



# **REDEFINE YOUR COMPANY BASED ON THE COMPANY YOU KEEP.**

**Intelligent Enterprise Unleashed**

**CENTRAL AND EASTERN EUROPEAN FOCUS**

**There's a new obligation—  
and a new opportunity—  
for companies to engage  
with people differently.**

**Paul Daugherty** | Chief Technology  
& Innovation Officer at Accenture



**Technology is now firmly embedded throughout our everyday activities, but its reach is larger than that: businesses are using their products and services to reshape, reimagine, and transform how our society works, communicates, and even governs. According to the Accenture Technology Vision 2018 Survey, 84 percent of European business and IT executives surveyed agree that through technology, companies are weaving themselves seamlessly into the fabric of how people live today.**

For the first time in a technological transformation, the change is a two-way street. People aren't just using companies' products and services, but are feeding information and access back to them. Savvy organizations are realizing that this level of connection—and this degree of trust—will require a new type of relationship, based not only on a company's products, but its goals and values. In short: people are "reading the labels" of enterprise—and companies must define those labels for themselves, or have the labels determined for them.

L'Oréal, the European cosmetics company, is taking steps to define their own labels. To continually operate as a good partner with society, the company wrote a strict ethical charter that was drafted in collaboration with French government agencies and international ethics organizations.<sup>1</sup> Importantly, the charter serves as a decision-making framework across nearly every aspect of L'Oréal.

Guided by the charter, L'Oréal also requires that potential suppliers commit to an equally strict set of ethical standards, and guides internal buyers through steps to ensure they are purchasing from suppliers who meet that code.

To partner with the public, the charter established tenets around environmental responsibility: the company has reduced carbon emissions by 67 percent, only purchases palm oil from sustainably managed forests, and invested in building "dry" factories that will only use recycled water--set to appear in 2018. Jean-Paul Agon, L'Oréal's Chairman and CEO, reiterates that these changes are mandated not merely by conscience, but also by business need. "The next 10 years will see ethics becoming no longer a 'nice to have,' but a fundamental prerequisite to any organization's license to operate. For companies that are leaders in this area, it will become a competitive advantage."<sup>2</sup>

## The Opportunity

Leveraging the rapid advancements in technology to create increasingly innovative products and services, businesses are driving unprecedented changes in the way people work and live. With the help of AI, learning systems are delivering personalized and adaptive lessons to millions of people; virtual reality systems are helping employees gain firsthand experience with challenging or potentially dangerous situations without real-world risk; and governments are using blockchain to enable fast, secure data-sharing between their agencies, while giving citizens insights into who is accessing what data and maintaining security.<sup>3,4,5</sup>

By embedding themselves throughout society, companies are blurring the lines between business and personal—and blazing a new trail for their own future growth.



**This new era is all about how we can use these ties and information that we have about companies—and they have about us—to change the way that we work together.**

**Gianrodolfo Tonielli** | Central and Eastern European  
Technology Lead at Accenture



# UNLEASH THE INTELLIGENT ENTERPRISE

**Technology-based products and services have a tremendous impact on the way people work and live. Through those products and services, businesses are driving unprecedented change in society.**

This year's Accenture Technology Vision highlights five emerging trends shaping the way technology is increasing businesses' impact across society. In each chapter, you will see how expectations are growing, as customers, employees, business partners, governments, and more, seek formalized partnerships with businesses.





Trend 1  
**CITIZEN AI**  
**Raising AI to Benefit  
 Business and Society**

As artificial intelligence grows in its capabilities—and its impact on people’s lives—businesses must move to “raise” their AIs to act as responsible, productive members of society.



Trend 2  
**EXTENDED  
 REALITY**  
**The End of Distance**

Virtual and augmented reality technologies are removing the distance to people, information, and experiences, transforming the ways people live and work.



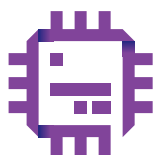
Trend 3  
**DATA  
 VERACITY**  
**The Importance of Trust**

By transforming themselves to run on data, businesses have created a new kind of vulnerability: inaccurate, manipulated, and biased data that leads to corrupted business insights, and skewed decisions with a major impact on society.



