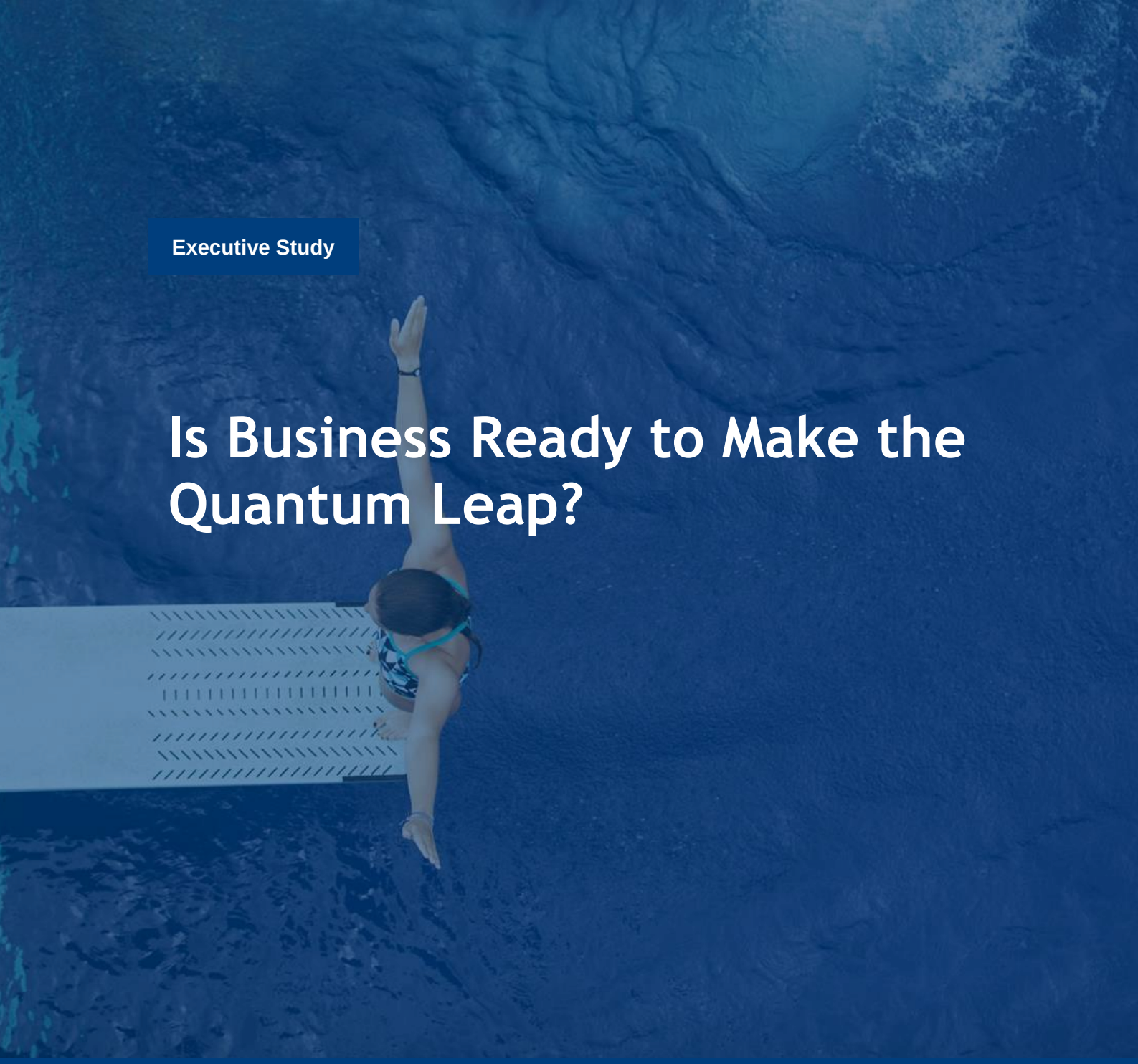

Executive Study

Is Business Ready to Make the Quantum Leap?

Lead Analyst

Nick Mayes

teknowlogy Group, May 2019

Commissioned by

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CONTENTS

INTRODUCTION

We are just a few years away from a world where a new form of computing will make the currently impossible, possible.

Imagine the potential when a life sciences company has the computing power at its fingertips to develop new drugs or treatments in the space of days rather than years, by solving complex multiple-variable research questions in a single keystroke.

Or consider how transportation companies could slash billions of Dollars of cost inefficiencies from their supply chains by being able to run algorithms that can identify the best possible routes for their fleets to take across multiple locations.

This is the promise of Quantum Computing, which by delivering previously unimaginable leaps forward in processing power, could open the door to new possibilities in transforming existing business operations and creating new growth opportunities, that are well out of the reach of classical computing.

Quantum Computing has become a huge area of interest for businesses, with multinationals in different industries such as Airbus, BASF, Boeing and RBS making major investments in Quantum research projects or partnerships in recent months. Microsoft CEO Satya Nadella has stated that Quantum Computing will be one of the technologies that will “shape the world” in the coming years.

But can businesses wait for Quantum to deliver on that promise?

Organizations need to move at speed in laying the foundations for a more agile business model to support their increasingly digital-centric strategies. As they transform to meet changing customer demands and an evolving competitive landscape, they are having to make significant changes to the way that they run critical processes, from the way they design new products and services, through to the flow of their supply chain, and their approach to risk management.

In order to better understand how business leaders are tackling the challenge of process optimization, teknowlogy Group partnered with Fujitsu to interview more than 300 senior executives at enterprises in North America, the UK and Ireland, Germany, Spain and the Nordic region. This report explores how boardroom leaders are looking to transform the under-performing parts of their business, and their current attitudes towards the potential of Quantum Computing. How well do they understand this topic, and how do they plan to harness it within their own organization? Do they see Quantum Computing as a game changer for their company or, indeed their industry sector, and when do they expect it to have an impact? The report offers recommendations on steps that organizations can take today to ensure that they are able to harness both current and future solutions to help the critical moving parts of their business flourish in a digital age.

