empowering domain experts with new tools and access to new insight.

The Performance Alternative

QiO is helping to make the Industry 4.0 vision become reality for our clients in the power systems, marine, oil & gas and CPG sectors. QiO is solving problems previously considered intractable, while also delivering up to 65% cost/performance improvement relative to traditional approaches.

QiO provides you with a cloud and mobile-native ecosystem that enables the development of smart applications at a cost and performance that encourage systemic adoption.

65%
cost/performance improvement relative to traditional approaches

ANY CLOUD

PUBLIC OR PRIVATE

EDGE CLOUD

Application Templates

Reusable Application Services

Multi-Tenancy

Security

Data Lake

ANY INDUSTRIAL OR ENTERPRISE DATA – ANYWHERE, ANY FREQUENCY

How do we do this?

- QiO collects data from a range of different industrial sensors, e.g. legacy pumps to the latest complex power engines;

- QiO cleanses and ingests this sensor data – at speed (typically 10 x faster) and (if applicable) in real time – into a cloud environment, while overcoming the problems of assets in remote locations with poor connectivity. We can combine this data with other information from design, manufacturing and operating environments, including third-party data sources;

- The information is stored in an off-premise scalable secure cloud to help with global industrial trend analysis and to utilise this data to build new engineering applications, e.g. equipment health management, maintenance and service centres;

- The information can also be stored with the asset on site (e.g. in a plant, a ship, on an oil rig) via QiO's innovative 'Cloud-in-a-Box' solution. This software has a powerful optimisation engine to help solve real-time complex unstructured problems, create predictive machine learning algorithms and provide insight at the edge;

- QiO provides industrial-strength security to protect all devices, users and data; and

- Using the latest innovative technologies and collaboration best practice, QiO builds rapid "as-a-service" applications, teaming with clients to help capture, distil and generate best-of-breed practices, procedures and technical insights.

In essence, QiO provides our clients with end-to-end visibility of vertically networked systems, be they 'as designed', 'as built' or 'as operated' business processes. Our cloud-based software platform can ingest huge volumes of data – in real time at high frequencies if required, or more cost-effectively from vast data lakes – from devices of all types. The platform comprises proven, converged and integrated open-source software. The platform incorporates industrial-strength security with blockchain structures to provide additional protection of digital assets.

The speed, flexibility and scalability of the platform and applications universe is matched by its cost advantage – there is no vendor lock-in and no perpetual license fees. We offer our products on a usage basis, incentivising QiO to help clients drive maximum value from their data. For maximum effectiveness, productivity and creativity, clients and QiO teams are paired – this 'Teaming' approach being much more powerful than outdated outsourcing methods. Teaming allows QiO to transfer processes and experience to internal client teams to upskill and become self-reliant. QiO offers a fundamental shift in effectiveness. We can help turn your Industry 4.0 potential into reality.

"Industry 4.0 is moving the goalposts. QiO is redefining the art of the possible by providing the flexible data handling, storage, interrogation and analysis tools needed in this new Industry 4.0 paradigm."

Baz Khuti, QiO Founder & CEO

"QiO differentiates itself as much in approach as technology: as a liberator of engineering talent, QiO enables customers to turn information overload into actionable insight and newfound competitive advantage."

Rick Haythornthwaite, QiO Founder & Chairman