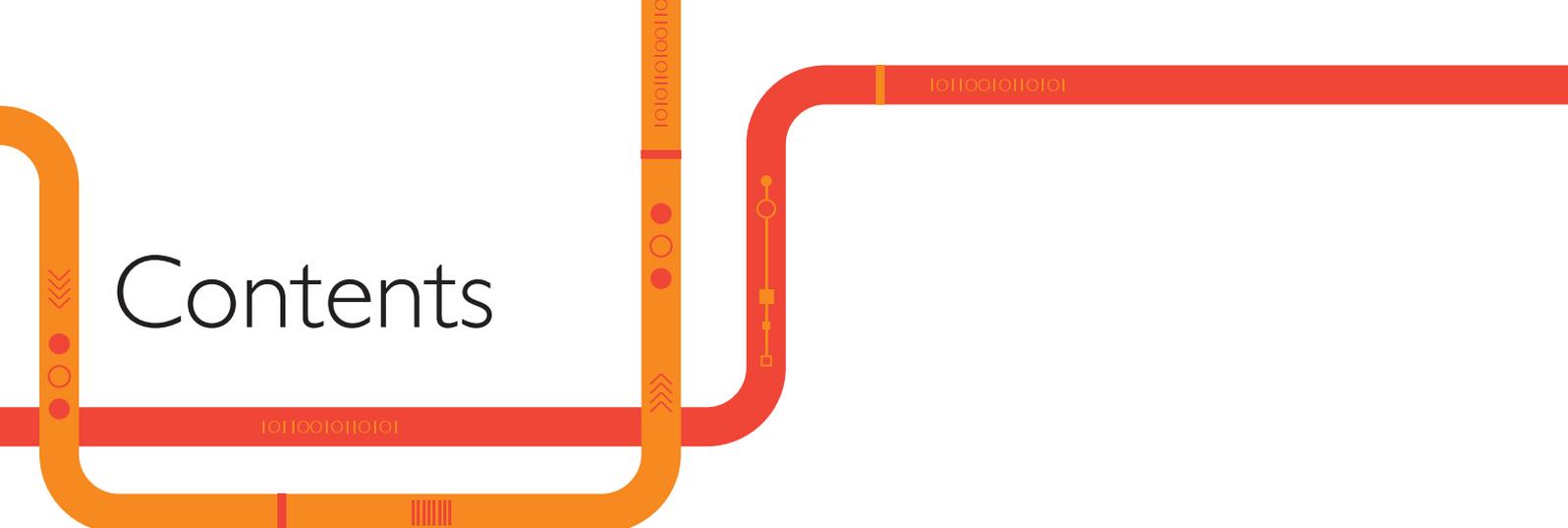




CYBER THREAT A GROWING CONCERN, WHILST TECH INNOVATION PRESENTS OPPORTUNITY

Calm before the post Brexit storm?



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BACKGROUND

In 2012, the first Tech Index study reviewed the perceptions and attitudes of European technology growth in light of market changes, shifts in the financial regulatory landscape and Government policies designed to spur business innovation post-recession. This then, set in motion a series of surveys to track the changes and evolution in the technology marketplace, with our 2014 survey exploring growth prospects of the technology sector.

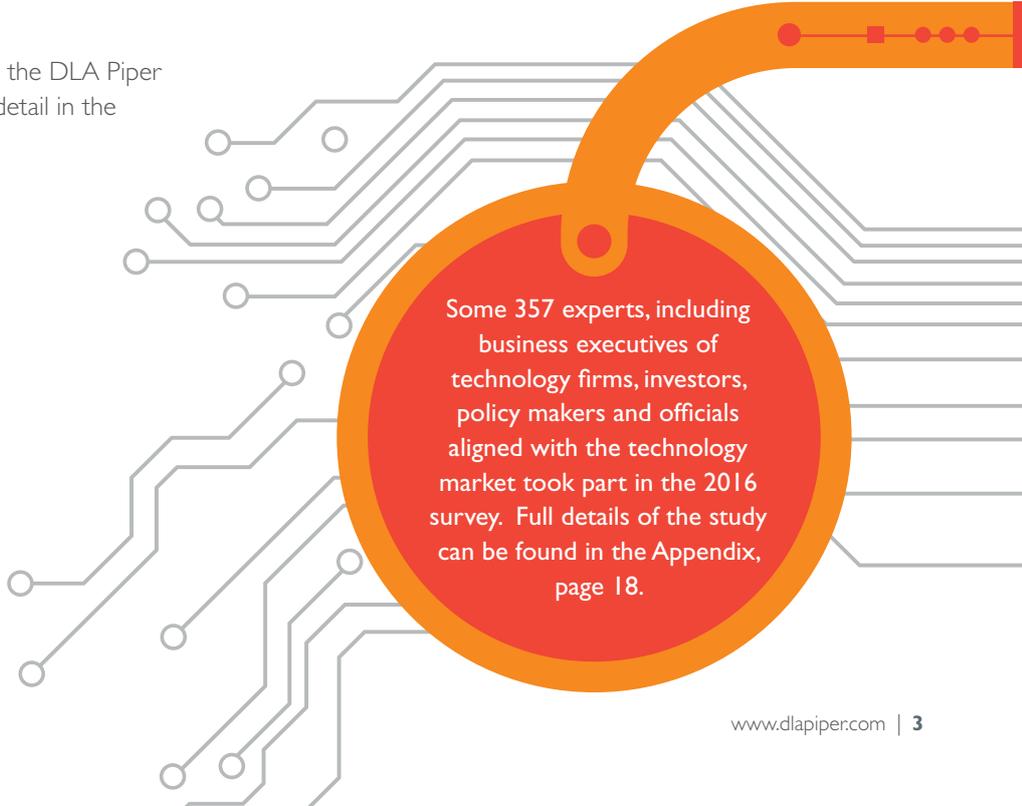
Our 2016 report, while looking at trends in the core areas our index reviews, shifted the focus to current important innovations and topics including:

- Cyber-security
- The Internet of Things (IoT) and connectivity
- Artificial Intelligence (AI) and robotics
- FinTech
- Digital transformation

The research methodology that underpins the DLA Piper European Technology Index is outlined in detail in the Appendix, page 18.

Detailed questions in the survey covered issues such as:

- Security
- Worries or concerns with respect to the core technologies
- Knowledge and expertise
- Technology's impact on business
- The ability to integrate new technologies for business gain



Some 357 experts, including business executives of technology firms, investors, policy makers and officials aligned with the technology market took part in the 2016 survey. Full details of the study can be found in the Appendix, page 18.

Executive Summary

The DLA Piper European Technology Summit is our flagship event which we run, every 2 years, for the benefit of our clients and wider networks. This exclusive conference is dedicated to providing insight and analysis into the current emerging technology and legal trends affecting businesses today and attracts hundreds of senior executives from across Europe's technology sector and beyond.

Our Summit is supported by our DLA Piper European Technology Index, a survey which we've run for several years that provides insights into perceptions, attitudes and trends relating to the technology industry. This year's report is our 3rd edition and is conducted with hundreds of industry executives from across Europe, exploring industry perceptions of the European technology sector and the regulatory environment, offering current insights into key areas that guide, amongst other things, investment and financing decisions. The analysis also provides perspectives from the market on topics we're covering in this year's European Technology Summit including: FinTech; artificial intelligence; the Internet of Things; cyber-security and more besides.

The findings from this year's data have, once again, proven interesting whilst, with this being the 3rd edition, we've also run a valuable trends analysis comparing this year's data with information collated from previous years. The findings from our 2012 survey focused on the impact of the Euro crisis and recessionary climate. Our 2014 survey explored growth prospects in the technology sector. In interpreting the data from this year's survey we've noted:

- The most important topics among the businesses interviewed were: cyber-security, the Internet of Things (IoT), mobile computing and recruitment of quality talent all of which are set to have a substantial impact on any business or organisation involved in the technology marketplace over the next few years.
- Ongoing concerns over cyber-attacks are still high among almost half of companies interviewed; yet only one quarter have response plans in place, which leaves those unprotected open to a major attack.
- Concerns over compliance regulations, staff skills and investment will hold development of FinTech back.