KEY FINDINGS

Process optimization is critical to competing in the digital era.
81% of business leaders believe that the optimization of their business processes can help them to tackle digital transformation and to remain competitive in a fast-changing market.

Businesses see a huge positive impact from improving core processes.
64% of executives believe that being able to undertake faster, more effective product or service development would have huge potential benefits for key elements of their business or their entire organization.

A majority of decision makers believe they could transform a critical part of their organization by undertaking an optimization calculation for an entire business process.
55% state that an optimization calculation for an entire business process would transform a vital part of their business and give them a much stronger competitive position.

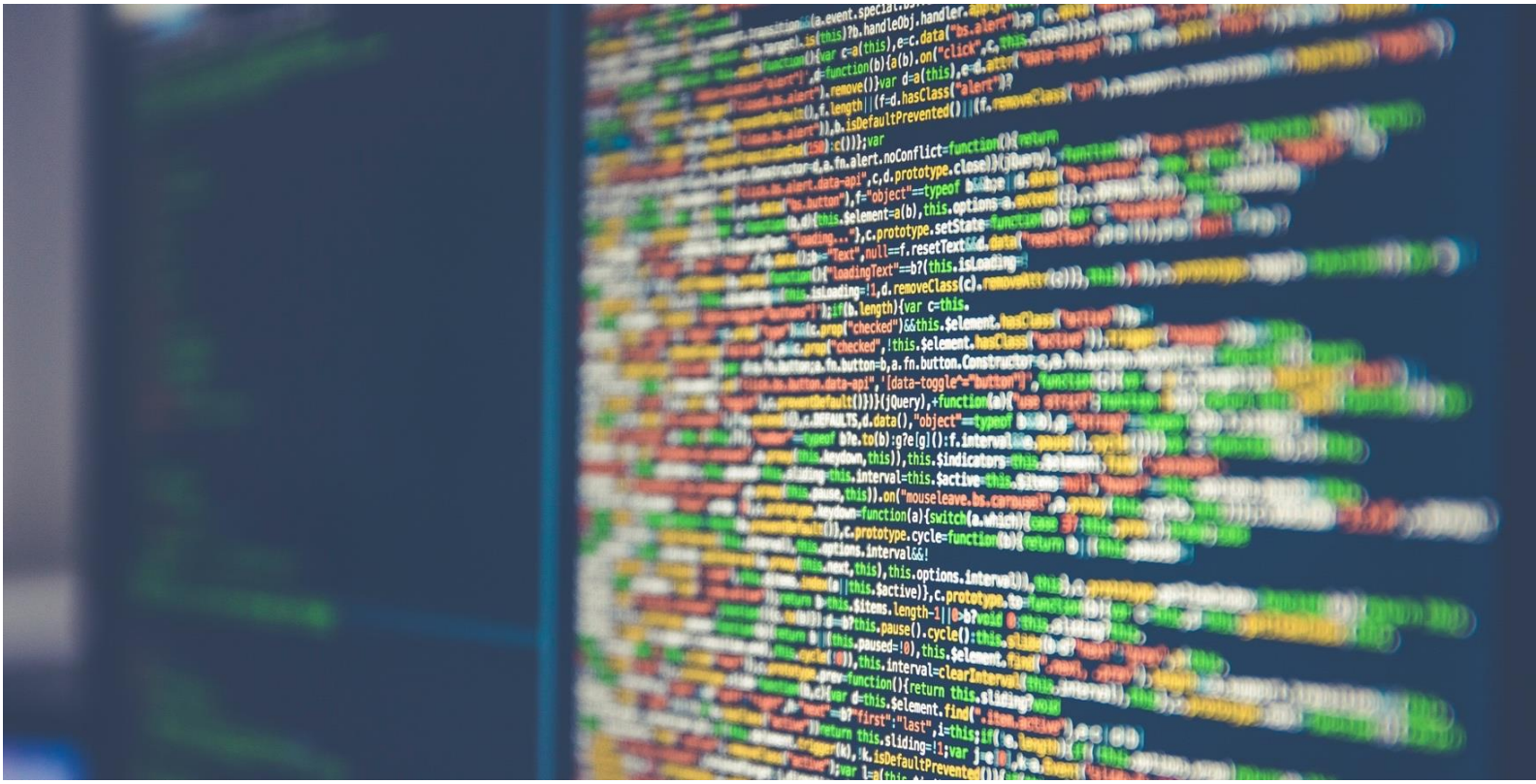
Today's technology is holding back process optimization.
89% of business leaders state that they are being held back from carrying out optimization calculations by the computing power from today's technology.

Most executives believe Quantum will transform their business.
79% believe that Quantum Computing will transform their industry sector and 52% state that it will also transform their own business.

Business leaders don't want to wait for Quantum Computing to tackle the critical issue of process optimization.
66% state they want optimization solutions today, rather than experimental quantum technology sometime in the far future."

The majority of business leaders believe that Quantum Computing won't become a force in the business world until a longer-term horizon.
50% believe it won't come into play for between 10 to 20 years.

The large majority of executives see potential benefits with the Digital Annealer as a bridging solution to Quantum.
70% believe that if the Digital Annealer can offer quantum-speed optimization calculations today, it would accelerate their journey to a quantum future.



DOES DIGITAL FAIL WITHOUT PROCESS OPTIMIZATION?

Process optimization has become critical to enabling digital transformation.

While many businesses have taken great strides in improving their digital front-end – from compelling websites and mobile apps, through to customer service chat-bots – the next challenge is to ensure that this innovation can be supported at the heart of the organization.

