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ACCENTURE TECHNOLOGY VISION 2020

THE ANALYTICS ANGLE WITH SAS

Contents

Introduction

"So how do we make it scale?"

Whether in the context of one-on-one conversations with clients, or when launching our ideas and insights in the form of our annual **Technology Vision** report, here at Accenture we've learned to prepare for the inevitable follow-up question: "Sounds interesting—but how would we actually make it work at the scale we need?" This is absolutely the right question to ask when presented with any bold prediction of what's next in the business world, because it simultaneously acknowledges the potential of the prediction while connecting it to the everyday reality of operating a large, complex organization today in the midst of hundreds of competing priorities.

Even those predictions that have clear, direct relevance to your organization today, with the potential to create significant new value, can also introduce a host of practical and strategic obstacles to applying them at the scale needed to make a real impact. "For example, many of our clients are working to deliver repeatable business value from AI today, going beyond implementing use cases in silos," says Nick Millman, Global Lead—Applied Intelligence Data Engineering & Architecture, at Accenture. "They need AI to scale beyond proofs of concept in order to justify further investment. That's where the real business value lies—scaling in a repeatable way. It requires building solutions on reusable data foundations, which enable machine learning algorithms and advanced analytics tools to deliver the insights needed to drive smarter actions at every step."

How do you develop capabilities to capitalize on these trends—at scale?

The good news is that some of the leading minds in business and technology are already thinking about how to put the trends highlighted in the

2020 Technology Vision report to work at scale. In many cases, they have been working with these ideas—or some key aspects of them—for years. That's why, for this year's report, we enlisted the help of a handful of some of our most innovative partners to share their insights on critical enablers of these trends—starting with SAS.

As a longtime behind-the-scenes leader in business analytics, SAS' insights into how analytics tools, built on a sturdy foundation of data, can be applied to bring these trends to bear across industries are instructive. Because if there's one thing that ties these trends together, it's data. AI? Smart things? Digital innovation? Customer experience management? Data is the lifeblood of each of these trends—it is virtually impossible to imagine any of them existing in the absence of data and analytics.

It is equally difficult to consider how to operationalize these trends at scale without having robust analytical capabilities in place, building on a data foundation to construct a deep, specific, constantly evolving baseline of business insight. With the ability to see deeply into the data surrounding and generated by these trends, business leaders will be prepared to make smarter decisions about how, when, and where to deploy them. This ability is especially important as business leaders look for smart, nimble ways to navigate the "tech-clash"—the tension between people's love for technology and the models that are incongruous with people's needs and expectations. If there was ever a time to have the capacity to make smarter consumer-facing decisions, this is it.

For anyone intrigued by the possibilities of this year's Technology Vision report and hungry for ideas on putting these trends to work at scale, **SAS'** analytics-focused view is bound to offer thought-provoking, practical thinking that can help. Enjoy!

"That's where the real business value lies—scaling in a repeatable way. It requires building solutions on reusable data foundations, which enable machine learning algorithms and advanced analytics tools to deliver the insights needed to drive smarter actions at every step."

Nick Millman
Global Lead, Applied Intelligence Data Engineering & Architecture, Accenture

The I in Experience

Helping people choose their own adventure

The trend "The I in Experience" in the **Accenture Technology Vision 2020** report, highlights the shift that is now unfolding in the area of customer experience management: After spending years building customization capabilities on top of their offerings, businesses have developed robust data gathering and analytics capabilities. Meanwhile, though, aging customization models are showing their constraints—as businesses expand their experience delivery and customization capabilities, these models are inadvertently pushing customers out of the equation. This can leave customers feeling out of control, and out of the loop in their own experiences. While companies may be delivering improved experiences, they are also at risk of isolating their customers and users, who are growing more savvy about what to expect from these relationships. In short, they increasingly expect to engage in *cooperative experiences*, in which companies are collaborative partners in experience creation, not simply the providers or owners of those experiences. The report is full of real-world examples of cooperative experiences at work today, across a number of industries.

These experiences promise incredible value to both companies and their customers. But delivering them requires undertaking a big shift. Companies must move from one-way selling (no matter how sophisticated) to using human input, guidelines, and choices to shape each experience.

Technologies such as machine learning (for automating aspects of customer experiences based on their inputs) and even no-code development platforms (for giving both customers and a wider range of employees the ability to design experiences) will likely play large roles in fueling this shift. So will advanced analytics capabilities—as you would expect in any attempt to better understand customers and their preferences.

According to SAS, there are three main areas where analytics and AI will be instrumental in enabling the cooperative experiences that will dominate the not-so-distant future of customer relationships.