- Lack of internal skills means collaboration with external resources is vital for future development of IoT.
- Lack of skills and investment costs could hold back further development of AI and robotics, though both these developments are likely to have a significant impact on the technology market.
- Access to skills and talent is always a challenge. Post Brexit this problem may become more serious given possible future immigration restrictions from across the EU.
- Security remains an ongoing concern across the technology ecosystem.
- The pre Brexit stability may not last; something that will be evaluated in the next Tech Index study in 2018, which will track the impact of the anticipated Brexit related negotiations over time.

We trust that this year's DLA Piper European Technology Index offers valuable food for thought for you and your organisation whilst, as with previous years, we anticipate that this report is to stimulate useful further discussions with industry going forward.

We also look forward to our equivalent report next year that looks at the US market.

Should you have any questions regarding this year's report do feel free to get in touch.

Thanks,



Kit Burden

Partner and Global Co-Chair, Technology Sector,
DLA Piper

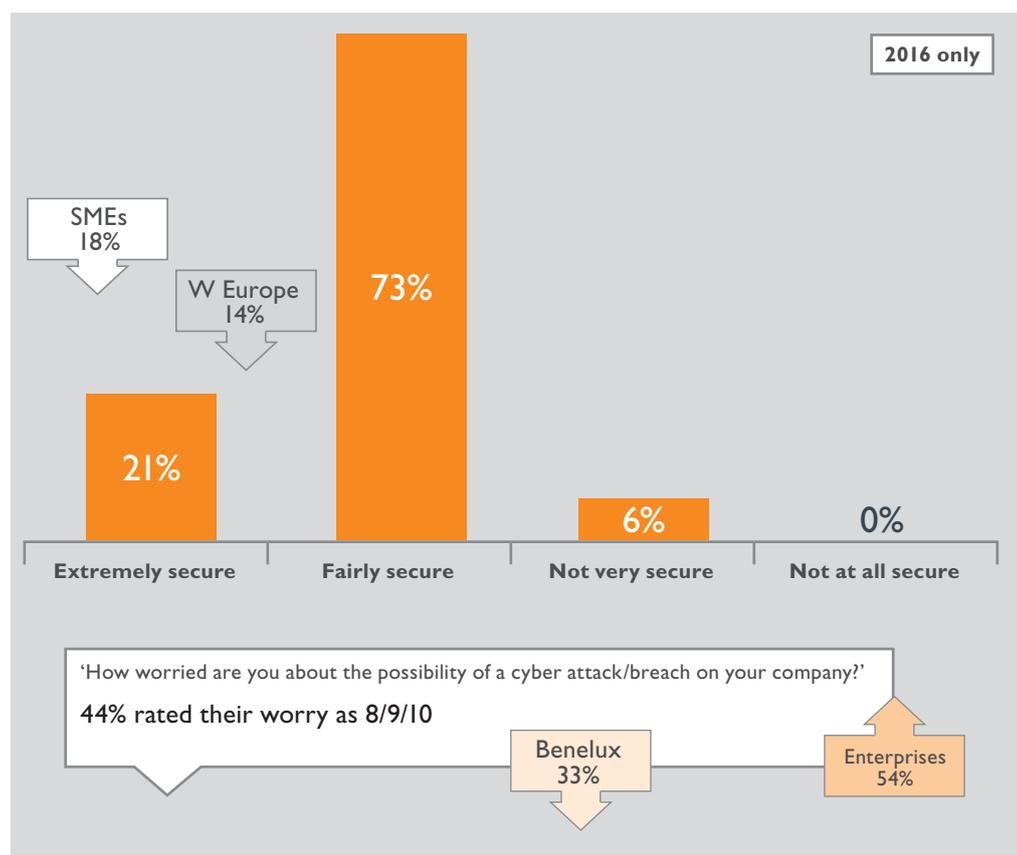
Cyber-Security: Ongoing concerns over cyber-attack are still high among almost half of companies interviewed; yet only a quarter have response plans in place, which leaves those unprotected open to a major attack

Security features high on the list of requirements to help companies grow in the future, being ranked equal 3rd out of the 10 areas covered in the research.

When asked how secure or unsecure they thought their company was in terms of cyber-security measures, only 21% of companies rated themselves as 'extremely secure'. This level was even lower in SMEs (18%) and in Western Europe (14%), but has to be a core area of concern for companies in the light of recent major, well publicised attacks. The reputational damage of a public cyber-attack is extensive, with some organisations simply not doing enough to nullify the threat.

When questioned further regarding how worried they were about the possibility of a cyber-attack or breach of security on their company almost half rated their level of concern as significant (8/9/10 out of a possible 10). Only around 1/3 of SMEs (37%) rated themselves as 8/9/10 and therefore seem significantly less concerned about cyber-attacks, which may lead to higher risk in this area.

SECURITY OF COMPANY AGAINST CYBER-ATTACK

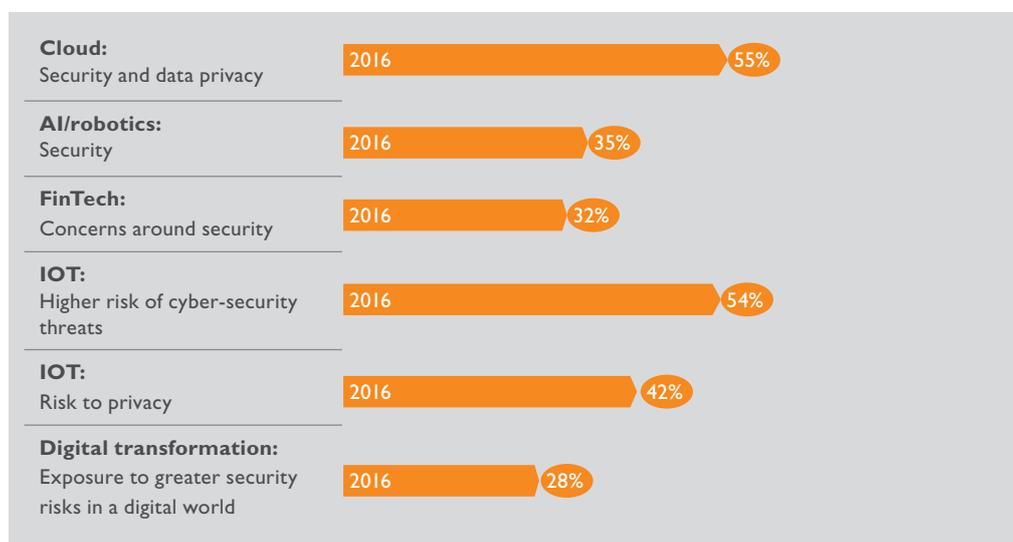


Cyber-Security: Ongoing concerns over cyber-attack are still high among almost half of companies interviewed; yet only a quarter have response plans in place, which leaves those unprotected open to a major attack

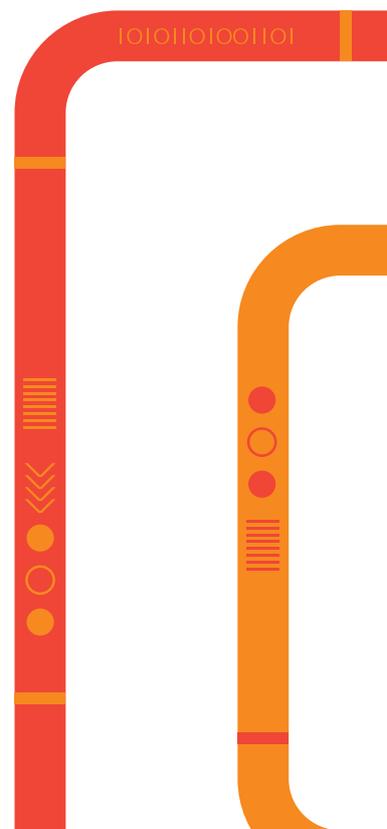
A vast array of policies and methodologies are in place to provide cyber-security, though unfortunately many of them seem unfit for purpose. Security software, such as online digital security, software updates and passwords are often seen as reasonable steps to prevent an attack, but are in fact insufficient steps in prevention. More concerning is that 1/4 of the companies evaluated have no cyber-attack response plan in place (a key issue for Western European companies - 31%).

Security is a common theme across many technology areas, with recent developments impacting businesses from across Europe. This was highlighted by the fact that security was mentioned as a challenge and/or drawback across each of the areas evaluated.