The recent collapse of retail giant Sears owed much to its failure to modernize its approaches to stock management and customer service despite the pioneering work it had done in becoming an omnichannel leader. Consider also the example of Samsung, which became the first major brand to get to market with a folding smartphone but was forced to pull the Galaxy Fold device after shortcomings in the testing and design process led to early users experiencing cracked and broken screens.

One of the key findings of the *teknowlogy Group / Fujitsu* study was that **81%** of business leaders across sectors including manufacturing, life sciences, retail, transport and utilities believe that the optimization of their business processes can help them to tackle digital transformation and to remain competitive in a fast-changing market. This included **87%** of manufacturing business executives and **86%** of their peers in the retail sector.

81%

of business leaders believe that process optimization can help them to enable digital transformation and remain competitive

Many large manufacturing and retail companies run their businesses on decades-old processes that have accumulated layer upon layer of complexity through localized and departmental projects, M&A activity and the evolution of the partner and supplier ecosystem. On top of that, these processes are often underpinned by a fragmented landscape of IT systems. It is therefore no surprise that many business leaders believe that their critical processes are far from fully optimized.

For example, three quarters of business executives rate the efficiency with which they use material resources as poor or adequate. This includes **84%** of utilities executives, and **78%** of their peers in the transport sector. Resource management is a major challenge in the utilities sector with most suppliers rebalancing their energy mix in favor of renewables while ensuring price competitiveness. The major challenge transport operators are facing is managing their vehicle fleets to meet a constantly changing environment in terms of traffic, weather and customer requirements.

In the life sciences sector, **56%** of executives rate their current ability to drive higher productivity with lower labor input as adequate or poor, while **62%** give a similar rating to their approach to accelerating and improving new product development. This is a worrying statistic, given the huge competitive importance of time-to-market in this sector.

In the wider manufacturing arena, just **12%** of business leaders claim that their product development processes are fully optimized, and the same proportion state that they believe they have gone as far as they can in eliminating efficiencies in their supply and value chains. This latter issue is also a big challenge in the retail sector, where close to two thirds (**63%**) see this as an area where they are performing at a poor or adequate level.

What areas of their organization do business leaders believe have significant room for improvement today?

DIALING UP OPTIMIZATION

Business leaders see huge potential benefits in dialing up the level of optimization across these aspects of their organization.

Some **64%** of participants believe that being able to undertake faster, more effective product or service development would have a transformational impact on key elements of their business or their entire organization. The same proportion of participants believes that being able to better allocate capital and resources to achieve faster or greater ROI, would have a similarly positive impact.

In the financial services sector, **61%** of participants believe that increasing the optimization of the way in which they undertake a risk assessment of customers or financial instruments would be a game-changer. The cost of failure in such a highly regulated market can be severe, evident in the $300m fine levied on Standard Chartered over shortcomings in its anti-money laundering processes.

Business leaders are constantly striving to drive improvement in areas such as these, but to what extent can they see beyond the conceptual and identify specific processes that are ripe for optimization today?

Some **39%** of executives state that they find it easy to imagine specific processes in their organization where process optimization would be immediately beneficial. This includes **43%** of business leaders in the manufacturing sector, which shows a clear case for investment in optimization today, particularly in tackling the challenges highlighted in product development and supply chain management.

64%

of business leaders believe that being able to undertake faster, more effective product or service development would have a transformational impact on their business

Do you believe that solving the following problems would transform your organization or a vital part of your business?

MANAGING ON INSTINCT

However, one of the biggest challenges facing process optimization strategies is that many are being formulated based upon either instinct or old data.

More than three quarters (**78%**) of executives state that their process planning and optimization strategies are being based upon the instinct of business leaders or historical data. This includes a surprisingly high **82%** of executives in the retail sector, a market that generates a wealth of valuable data on aspects such as customer buying trends, pricing and stock availability. This data is clearly not being truly harnessed.

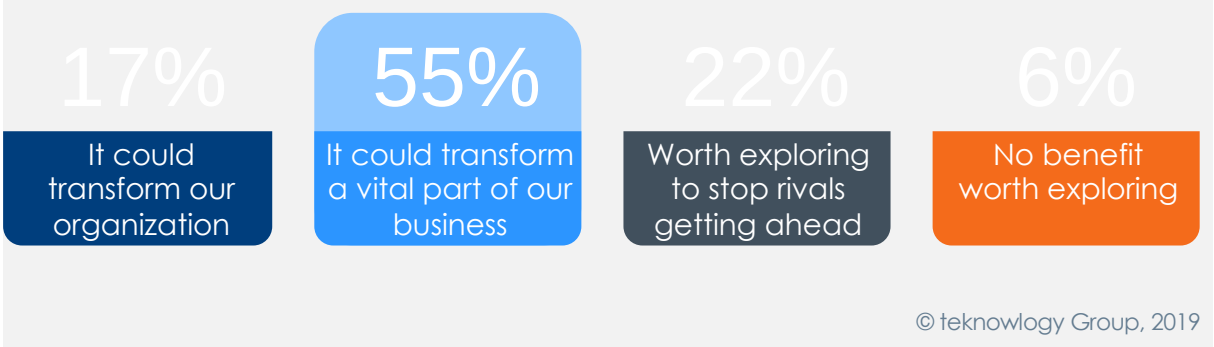
So what is the solution? A small proportion of the participants in the study (**31%)** state that they have already considered undertaking an optimization calculation for an entire business process.

This is potentially a hugely complex exercise. For example, if a logistics company wanted to plan the optimal route for a fleet of 100 trucks, travelling between multiple collection and delivery points, it would require massive computing power to run an algorithm that would assess every possible route and identify the best one.

But while those that have already mulled over a process optimization are in the minority, a much larger proportion sees a benefit in undertaking one in the future. Some **55%** state that an optimization calculation for an entire business process would transform a vital part or process of its business and give them a much stronger competitive position. This includes **65%** of life sciences business leaders and **63%** of their peers in the utilities sector.