Trend 4  
**FRICTIONLESS  
 BUSINESS**  
**Built to Partner at Scale**

Businesses depend on technology-based partnerships for growth, but their own legacy systems aren’t designed to support partnerships at scale. To fully power the connected enterprise, companies must first re-architect themselves.



Trend 5  
**INTERNET OF  
 THINKING**  
**Creating Intelligent  
 Distributed Systems**

Businesses are making big bets on intelligent environments via robotics, AI and immersive experiences. But to bring these intelligent environments to life, they must extend their infrastructures into the dynamic, real-world environments they want to reach.

# CITIZEN AI

## Raising AI to Benefit Business and Society

**With artificial intelligence (AI) growing in its reach throughout society, any European business looking to capitalize on AI's potential must also acknowledge its impact. Much more than just a technological tool, AI has grown to the point where it often has as much influence as the people putting it to use, both within and outside the company.**

For businesses, this means deploying AI is no longer just about training it to perform a given task. Similar to the way parents raise their children, it's about "raising" AI to act as a responsible representative of the business, and a contributing member of society. Many enterprises still treat AI as a software program—a tool to be used. No one would expect a tool to "act" responsibly, explain its decisions, or work well with others. But with AI systems making decisions that affect people, companies must teach AI to do these things, and more.

By recognizing the impact AI now has in society, and raising it accordingly, companies can create a collaborative and powerful new member of the workforce. However, collaboration will be most successful if businesses ensure there are ways of understanding an AI system's outputs, whether by customers and employees, or other artificially intelligent systems.

Understanding for children begins with the use symbols and signs before words—but ultimately, they must achieve the taxonomy of a language to scale their understanding of the world.

Similarly, a company's AI starts from basic principles, but progressively build its skills from set of taxonomical structures. The companies with the best data available to train an AI how to do its job will create the most capable AI systems. However, a business's data scientists must use care when selecting taxonomies and training data—it's not just about scale, but about actively minimizing bias in the data. Building provenance into a library of models preserves a link between models and the data used to train the model. When data inputs are well documented, organized, and properly labeled, companies will build a strong library of AI models ready for reuse.



European executives realize efforts around building and, importantly, using AI present unique challenges, and 84 percent of the ones surveyed state it is very important and important for employees and customers to understand the general principles their organizations use to make AI-based decisions. Regardless of the exact role an AI ends up playing in society, it represents its company in every action that it takes. What happens if an AI-powered mortgage lender denies a loan to a qualified prospective homebuyer, or if an AI-guided shelf-stocking robot runs into a worker in a warehouse? The companies using the technology must think carefully about apportioning responsibility and liability for its actions.

The Hungarian company Turbine is researching and building an AI solution to find treatments for different types of cancer. The company has built an AI system that models how cancer works on the molecular level, and tests millions of potential drugs.

The company is collaborating with Bayer, the University of Cambridge and top Hungarian research groups to find new cancer cures and speed up the time to market.<sup>6,7</sup> In financial services, Slovak Tatra banka is applying AI to recognize the face, age, gender and emotion of visitors to evaluate client satisfaction. AI functionalities also allow the bank to make real-time analysis of its product offerings and customer visits, demographic structure, and satisfaction with visits or service.<sup>8</sup>

As AI becomes more firmly and widely integrated into society, it will have direct influence and impact on everything from financial decisions, to health, to criminal justice, and beyond. Organizations that hesitate to consider their AIs as something that must be “raised” to maturity will be left struggling to catch up with.



# EXTENDED REALITY

## The End of Distance

**Virtual reality (VR) and augmented reality (AR) deliver immersive experiences that extend reality. Extended reality (XR) is the first technology to let people experience omni-present abilities, relocating them in both time and place—bringing about the end of distance.**

Forays into XR are solving a tactical pain point that customers and businesses share: distance. Companies, and even entire industries, have been built around the most basic and intractable principle of “needed here, but exists there.”

Think about the challenge of moving to another city and trying to get the best accommodation and ideal company to work for. Czech startup Flatio connects flat owners with potential tenants to view the real estate remotely using virtual reality glasses. Another Czech company Proudly leverages virtual reality to attract potential employees. Proudly creates customized videos to give job candidates a virtual look of a company’s spaces, introduce its corporate culture and give a glimpse into the company’s work atmosphere and environment<sup>9</sup>

Results from our Tech Vision 2018 survey show 80 percent of European executives

indicate removing distance barriers as a driver in their adoption of extended reality solutions.