SECURITY: IMPLEMENTATION DRAWBACKS

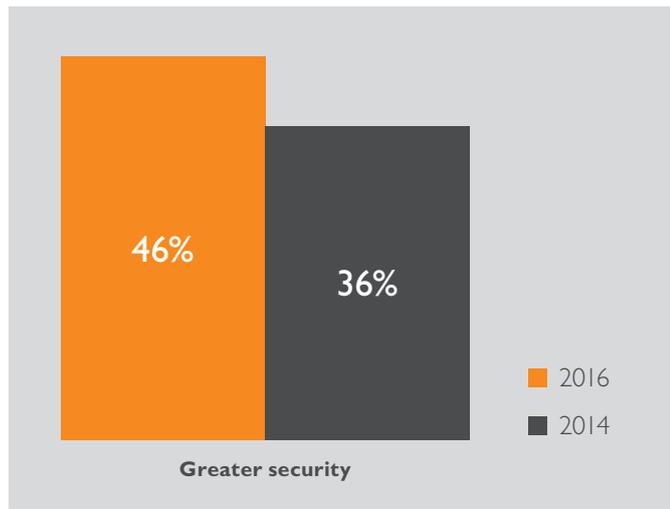


The industry, as a whole, has failed to overcome the security issues related to Cloud services, with recent cyber-attacks only highlighting concerns further: Only 1/4 of respondents cited security as a benefit with the adoption of Cloud, though conversely over 1/2 of the respondents selected security and data privacy as a drawback (slightly less so in Eastern Europe - 43%, but higher in enterprise companies - 61%).

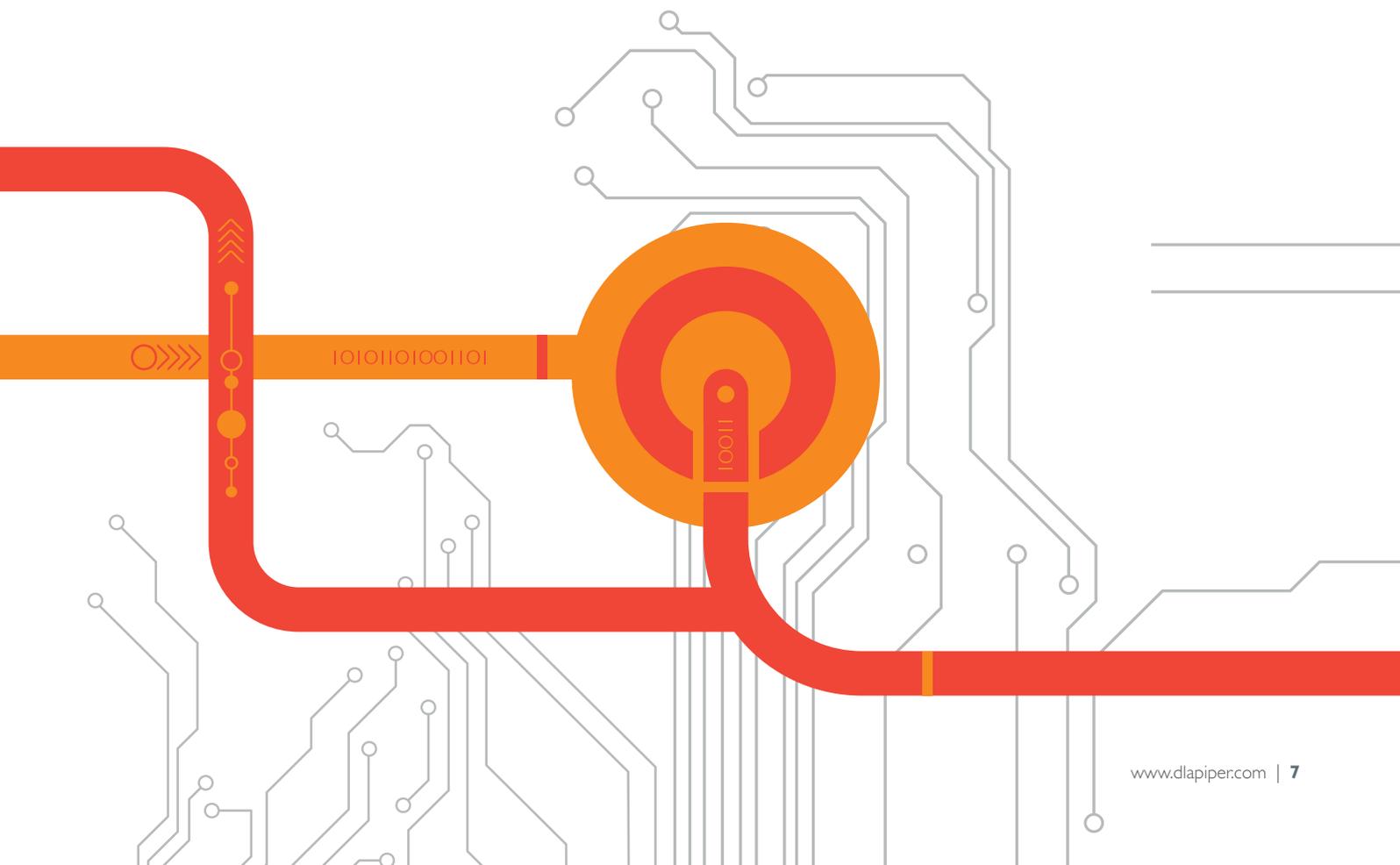


Cyber-Security: Ongoing concerns over cyber-attack are still high among almost half of companies interviewed; yet only a quarter have response plans in place, which leaves those unprotected open to a major attack

SECURITY A BENEFIT FOR MOBILE COMPUTING

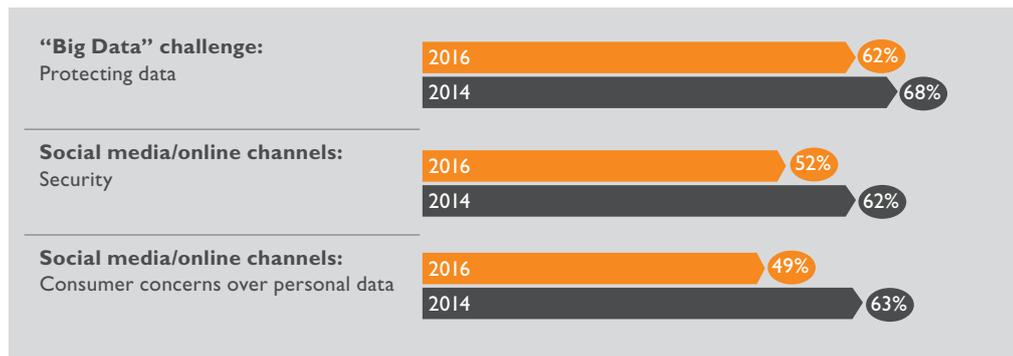


For mobile computing there has been a major increase in user confidence from 36% to 46% of respondents seeing greater security as a benefit. However, concerns around security still exist, including: information-stealing, mobile malware and viruses, all of which were mentioned by nearly 2/3 of companies (Benelux 75%). The loss of governance or control over sensitive information was also a concern for over half of organisations (Benelux 64% and SMEs 59%).



Cyber-Security: Ongoing concerns over cyber-attack are still high among almost half of companies interviewed; yet only a quarter have response plans in place, which leaves those unprotected open to a major attack