The appetite is clearly there, but today's technology is holding back process optimization. More than a quarter (**29%**) of business leaders state that they are already being held back from carrying out optimization calculations by their current computing power. A further **60%** believe that their current capabilities would be a barrier if they decided to go ahead. This includes more than two thirds of participants from the transport and retail sectors.

What level of benefit do executives expect from an optimization calculation for an entire business process?



KEY TAKEAWAYS

Process optimization is high on the executive radar, and is seen as critical to growth, innovation and enabling digital transformation.

Across all major industry sectors, business leaders believe that they are falling short in crucial areas of their organization, from basic workforce productivity through to new product development and the efficiency of their supply chains.

There is clearly a need for companies to build a clearer picture of process performance, and with an ever-expanding wealth of near real-time data increasingly at their fingertips, their dependence on management gut-feel or data that is well past its use-by date should reduce in the coming years.

Undertaking a process optimization calculation is the most effective way to re-wire and re-invigorate underperforming parts of the organization, but most executives feel that their current technology does not enable them to do this.

This may change, with a new era of computational power on the horizon in the shape of Quantum Computing. In the next section, we look at the short- and longer-term potential that business leaders see in quantum, and how they plan to harness it within their organizations.

QUANTUM COMPUTING: SCIENCE FICTION OR GAME-CHANGER?

Quantum Computing has become one of the biggest talking points in the technology industry, and it is already on the radar of many businesses at a boardroom level.

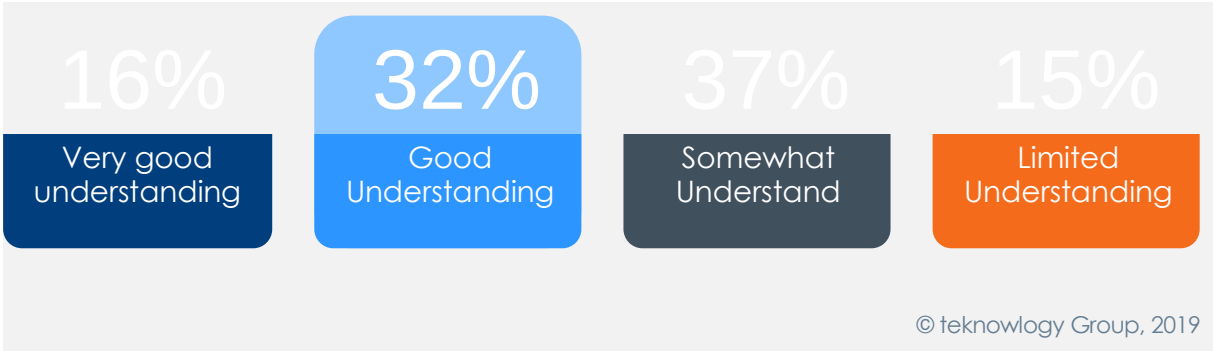
More than two thirds (**69%**) of business leaders state that they have heard of Quantum Computing, including **75%** of participants in the UK and Ireland and **70%** in the Nordic region. Awareness is strongest among manufacturing business leaders, where **75%** state that they are familiar with the concept.

Explainer: What is Quantum Computing?

Quantum Computing carries the potential to leapfrog the limitations of today's silicon-based technology.

A Quantum Computer uses the quantum properties of matter, such as overlay and entanglement, to handle and process data. Unlike a conventional transistor-based computer, which works on binary data (bit-coded 0 or 1), a Quantum Computer works on qubits whose quantum state can have infinite values. This means that while a traditional computer tries to calculate possible answers to a problem one-by-one, a Quantum Computer can consider many outcomes at once, before arriving at the correct or best possible solution. Quantum Computing offers the potential to leverage quantum logic to process calculations that are currently impossible with today's computing architecture. The technology remains in the research and development phase, as organizations tackle complex challenges around requirements in cooling, shielding and error correction.

How well do business leaders understand the concept of Quantum Computing?

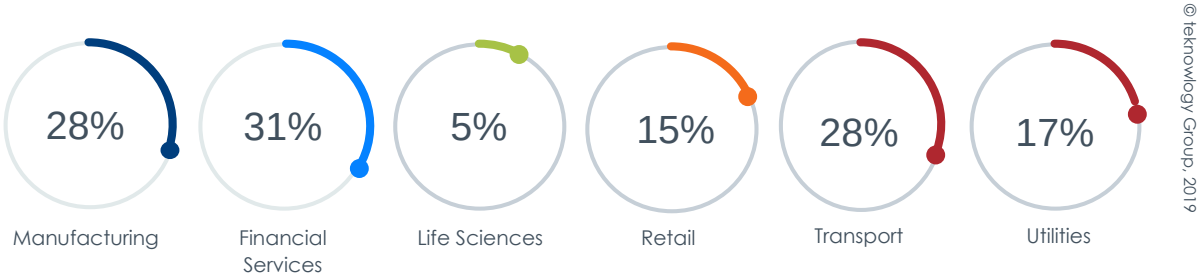


However, very few claim to have a deep understanding of the subject. Overall, just **16%** claimed that they had a "very good understanding" of Quantum Computing, while one third state that they have a good understanding. Insight into Quantum Computing is strongest in the financial services sector, where **54%** of respondents stated that they had either a good or a very good understanding.

The list of major companies that is starting to channel significant investment into exploring Quantum Computing is growing by the week, with activity across all major industry sectors. Nearly a quarter (**24%**) of business leaders state that Quantum Computing is under consideration in their organization, with participants in financial services (**31%**) and manufacturing (**28%**) the most interested.

But this interest in Quantum is not necessarily being channeled in a meaningful way. Just **10%** of executives say that Quantum Computing is currently part of their optimization strategy, with manufacturing companies (**17%**) way ahead of their peers in other sectors in terms of looking at the role it can play in impacting the key moving parts of their operations.