The fundamental changes to enterprise and society are clear: the importance of place is disappearing. XR is removing the hurdle of distance, increasing access to people, information, and experiences.

Consider XR-based training: companies can bring trainers “on-site” from anywhere, or have students virtually “travel” to an instructor; training scenarios can be set up anywhere, then run, re-run, and adjusted to give a firsthand experience of different situations. This eliminates the distance not just between student and teacher, but also concept and practice.

Extended reality has also found its use on warehouse floors. Penny Market, retailer in Romania, has started using smart glasses to boost picking performance. After an XR implementation, they recorded an increase in worker performance and time saving of the warehouse management system solution between 15-30%.<sup>10</sup> The Polish training company CTA is using VR to train workers from the petroleum and energy industries. Training for dangerous situations on the offshore platforms can be practiced remotely.<sup>11,12</sup>

Extended reality is also closing the distance to new business insights for organizations. Emerging XR tools express data in 3D environments, closer to the way humans actually see and imagine scenarios. This clears the way for new types of visualizations—and new discoveries. So far only several applications are available around the globe. The Body VR creates interactive 3D builds of traditionally 2D medical imaging, like CT scans and MRIs, to provide a more intuitive view of medical conditions. Similarly, Oxford researchers have created VR models of genetic data to better visualize what happens within living cells.<sup>13,14</sup> Extended reality is changing the viewer's relationship to information: how people parse, communicate, and extract value from data.

Today, extended reality is still evolving, and challenges around processing lag and content creation remain barriers to its full maturity. But thanks to its transformative potential, already 21 percent of European executives agree that it is very important for their organizations to be a pioneer in XR solutions.

Making well-planned forays into immersive experiences now will help build the capabilities needed to transform entire industries tomorrow. Extended reality is pushing companies to create new solutions that bypass many of the distance-based challenges they face today—a clear advantage for leading companies that embrace it. As XR becomes pervasive, immersive experiences will eliminate the most important distance of all: the distance between where businesses are today and where they want to be in the future.



# DATA VERACITY

## The Importance of Trust

**81 percent of European executives responding to our Tech Vision survey report their organizations are increasingly using data to drive critical and automated decision-making, at unprecedented scale. Today, the global economy runs on live information: IDC forecasted global revenues of nearly \$151 billion for big data and analytics practices in 2017, up 12 percent from the year before.<sup>15</sup> And companies around the world are betting big on advances in data-hungry technologies. In 2017 alone, AI investments were projected to reach \$12.5 billion, while Internet of Things investments were expected to top \$800 billion.<sup>16,17</sup>**

While business is more data-driven than ever, inaccurate and manipulated information threatens to compromise the insights that companies rely on to plan, operate, and grow. Left unchecked, the potential harm from bad data becomes an enterprise-level existential threat. According to our survey, 79 percent of European organizations agree that organizations are basing their most critical systems and strategies on data, yet many have not invested in the capabilities to verify the truth within it.

Companies can address this new vulnerability by building confidence in three key data-focused tenets: provenance, or verifying the history of data from its origin throughout its life cycle; context, or considering the circumstances around its use; and integrity, or securing and maintaining data.

Every business must build a “data intelligence” practice, drawing from existing data science and cybersecurity capabilities.

**81%**

**of European executives responding to our Tech Vision survey report their organizations are increasingly using data to drive critical and automated decision-making, at unprecedented scale.**

Whether it's a person creating a data trail by shopping online, or a sensor network reporting temperature readings for an industrial system, there's an associated behavior around all data origination. Companies must build the capability to track this behavior as data is recorded, used, and maintained. With this knowledge, businesses can provide cybersecurity and risk management systems with a baseline of normal behavior.

Even European Union is now using AdVerif.ai AI engine to identify disinformation being spread on the web and on social media. The startups' algorithm begins its evaluation by checking the source of information in an article against a catalog of sites that publish fake news, satire, clickbait, or political propaganda!<sup>18</sup> Use of the right data is crucial for many companies as well. Čepro, the Czech company providing transport, storage and sale of oil products uses data anomaly detection to gain visibility into company network traffic.