SECURITY: CHALLENGES

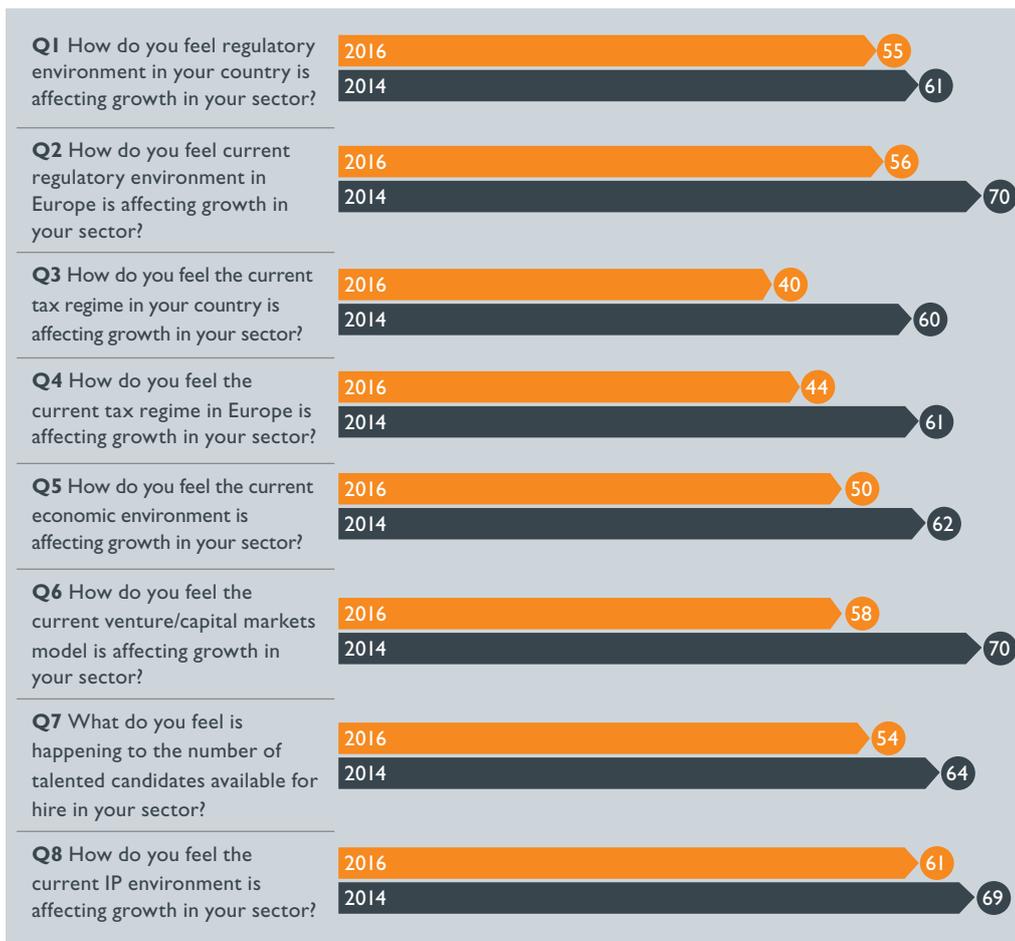


Security was the main issue in regards to “Big Data”, and was mentioned by 62% of organisations rising to 67% in Benelux based organisations. For IoT and connectivity, higher risk of cyber-security threats was mentioned by 54% of firms, and, to a slightly lesser degree, risks to privacy (42% - Eastern Europe 48%).

Although slightly lower down in terms of being a negative drawback, security was cited as an issue for AI and robotics (35%) and FinTech (32%).

Tech Index: Stability in the market pre Brexit may change – next Tech Index study to track impact post Brexit

TECH INDEX — 2014 VS 2016 COMPARISON

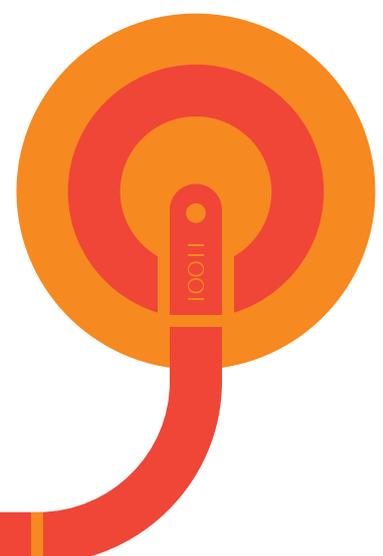


Note: Details of the calculations used to create the index scores can be found in the Appendix, page 19.

The above analysis shows that, compared to 2014, the market appears to be significantly less volatile as the impact of regulation and tax regimes seem to have had far less of an influence on index scores in 2016. This is particularly notable for the regulatory environment in Europe (index score of 70 down to 56), tax regime's in their respective countries (60 to 40) and venture and capital market models (70 to 58).

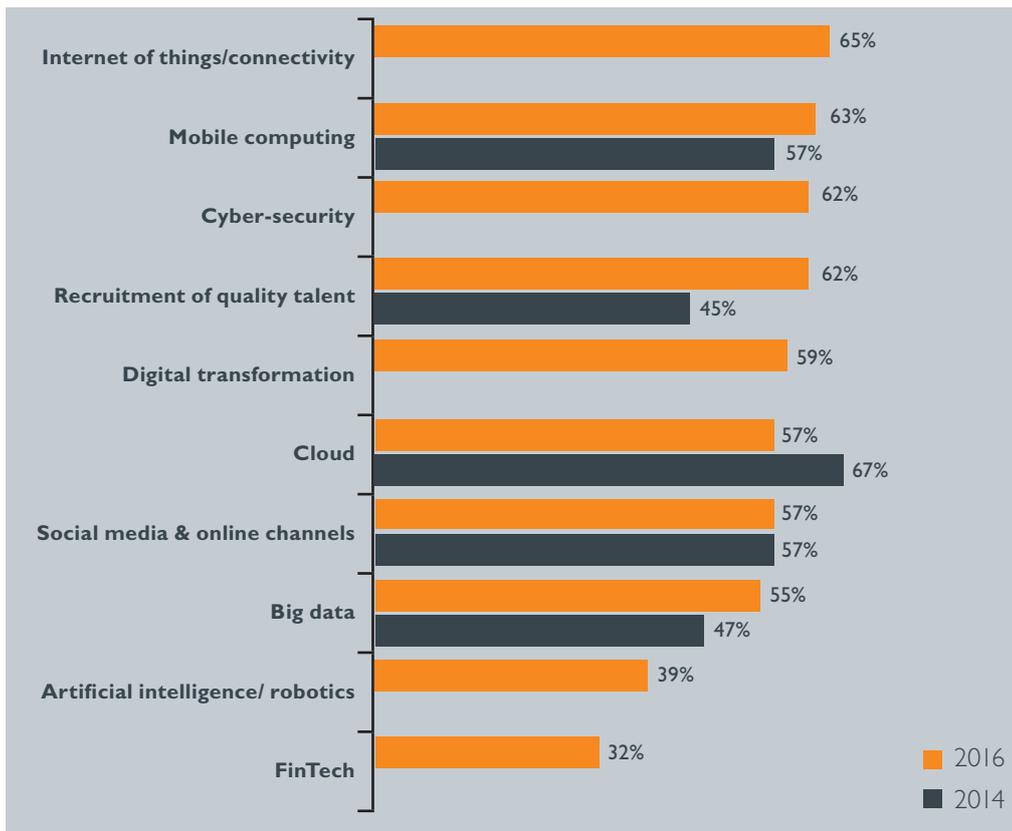
It should, however, be noted that this study was conducted pre Brexit so the recent uncertainty of the market has not impacted respondents at the time of this particular study.

The above data also confirms a shift to greater technology maturity with increased exploitation across Europe with improved controls across businesses.



Tech Index: Stability in the market pre Brexit may change – next Tech Index study to track impact post Brexit