How many business leaders are currently considering exploring Quantum Computing in their organization?

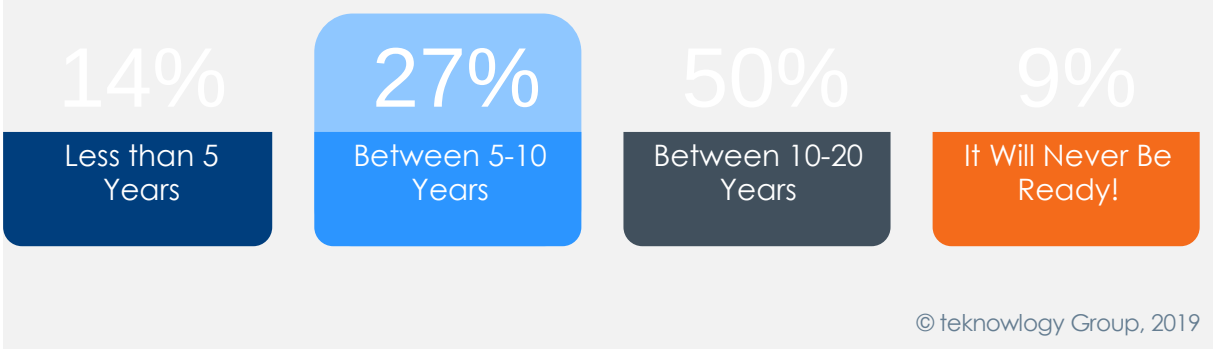


WHEN WILL QUANTUM HIT THE MAINSTREAM?

But when will Quantum Computing become a reality?

Technology companies and academia have spent the last decade laying the groundwork through research initiatives, which are now resulting in successful lab demonstrations of systems and simulations involving multiple Qubits. However, there is still some way to go before these evolve into commercially ready solutions.

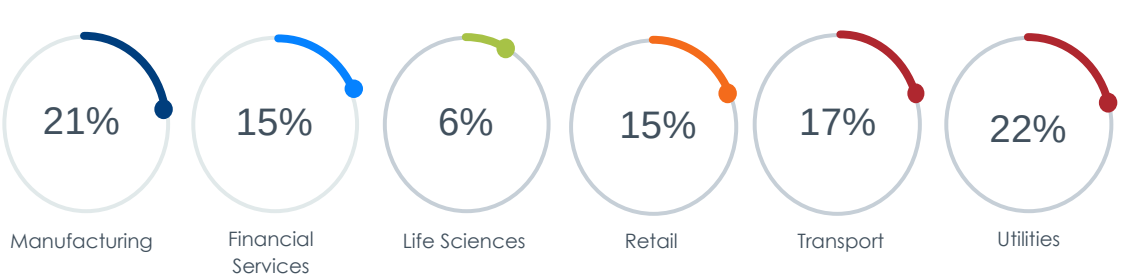
When do business executives expect Quantum Computing to be ready for business use?



The majority of participants in the study believe that Quantum Computing won't become a force in the business world for several years or even decades. A quarter expect it to come into play between five to 10 years, with **50%** looking at a window of opportunity of between 10 and 20 years. It is executives in the transport sector that are most optimistic about a shorter-term impact, with **22%** of business leaders anticipating Quantum to be business ready within five years.

The study also explored how quickly business leaders expected to be actively using Quantum Computing. As we saw earlier, a relatively small proportion is currently considering whether Quantum can add value for them, and an even smaller group (**17%**) believes it will have live engagements running by 2025.

How many business leaders expect to be using Quantum Computing in their business within five years?



ASSESSING QUANTUM'S IMPACT

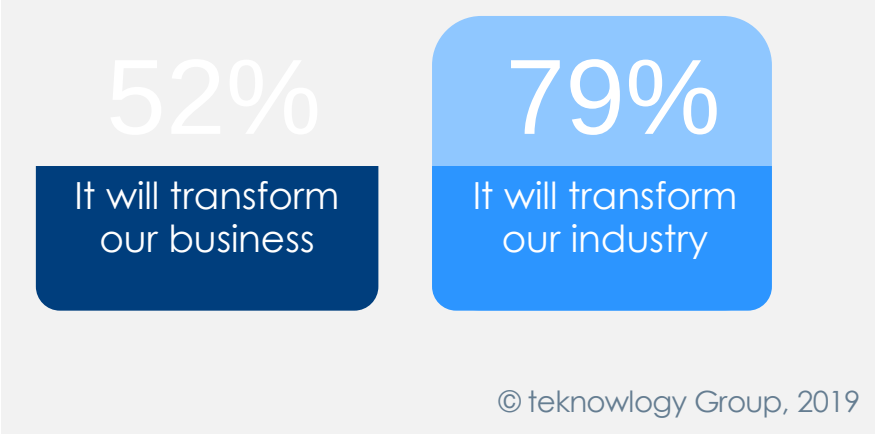
Although the majority expects the dawn of the Quantum age to happen well into the 2030s, there is widespread expectation that if it does become a reality, its impact will be enormous.

Most business leaders believe that Quantum Computing could transform their organization and their sector. More than three quarters (**79%)** believe that Quantum Computing could transform their industry and **52%** state that it could also transform their own business. Participants in the financial services (**61%**) and utilities (**59%**) industries see the strongest potential for Quantum Computing to reshape their own organization.

In the former sector, the number of potential use cases for Quantum Computing continues to expand as a growing list of banks and insurance carriers put their shoulder to the wheel. JP Morgan, Barclays and Morgan Stanley are currently exploring Quantum's potential in areas as diverse as advanced cryptography, fraud detection, asset valuation and portfolio analysis.