Knowledge of traffic characteristics and network flows allows them to make qualified purchasing decisions as well as reveal them and eliminate undesirable anomalies in infrastructure.<sup>19</sup>

The presence of bad data in a system isn't always the result of malicious intent, but may be a sign that a process isn't working the way it was intended. Using a data intelligence practice to uncover these processes will allow companies to reduce noise in data, so that real threats stand out.

Data is the lifeblood for digital companies, fueling complex business decisions that drive sustained growth. Ensuring the veracity of this data, then, becomes a cornerstone of strong leadership. Failure to do so can have grave consequences--especially as companies invest heavily in autonomous data-driven systems.

**Companies as well as authorities have to understand how the innovations, the services that they are developing and consuming, will impact policy and regulations, competitiveness, security, privacy and things like that. And reliability of the data we use in that process is going to be even more critical than before.**

**Adam Leščišin** | Financial Services Technology  
Consulting Lead at Accenture

# FRictionless BUSINESS

## Built to Partner at Scale

**Companies compete through strategic partnerships, and when these partnerships are technology-based, they can expand partner networks faster and into more ecosystems than ever before. But legacy business systems weren't built to support this kind of expansion, and soon, outdated systems will be major hindrances to growth. To build a strong foundation for technology-based partnerships, businesses must consider adopting microservices architectures and using blockchain and smart contracts. Those that invest in these changes today will redefine how businesses transact in the future.**

Already, our survey shows one third (33 percent) of European businesses report working with double or more partners than they were two years ago. It's critical for business leaders to recognize that their organization's own technology will serve as the foundation for these strategic relationships—but could also be holding them back.

To spur a new wave of technology-based partnerships, companies must start inside their own walls. Microservices is not a single piece of technology, but rather an approach to architecture. It delivers internal benefits like application scalability and reliability, but it is also vital for building technology partnerships. A microservices architecture will push organizations to clearly define the services they offer, allow them to discover new sources of revenue,

and turn each service into a potential enabler of technology-based partnerships.

APIs are the pathways by which businesses make microservices and data available to partners, but developing APIs to only expose part of an application is fraught with difficulty, from the complexity of choosing which services to expose to potential security risks.

Polish Alior Bank was facing problem during shared delivery of product with partner due to its monolith architecture. Therefore, they decided to develop a sales process engine working within a microservice architecture to expand its functional portfolio for credit, non-credit processes and related customer service.<sup>20</sup>

Alior Bank reports that its utilization of microservices architecture has led to a reduction in the cost of implementation by 40 percent and has shortened the time of releases by 78 percent. Furthermore, over 84 percent of loan applications are now processed in less than 60 seconds.<sup>21</sup>

If microservices is the key to scaling and integrating partnerships, blockchain will be critical to managing and operating them. European businesses will be challenged to maintain a higher volume of partnerships than ever before, and even rapidly pivot between partners, without sacrificing the integrity or security of their products and services. Blockchain will address this complexity by acting as a surrogate for trusted relationships.

The Republic of Estonia uses a blockchain-based smart contract system to operate like an ecosystem of partners. All public data, from medical records to residency information, is exclusively stored and maintained by local offices that create it, rather than in a centralized database. When completing a task requires cross-departmental information, whether creating a birth certificate or filing a police report, government employees use “X-road,” the country’s smart contract system.

X-road automatically authenticates the requestor’s identity, verifies their need to access the information, and regulates the time and ways in which the requestor can use the information. The framework enables fast, secure data-sharing between government agencies, while giving citizens insights into who is accessing what data and maintaining security.<sup>22</sup>

While many blockchain initiatives are still in early stages, 49 percent of European organizations responding to our survey are planning active research into how they can leverage blockchain, or piloting a blockchain initiative over the next year.

Companies should begin to re-evaluate how they architect their applications and services, moving toward microservices to set the foundation and quickly build the relationships needed for growth. For many, blockchain will become the future of how businesses transact, and leaders must begin investing in the relevant skills and tools today. Tomorrow’s leading businesses will be those that enable partnerships through technology today.