AREAS WITH MOST POTENTIAL FOR GROWTH



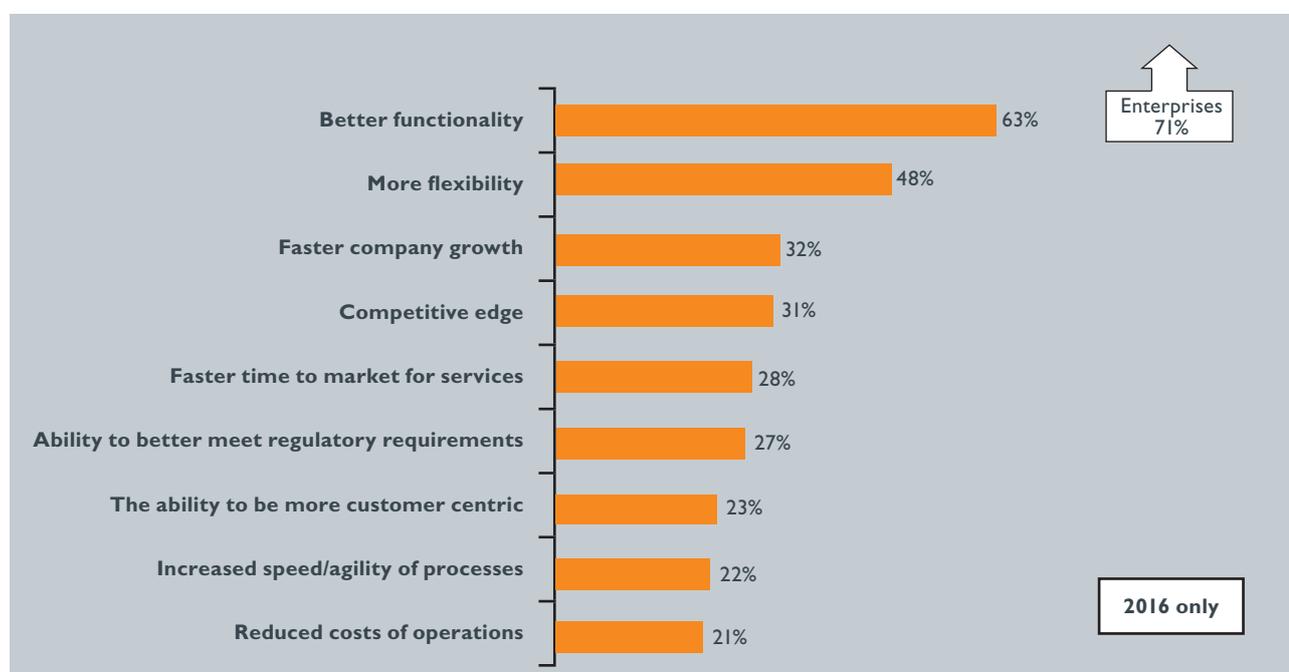
Respondents were asked which technology areas had the most potential for growth within their company (with new areas of opportunity being added in 2016 to reflect ongoing technological changes in the marketplace); the Internet of Things (IoT), mobile computing, cyber-security and recruitment of quality talent came top among the businesses interviewed, which seems to have been primarily driven by companies in the financial sector: Compared to 2014, we are seeing a reduction to drive Cloud further as more and more companies have adopted the approach and its competitive impact is declining.

Artificial intelligence, robotics and FinTech, although relatively lower in importance when compared to the other technologies, still showed their value for many companies and are set to drive change over the next few years.

FinTech: Concerns over meeting regulations, staff skills and investment will hold back development

The core benefits of FinTech are seen to include better functionality and (to a lesser extent) more flexibility; particularly among enterprise companies. Compared to other regions Eastern European companies were more likely to cite competitive edge (38%) and the ability to be customer centric (33%) as benefits of FinTech, perhaps reflecting the slightly less developed markets where FinTech is still in the process of being adopted.

BENEFITS OF FINTECH



Key drawbacks to the implementation of FinTech were:

- meeting regulatory requirements (54%)
- lack of expertise and skills (50%)
- the level of investment required (47%)
- disruption (45%)¹

IT is the driving force behind the implementation of FinTech (particularly among enterprise companies - 51%), though other line of business executives are now being seen to have more input in the process. It is, however, very clear that FinTech needs to be more collaborative and continue to show a greater alignment between IT and other business units.

Recently the FCA facilitated a regulatory initiative in the FinTech arena with the implementation of Project Innovate and RegTech (Regulation Technology). These projects help to accelerate open competition, as well as assisting with the UK's Open Banking API (now aligned to Europe's Payment Services Directive), as well as focusing on the implementation of the Financial Advice Market Review findings. These initiatives will hopefully continue to drive increased collaboration and development in the short term.

¹ Particularly among enterprise companies, who cited 51% for disruption.

IoT: Lack of internal skills means collaboration with external resources is vital for future development

The top benefits IoT and connectivity bring to a business are said to include:

- more efficient processes (51%)
- increased flexibility (49%)
- reduced costs (40%).

Western European companies are more likely to cite more efficient processes (57%) as a benefit of IoT, whereas Benelux based businesses are more focused on flexibility (57%). The Eastern European companies surveyed were more likely to mention reduced costs (45%) than the other, more mature regions.

The potential drawbacks of IoT and connectivity included:

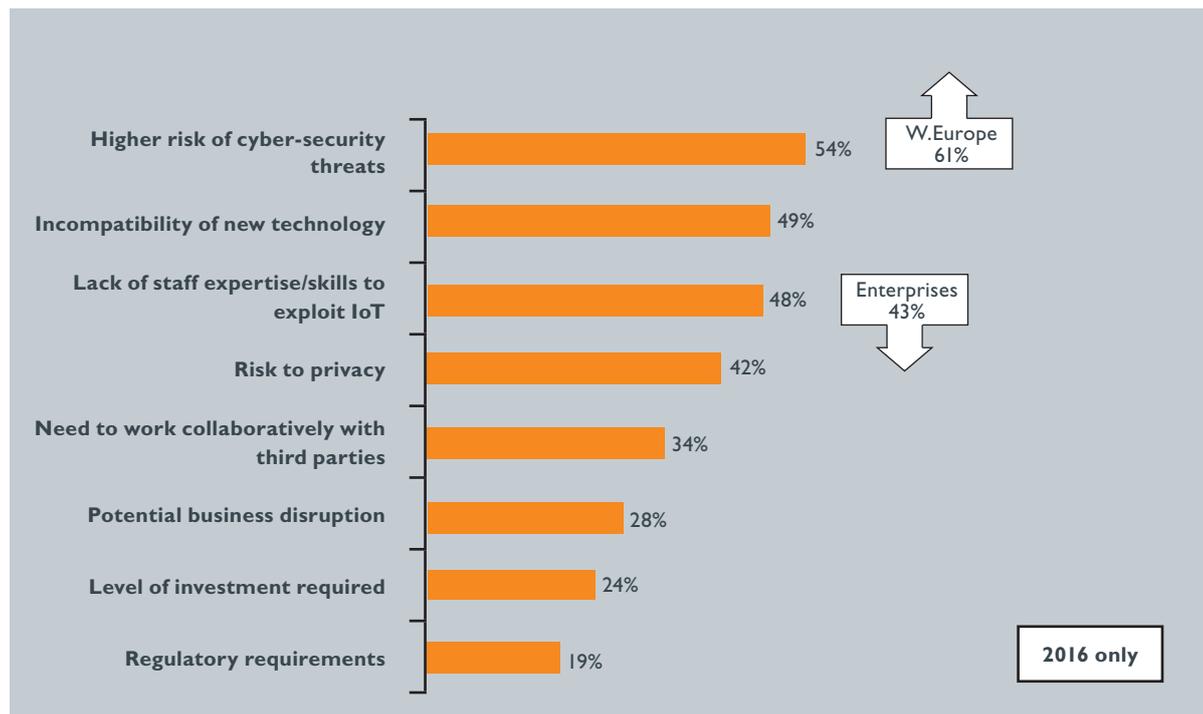
- security (54%),
- incompatibility of new technology (49%)

For IoT and drawbacks with connectivity...

Western European businesses (61%) focused on cyber-security threats, reflecting concerns over recent well publicised cyber-attacks. Benelux organisations cited lack of staff skills (59%).

IoT: Lack of internal skills means collaboration with external resources is vital for future development

DRAWBACKS OF IOT/CONNECTIVITY



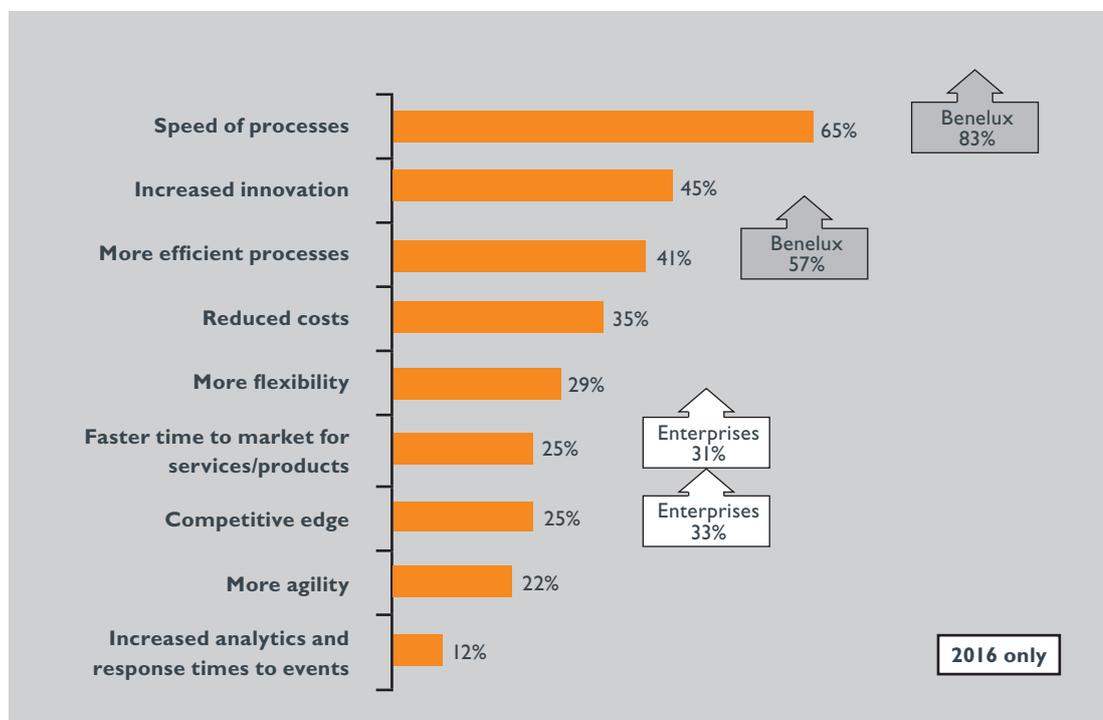
Nearly two thirds of companies said they used a combination of internal and external resources to meet their connectivity needs, indicating a lack of internal skills and collaboration. Skill shortages are a common problem across the technology sector, and an area that certainly needs attention in the short term.