In the financial services space in particular, Quantum Computing is seen as a factor that could provide rivals with a competitive edge. More than three quarters (**78%**) of business leaders in the banking and insurance sector believe that they would be disrupted if a competitor adopted Quantum Computing before they did. Executives in the utilities sector (**75%**) are also highly attuned to the risk of falling behind the pack if they don't push ahead with their own Quantum initiatives.

Do business leaders believe that Quantum Computing will transform their business or their industry?



78%

of business leaders in the financial services sector believe their business would be disrupted if a competitor adopted Quantum Computing before they did.

KEY TAKEAWAYS

Quantum Computing is already a subject that business leaders are taking seriously enough to view it as having a potentially transformational effect on their business and their wider industry sector.

They are concerned that their rivals will gain an edge if they are able to harness its potential before they do, and many – particularly in the financial services and manufacturing sectors – are channeling significant investment into Quantum research and test initiatives to stay ahead of the curve.

The majority of business leaders do not expect Quantum to have an impact for at least the next five or ten years, but organizations need to start exploring the possibilities today to secure a position on the starting grid when it becomes a commercial reality.

A current focus for many organizations is on investigating possible bridging solutions between today's computing technology and fully-fledged Quantum Computing. In the next section we look at how some executives are already looking to harness Quantum-like capabilities with currently available technologies.

Five Businesses Laying Quantum Foundations Today

Airbus: The aerospace giant launched a competition to identify possible uses for Quantum Computing in the flight physics domain. Academics, start-ups and technology suppliers have been invited to explore areas including optimization of wing design and aircraft climb.

BASF: The chemicals manufacturer has invested in a US-based Quantum Computing start-up, with the aim of exploring how the technology can help it efficiently investigate complex operational questions and accelerate the time-to-market for new products.

RBS: The banking group is using Quantum-inspired Computing to help portfolio managers decide on the right composition for the bank's $150bn high quality liquid assets portfolio. The bank is also looking at which other portfolios could be calculated using the same technology.

US Department of Energy: The DoE announced $218m in funding for 85 research awards in the area of Quantum Information Science (QIS). The partners will explore the ways in which Quantum Computing provides insights into such cosmic phenomena as Dark Matter and black holes.

Volkswagen: The German automotive manufacturer has started to use Quantum Computing algorithms as part of a new traffic management system that can better process transport information and improve the performance of bus and taxi services. The system is being tested in Barcelona.

BUILDING A BRIDGE TO QUANTUM

Business leaders do not want to wait another five or ten years to harness the potential benefits of Quantum Computing.

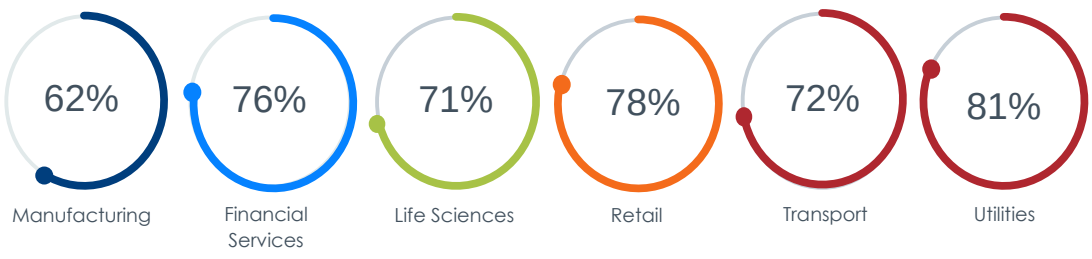
As discussed in the first section of this report, executives are looking to optimize their critical processes today. While Quantum Computing could offer a way to dramatically improve the inefficiencies in key parts of many organizations, the boardroom has recognized the need to act fast.

Close to two thirds (**65%**) of the participants stated that they want optimization solutions today, rather than experimental quantum technology sometime in the distant future. The desire to move now is strongest among leaders in the manufacturing (**80%)** and retail (**67%)** sectors. This appetite for practical solutions is also highlighted by close to three quarters (**71%)** of business leaders claiming that optimization services are far more relevant and real to their current requirements than Quantum Computing.

65%

of business leaders want optimization solutions today, rather than experimental Quantum technology sometime in the future

Do business leaders see optimization services as more relevant and real to them than Quantum Computing?



ASSESSING THE DIGITAL ANNEALER

One practical bridge between current and Quantum Computing is the Digital Annealer, a new business solution from Fujitsu that uses a digital circuit design inspired by Quantum Computing to help solve problems that are out of the reach of classical computers.

The Digital Annealer has already been deployed by major corporations across several industry sectors as a way of tackling complex combinatorial problems without having to wait for true Quantum Computing to become available and is helping to deliver significant improvements in process performance. For example, several automotive manufacturers are trialing the Digital Annealer to help them streamline shop floor job scheduling, enhance smart mobility services and refine car design to reduce noise while driving. For example, one manufacturer used the Digital Annealer to recommend optimized routing and stock placement across its warehouse operations, which helped to reduce the distance travelled to collect items by 45%.

Awareness of the capabilities of the Digital Annealer which was launched in February 2018 is relatively low, with just **29%** of participants in the study familiar with the solution. However, once the survey participants were provided with more background, the majority was quick to see the potential benefits. Some **70%** of organizations stated that if the Digital Annealer fulfills its claim to offer Quantum-speed optimization calculations today, it would accelerate their journey to a Quantum future. This view was held most strongly in the retail (**83%**) and utilities (**81%**) sectors.

Explainer: What is the Digital Annealer?

The Digital Annealer is a Quantum-Inspired technology architecture that is designed to help businesses solve complex combinatorial challenges that are beyond the capabilities of today's computers.

The Digital Annealer uses an architecture that is inspired by the key characteristics of Quantum Computing: superposition, quantum tunneling and entanglement, which enable it to evaluate multiple potential options simultaneously.