# THE INTERNET OF THINKING

## Creating Intelligent Distributed System

**Robotics, immersive reality, artificial intelligence and connected devices are bringing a new level of technological sophistication to the physical world. The next generation of technology demands an overhaul of existing infrastructures, with a balance of cloud and edge compute, and a renewed focus on hardware to deliver intelligence everywhere.**

Current infrastructures are designed around a few basic assumptions: enough bandwidth to support any remote application, an abundance of compute in a remote cloud, and nearly infinite storage. But the demand for immediate response times in physical-world applications defies this approach. Current predictions suggest that by 2020, smart sensors and other Internet of Things devices will generate at least 507.5 zettabytes of data. Trying to do all of the computational heavy lifting offsite ultimately will become a limiting factor.<sup>23</sup> The resulting need for real-time systems puts hardware in focus: special-purpose and customizable hardware is making devices at the edge of networks more powerful and energy efficient than ever before.

Across industries, the next generation of intelligent solutions are moving into physical environments, and key company strategies ride on pushing

intelligence into the physical world: improving traffic flows in smart cities; telemedicine that continuously analyzes a patient's condition; disaster analysis that prevents oil field catastrophes before they start.<sup>24,25,26</sup> Now, companies need to extend their infrastructures to reach into the dynamic physical environments they want to serve.

This extended infrastructure calls for a renewed focus on hardware, at a time when many companies have grown accustomed to software-driven solutions as their go-to strategies. Companies are taking note: our Technology Vision 2018 survey indicates already 15 percent of European executives believe it will be very critical over the next two years to leverage customer hardware and hardware accelerators to meet the computing demands of intelligent environments.



Internet of Things in combination with powerful hardware has found its potential in agriculture. Romanian farms use drones to monitor the wild animals and crop failure to avoid accidents. With continuous data collection, three drones, making two flights a day each, can now monitor 10,000 hectares using digital images and live information.<sup>27</sup> In another example, EvoBus has piloted semi-autonomous buses in Czech Republic. The company helps bus operators to save on operation costs using a driving style that boosts efficiency and reduces component wear.

Businesses must act today to incorporate hardware-focused skills into their workforce—an added challenge for those

whose cloud-first mentality may have deemphasized this need.

Building or leveraging custom and specialized hardware is a shift from the “one-size-fits-all-tasks” approach that proved popular in enterprises during the last decade. 82 percent of European executives agree that edge architecture will speed the maturity of many technologies.

To drive AI, robotics, and other revolutionary technologies to their full potential, companies must make a significant effort across key areas of business processes and strategy, from service design, to infrastructure transformation, to hardware considerations. The well-earned result will be truly intelligent environments that meet people where they are.

# 82%

**of European executives agree that edge architecture will speed the maturity of many technologies.**



# RESEARCH METHODOLOGY

**Every year, the Technology Vision team partners with Accenture Research to pinpoint the emerging IT developments that will have the greatest impact on companies, government agencies, and other organizations in the next three to five years. These trends have significant impact across industries, and are actionable for businesses today.**

The research process begins by gathering input from the Technology Vision External Advisory Board, a group of more than two dozen experienced individuals from the public and private sectors, academia, venture capital, and entrepreneurial companies. In addition, the Technology Vision team conducts interviews with technology luminaries and industry experts, as well as nearly 100 Accenture business leaders from across the organization.

Each year, the research process also includes a global survey of thousands of business and IT executives from around the world, to understand their perspectives on the impact of technology in business. Survey responses help to identify the technology strategies

and priority investments of companies from across industries and geographies. As a shortlist of themes emerges from the research process, the Technology Vision team reconvenes its advisory board.

The board's workshop, a series of 'deep-dive' sessions with Accenture leadership and external subject-matter experts, validates and further refines the themes.

These processes weigh the themes for their relevance to real-world business challenges. The Technology Vision team seeks ideas that transcend the well-known drivers of technological change, concentrating instead on the themes that will soon start to appear on the C-level agendas of most enterprises.

## Survey Demographics

For the fourth year, we conducted a global survey of thousands of business and IT executives to understand their perspectives on the impact of technology on their organizations, and to identify their priority technology investments over the next few years. More than 6,300 executives from 25 countries responded to the survey, which was fielded from November 2017 through January 2018.

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