AI and Robotics: Lack of skills and investment costs could hold back further development of AI and robotics but its impact is set to be significant

The most commonly cited benefit of AI and robotics was the impact on the speed of processes, which was particularly notable in Benelux based organisations (83%).²

Enterprise companies were more likely to see the benefits of AI and robotics in terms of faster time to market (31%) and for providing a competitive edge (33%).

BENEFITS OF AI/ROBOTICS



² Benelux companies also cited the benefit for more efficient processes (57%).

Lack of skills (51%), the level of investment (50%) and concerns over job losses (47%) were reported as being the key challenges to the implementation of AI and robotics, with lack of skills a greater concern for Benelux based companies (61%), and concerns over job losses being the most cited factor in Western Europe (51%) as AI and robotics are seen as a people replacement technology for certain applications.

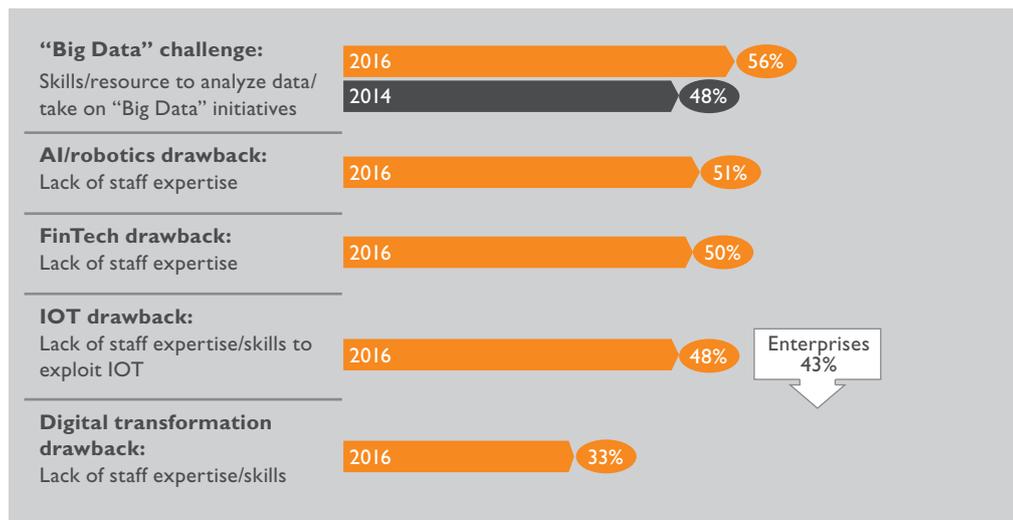
Collaboration between third party and in-house resources is driving AI and robotics adoption across Europe. In addition, the need for new technology, such as 5G, will drive further development in AI and robotics across the region as connectivity increases and the ability to provide state of the art applications improves.

Talent and Resources: Access to skills is always a challenge – post Brexit this may increase given possible border and immigration restrictions

Recruitment of quality talent features high on the list of requirements (being ranked equal 3rd out of the 10 areas covered in the research) when examining the future growth of companies and their ability to exploit new technology.

Since 2014, the index for the number of talented candidates available for hire has declined across all markets from 64 to 54. At this point there are indications of an ongoing and perturbing skills gap. In the short term we predict an ongoing skills shortage that will be exacerbated by Brexit as talent becomes more localised and scarce, however with proper investment and leadership, educational establishments will be able to address this issue with appropriate curricula and governance.

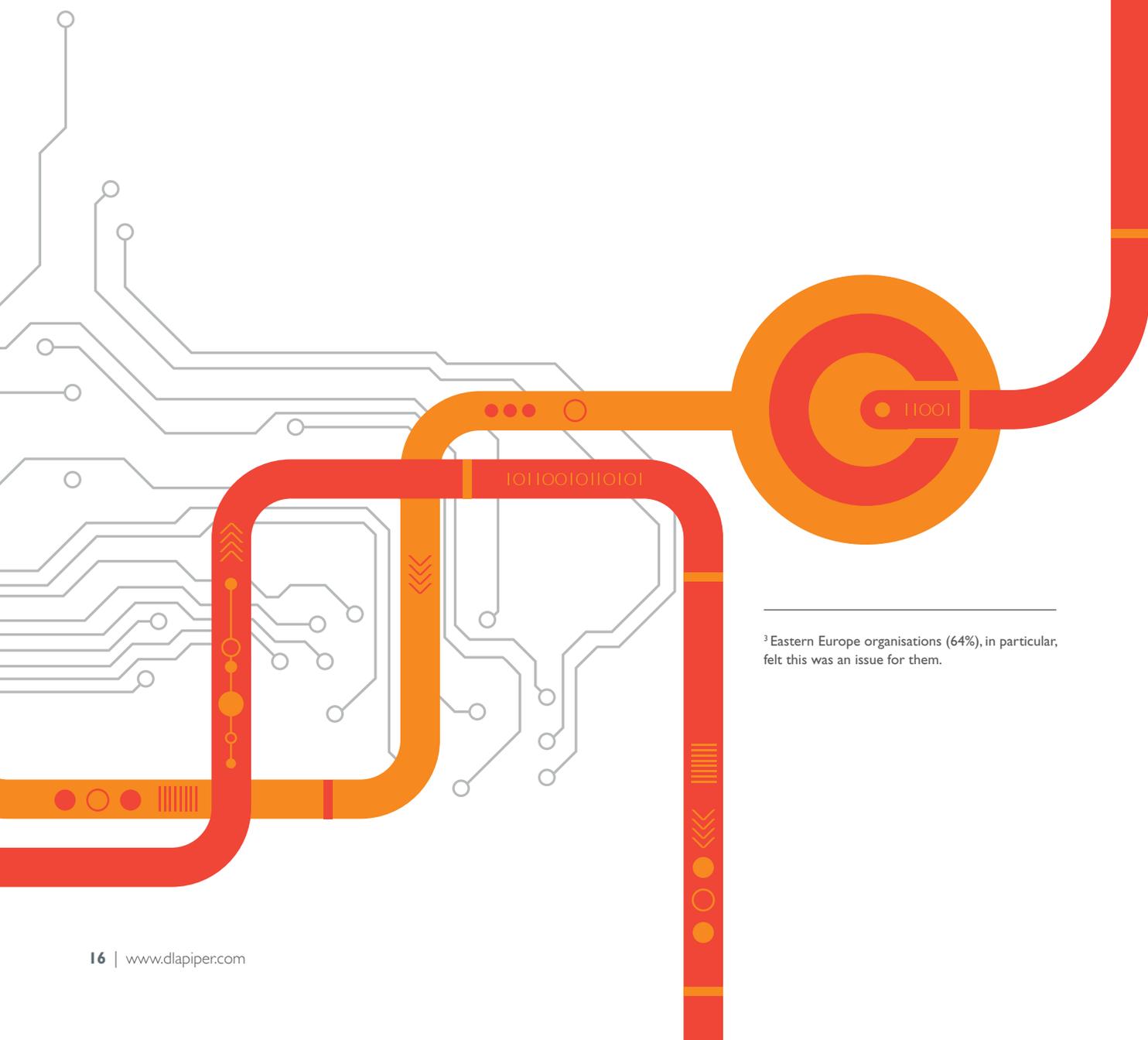
STAFF/SKILLS DRAWBACKS/CHALLENGES



Lack of skills and talent are holding back the use of “Big Data” and, instead, companies are moving towards “Big Insight” initiatives, where the skills are already in place to analyse and use the volumes of data being obtained. Organisations are also struggling to find and recruit specialist staff to move their companies forward and exploit new emerging technology and, while they are prepared to embrace new technology, there is a significant gap between implementation and having the appropriate resources to enable real exploitation.