This is ideal for solving what is known as "combinatorial optimization" problems. For example, choosing the most valuable combination of 40 from 100 items to be put in a backpack for a trek could result in a number of possibilities exceeding one million times the number of stars in the universe. The Digital Annealer has been able to solve this problem within a second in a standard infrastructure environment at room temperature.

Whereas regular Quantum Computing solutions have to be operated at close to absolute zero in order to keep it from any kind of interference, the Digital Annealer operates at room temperature. And unlike classical computers, the Digital Annealer does not require extensive programming; instead, simply setting parameters allows calculations to be performed.

Do business leaders believe the Digital Annealer has the potential to accelerate their journey to a Quantum future?

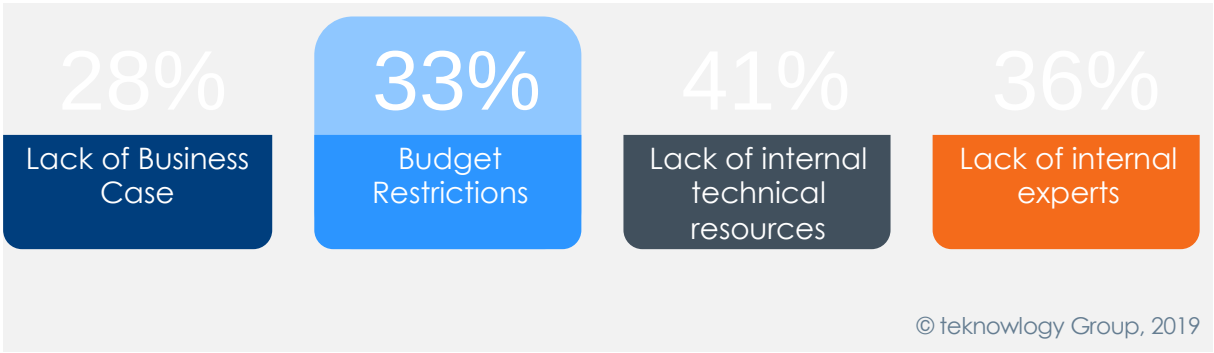
WHAT IS HOLDING BACK ADOPTION?

So what would prevent businesses from adopting the Digital Annealer today?

It was interesting to see that a lack of a business case is not viewed as a major stumbling block. This was cited by just a quarter (**28%**) of executives as a potential blocker to leveraging the Digital Annealer to accelerate process optimization, which suggests that the perceived benefits of adoption are clear. Cost is not seen as a significant hurdle either, with only one third (**33%**) citing budget restrictions as a potential problem.

Instead, skills are viewed as the main obstacle to overcome. More than three quarters (**77%**) of participants cite either a lack of internal technical resources or a lack of internal experts as a potential challenge in adopting Quantum-inspired technology. A lack of internal technical resources is seen as a particular constraint in the utilities (**47%)** and transport (**44%)** sectors.

What do executives perceive to the main barriers to adopting the Digital Annealer in their organization?



The race for talent remains a massive issue for organizations across all sectors as they look to attract and retain the skills to support their digital transformation. Many are already struggling to meet business demand in areas such as data analytics, cyber security and the Internet of Things, so it is understandable that organizations concerned about their ability to add the technical and business skills needed to adopt Quantum-inspired computing.

KEY TAKEAWAYS

Business leaders do not want to wait a decade or more for Quantum Computing to support their process optimization strategies.

The Digital Annealer offers a commercially available solution for businesses to harness the potential of Quantum today. While it may not currently be on the radar of many business executives, they can clearly see its potential value in accelerating process transformation within their organization.

The Digital Annealer does not carry the same specific and technical requirements of Quantum Computing solutions. It can be deployed in a traditional data center environment, or as a cloud service. However, it is clear that business leaders see lack of skills and expertise as the biggest barriers to adoption. They need guidance and support to take this technology leap.

This is understandable given the resourcing challenges that businesses already face in many areas of their digital transformation strategies. And it is one of the main reason why many early adopters of the Digital Annealer are choosing to test it with a partner that can help them to deploy the solution as a managed service, while helping them to focus its capabilities in the right areas.

CONCLUSIONS

There could be a gap of a decade or more before Quantum Computing enters mainstream business.

But the study has shown that executives do not have time to wait to optimize under-performing processes, which they acknowledge will be crucial in executing their digital transformation strategies. So for the vast majority of companies that have not yet started their Quantum journey, where should they begin?

For those with access to the budget, there is a growing ecosystem of technology companies that can help companies to start building the foundations for their own internal Quantum capability. However, with the market for Quantum Computing technology at such an immature stage and the pace of new development so fast, there is a high risk of making a costly investment in a platform that may soon be superseded by a more effective proposition. Flexibility and accessibility should be front and center of any Quantum strategy at this moment.

Many see the value in exploring a solution such as the Digital Annealer, which offers Quantum-style computing power to enable businesses to run complex process optimization calculations today. The research highlighted that many business leaders find it easy to picture specific processes within their organization that are crying out for this kind of approach.

The study also found that building the business case for Quantum-inspired Computing is not viewed as a major challenge by executives, but they will still have to qualify its potential. While keeping a close eye on breakthroughs in true Quantum Computing, business leaders should look closely at the successes and failures of the early adopters that are most relevant to them. Some existing use cases are summarized on the following page.

A great way to leverage Quantum-inspired Computing is to access it as a scalable cloud-based service, which can be done with a relatively small level of investment. Skills constraints was the biggest obstacle to Quantum-inspired Computing adoption cited in the study, but using a cloud-based service in conjunction with a partner can help organizations to run their initial forays into process optimization with minimum burden placed on internal technical resources.

Quantum Computing may be a few years down the road, but its potential to transform critical processes can be harnessed today.

The journey starts now.