Over 50% of respondents felt that although they make very or fairly good use of “Big Data”, they lack the expertise and resources to make full use of it.³ We therefore predict that the trend from “Big Data” to “Big Insight” will be stifled by the lack of skilled talent within organisations. It is also worth noting that as digital transformation takes an increasing focus, lack of talent within the technology market will more than likely restrict the impact on this area as well.

A key concern for technology companies and investors will be what impact Brexit may have on access to talent. With immigration a major issue in the UK referendum, and the EU emphasising that the UK must honour the principle of free movement of people if it wants to retain access to the single market, the free movement of digital and tech talent (such as developers and engineers) will form part of wider complex negotiations.



³ Eastern Europe organisations (64%), in particular, felt this was an issue for them.

Conclusions

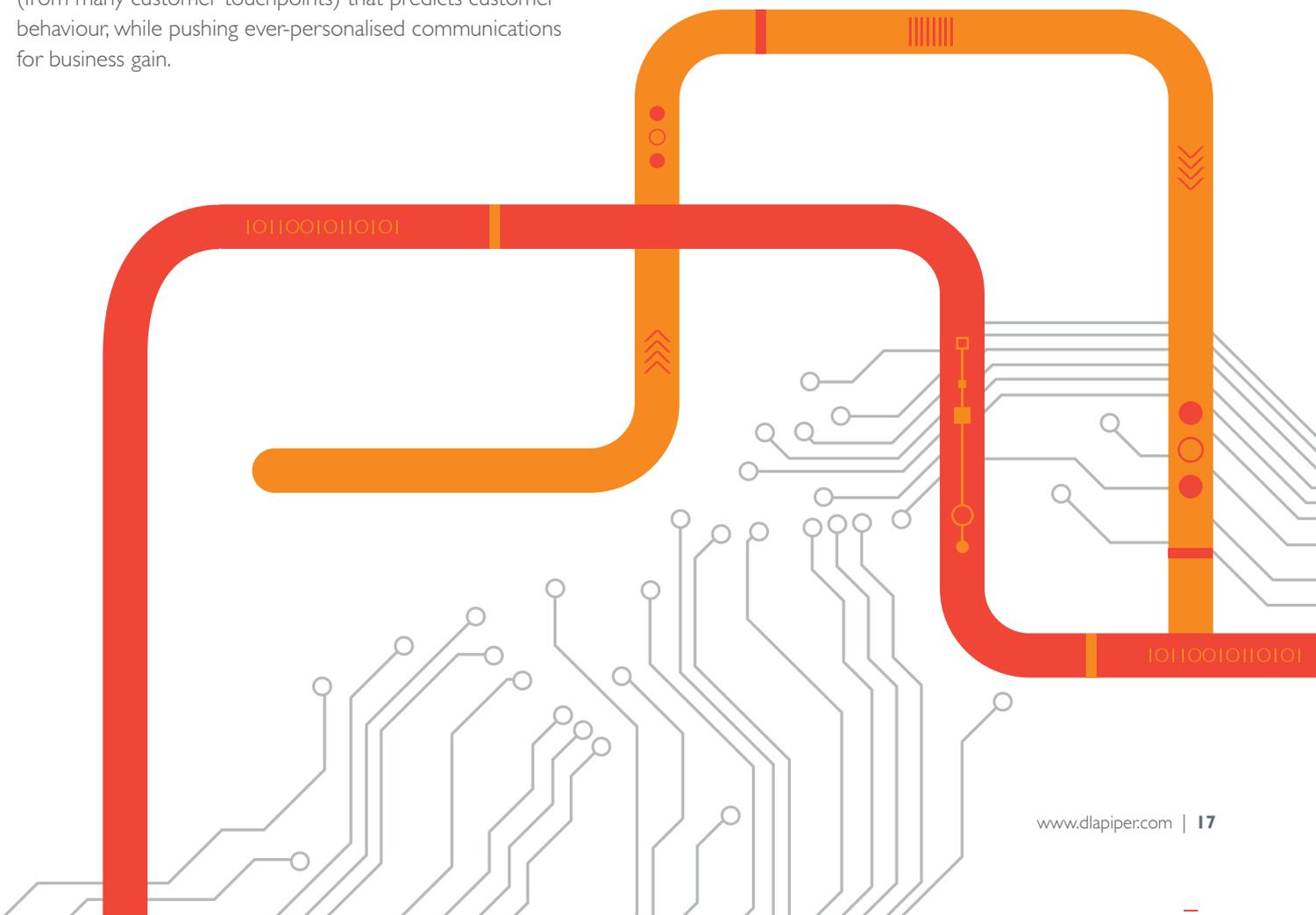
The 2016 European Tech Index has highlighted a maturing of the use of technology across organisations, which we expect to continue over time. However, security concerns continue to be an issue common to all technological developments, though the advent of the Chief Information Security Officer (CISO) in many enterprise firms will help develop a more structured approach to information security. For SMEs security remains a core challenge but unlike larger companies it is not being taken as seriously as it should be.

We predict talent management to be an ongoing challenge for all organisations, with Brexit only adding to the complexity. Top technology talent is scarce, which will inevitably increase wage costs, and, in turn, will push up the cost of technology adoption across businesses at a time when focuses are on cost reduction.

There will inevitably be a shift from “Big Data” to “Big Insight”, with the ability to exploit and use vast arrays of information (from many customer touchpoints) that predicts customer behaviour; while pushing ever-personalised communications for business gain.

IoT will develop, leading to substantially more devices being connected, which will drive the need for better predictive analytics and the “Big Insight” approach. Exploitation of the insight from “Big Data” is essential for all organisations to drive competitive positioning.

The uncertainty caused by Brexit may have a significant impact on the technology sector, but at present we just do not know the extent of this impact. What is certain is that technology will continue to play a major part in the growth of all organisations, and how they choose to exploit it will be fundamental to their success.



Appendix

METHODOLOGY AND RESPONDENT PROFILE

DLA Piper commissioned Coleman Parkes Research to conduct this study in March/April 2016 and to use their expertise to examine views on the current climate across core business areas and future growth areas within European businesses.

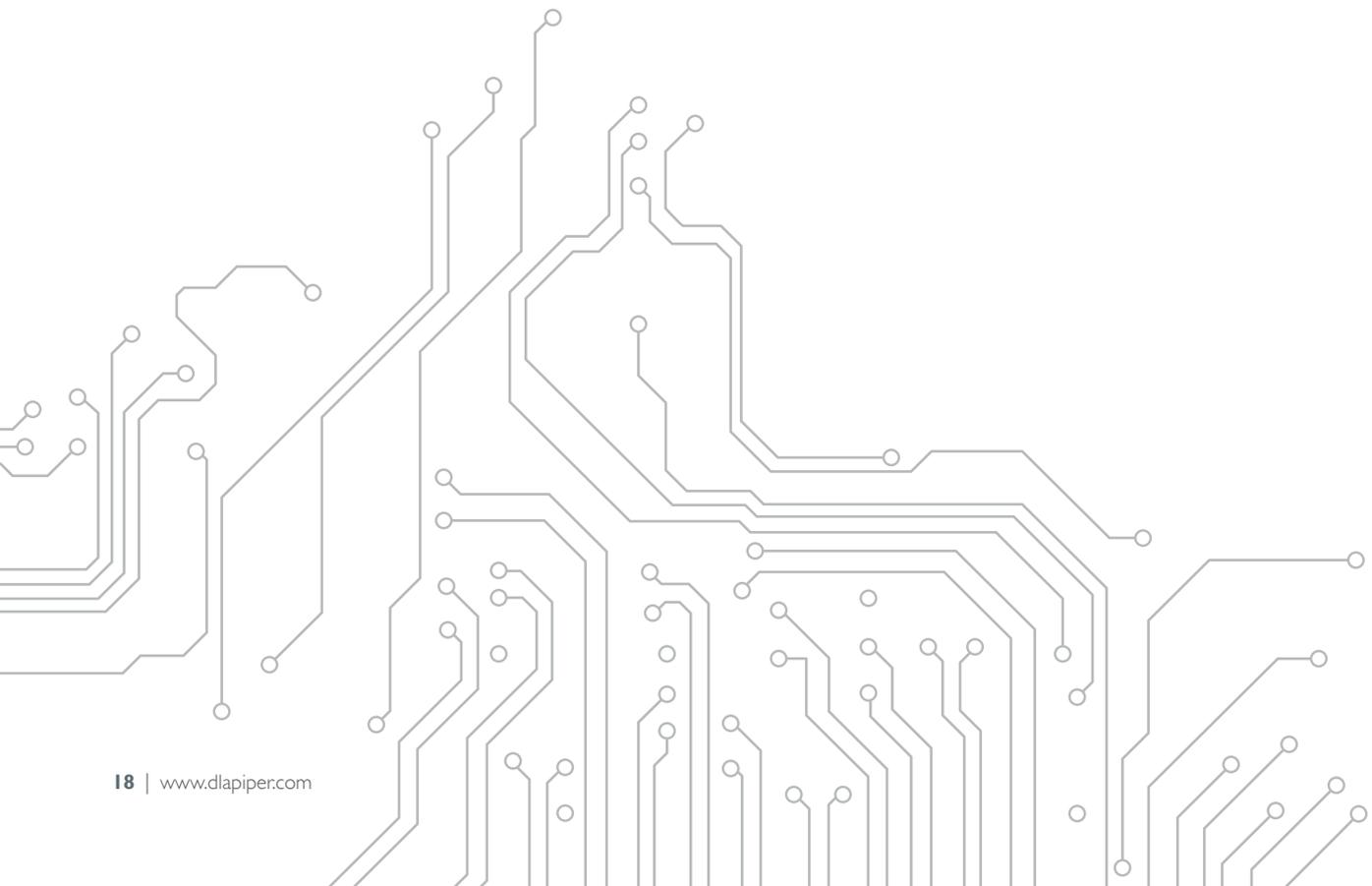
RESPONDENT BASE

357 interviews were conducted online with executives from key European technology firms, members of the investment community with a technology focus and, finally, Government officials focused on technology policy making.

All interviews were carried out in the respondent's local language, within organisations with more than €10 million annual turnover.

METHOD

All surveys were conducted under the MRS code of conduct. The results were then collated and provided a weighting to align them to create DLA Piper's European Tech Index for 2016.



Appendix

EUROPEAN TECH INDEX METHODOLOGY

How do we get the score?

The results of the survey have been collated and weighted to provide DLA Piper's European Tech Index score. This is based on a diffusion index which weights the percentage of respondents' answers that are positive, negative and neutral - the results are presented as a scorecard next to each of the areas monitored. The scorecard is designed to demonstrate degrees of positive feedback, where 50 represents a neutral score, 100 represents the maximum positive score and 0 represents an entirely negative score. This score then gives an overall view of the sentiment of the respondents, and therefore the Index.

Respondents were also invited to consider the specific areas within their industry that offered the greatest opportunity for growth.

The Index itself is based on a diffusion index. A score for each of the first seven technology index questions (focused on regulation, tax, financing, talent and IP) was generated using the calculation below.

$$\text{INDEX} = (P1 * 1) + (P2 * 0.5) + (P3 * 0)$$

P1 = Percentage number of answers that reported an improvement.

P2 = Percentage number of answers that reported no change.

P3 = Percentage number of answers that reported a deterioration.

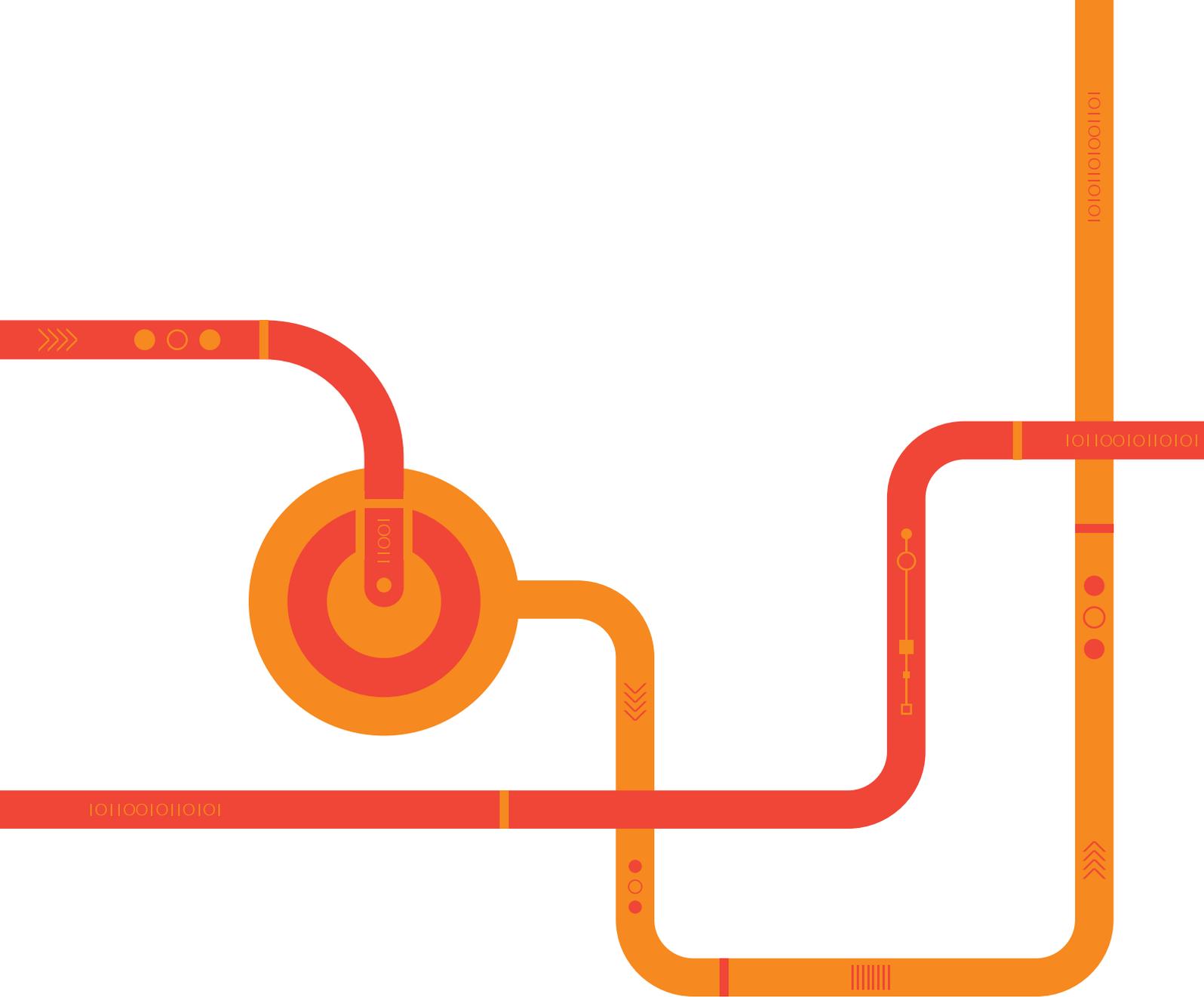
Thus, if 100% of the panel reported an improvement the index would be 100.0.

If 100% reported deterioration then the index would be zero. If 100% of the panel saw no change the index would be 50.0 ($P2 * 0.5$).

Therefore, an index reading of 50.0 means that the variable is unchanged, a number over 50.0 indicates an improvement while anything below 50.0 suggests a decline. The further away from 50.0 the index is, the stronger the sentiment, for example, a reading of 55.0 points to a stronger increase in a variable than a reading of 52.5.

As each factor (regulation, tax, financing, talent and IP) has a different level of impact upon the growth of the technology sector, once each individual score has been calculated each have the following weighting applied:

- Regulatory = (10% + 10%) 20%
- Tax = (10%+10%) 20%
- Financing = (15%+10%) 25%
- Talent = 10%
- IP = 25%



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