Current Use Cases for Quantum-Inspired Computing

Financial Services: Finance involves a large number of tasks that are very close to optimization, where Quantum-style Computing can allow faster and more complex "Monte Carlo" simulations, in areas such as trading, trajectory optimization, market instability, price optimization and hedging strategies.

Life Sciences: Quantum Computing could be used to accelerate the sequencing of DNA genes, the optimization of treatment in radiotherapy and better and faster detection of brain tumors, which could be done in seconds instead of hours or weeks. This could mean reduced exposure to X-rays by simulating and optimizing the movement of waves in the human body.

Manufacturing and Automotive: One of the most promising uses of Quantum Computing is the simulation and discovery of the properties of new materials and active products (for chemistry and pharmacy), through the simulation of atomic interactions. Projects in this area are in progress at Dow Chemicals and at Airbus. Another interesting topic is the modeling, simulation and design of batteries, and other electrical equipment that is needed for green energy and electrical vehicles.

Transportation: The management and optimization of traffic (road, rail, air, etc.), the operation of vehicle fleets and the management of autonomous vehicles are promising fields where the inherent qualities of Quantum can add value. Several companies are evaluating this around the optimization of filling of airline fleets in near real time and in a global way.

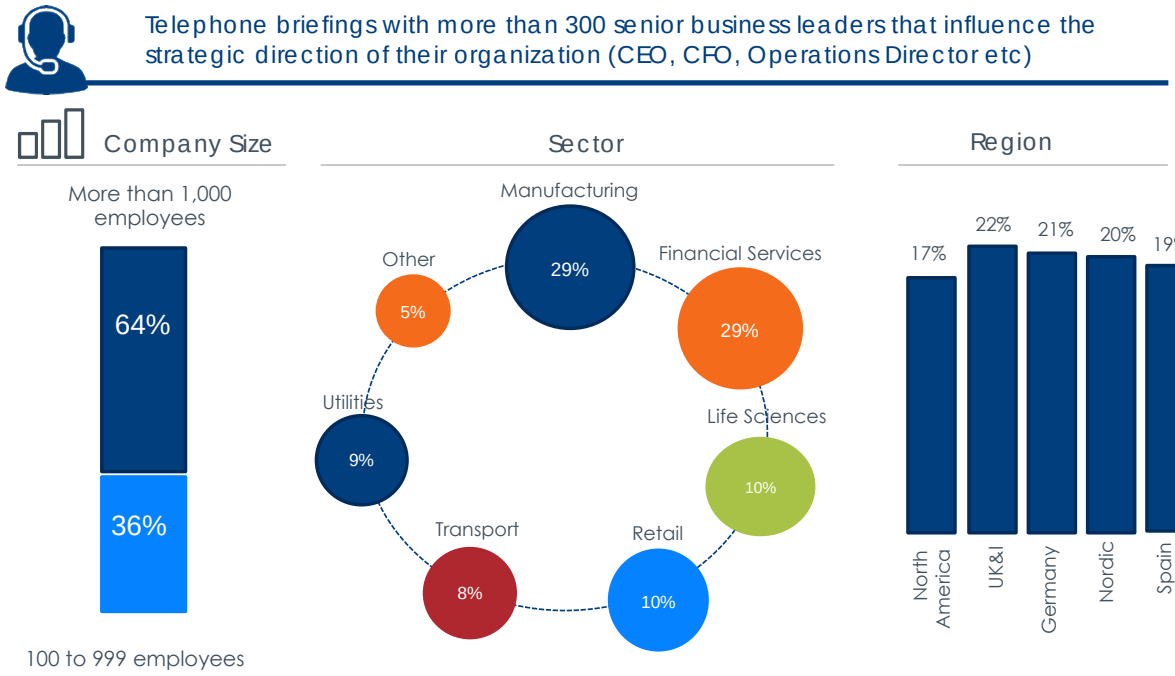
Utilities: Quantum Computing simulation capabilities could be used to improve oil exploration, and BP has a project ongoing on this topic. Dubai Electricity is experimenting around distribution and optimization of the water and electricity networks.

METHODOLOGY

The results of this study are based on telephone briefings with senior business leaders at large and medium-sized business based in Europe and North America.

All participants are involved in influencing the strategic direction of their organization, including CEOs, CFOs, Operations Directors and Line of Business leaders. It is important to emphasize that the study was run with Business rather than IT/technology leaders, as we wanted to understand current challenges around business process optimization, and the perceived benefits or barriers to adopting Quantum-style computing.

The field research was undertaken during the second quarter of 2019, and included participants from six major industry sectors: manufacturing (including automotive production); financial services (including both banking and insurance); life sciences; retail; transport; and utilities. A breakdown of the study sample can be found below.



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Fujitsu promotes a Human Centric Intelligent Society, in which innovation is driven by the integration of people, information and infrastructure. In the Europe, Middle East, India and Africa region (EMEIA), our 28,000-strong workforce is committed to Digital Co-creation, blending business expertise with digital technology and creating new value with ecosystem partners and customers. We enable our customers to digitally transform with connected technology services, focused on Artificial Intelligence, the Internet of Things, and Cloud - all underpinned by Security. For more information, please visit http://www.fujitsu.com/fts/about/

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teknowlogy Group is the leading independent European research and consulting firm in the fields of digital transformation, software, and IT services. It brings together the expertise of three research and advisory firms, each with a strong history and local presence in the fragmented markets of Europe: Ardour Consulting Group, CXP and PAC (Pierre Audoin Consultants).

We are a content-based company with strong consulting DNA. We are the preferred partner for European user companies to define IT strategy, govern teams and projects, and de-risk technology choices that drive successful business transformation.

We have a second-to-none understanding of market trends and IT users' expectations. We help software vendors and IT services companies better shape, execute and promote their own strategy in coherence with market needs and in anticipation of tomorrow's expectations.

Capitalizing on more than 40 years of experience, we operate out of seven countries with a network of 140 experts.

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