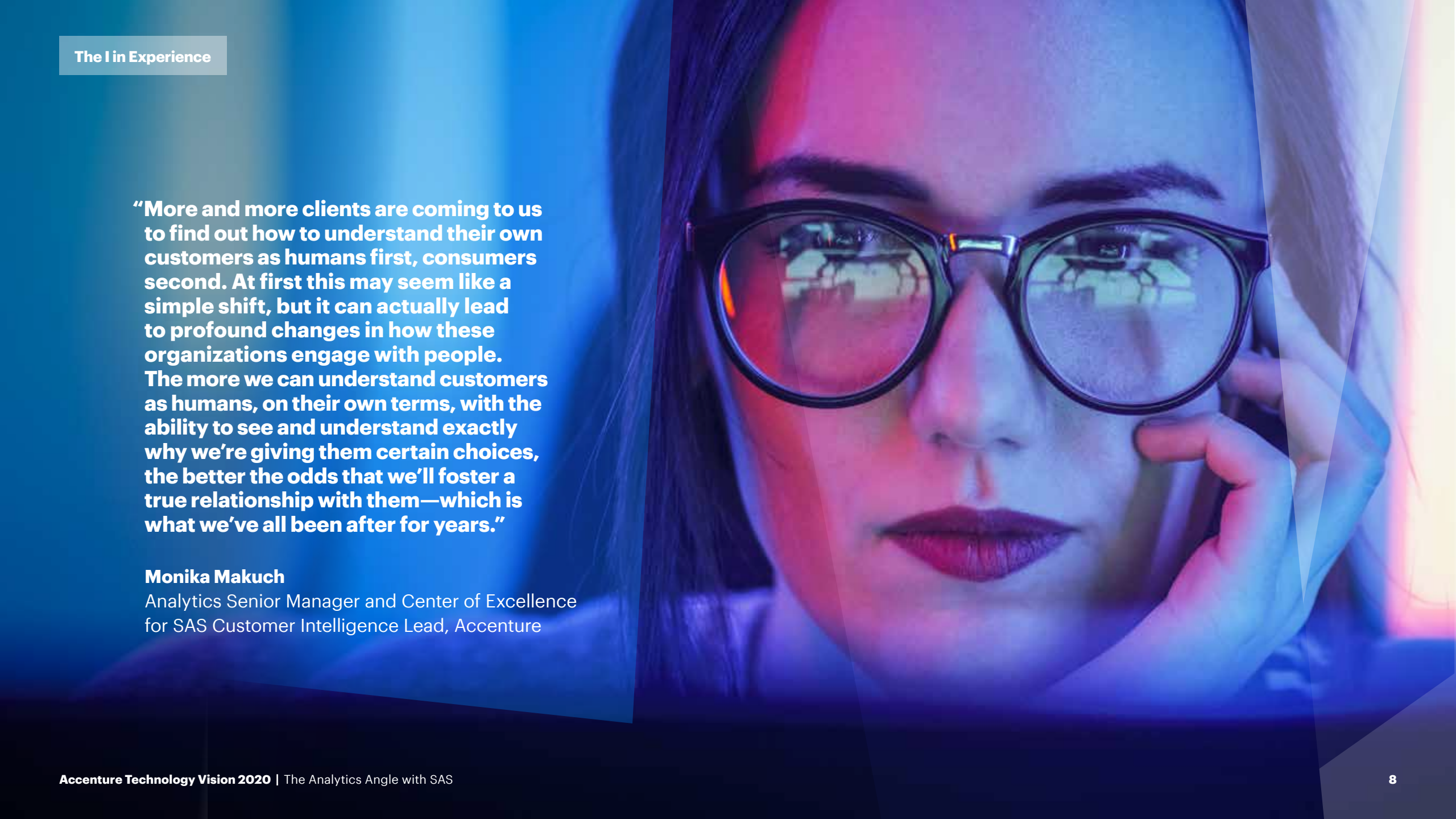
"Brands will use analytics to see the world as their prospects and customers do—and shape customer experience in real-time accordingly. The rewards: higher brand preference, revenue, and cost improvements and an enduring competitive advantage."

Wilson Raj
Global Director of Customer Intelligence, SAS

Forensic understanding of the customer

Companies across industries have made enormous strides over the past decade in understanding their customers. At this very moment in your organization, there are entire teams of people working to target different, clearly defined customer personas, segments, and demographic profiles—and they are working with a stronger understanding of customers than ever before. But even these approaches fall short when it comes to wringing more from your data to answer even more detailed questions about human preferences and habits. Exactly which devices are your customers using? When are they using them? How are their preferences different today than they were last month? How has the context surrounding their preferences changed? You get the picture. Think of this as a "forensic" understanding of the customer—one that relies on relentless, rigorous, algorithmic analysis. In the era of cooperative experiences, this type of forensic-level understanding is required.

Customers are willing to share this type of information if a) companies make it easier to share, and b) they trust and understand how this information will be used. At Accenture's Center of Excellence for SAS Customer Intelligence, we are helping companies create the foundation of cooperative experiences through the use of applied, real-time intelligence. Today we are working with organizations that are actively seeking ways to be more transparent and collaborative with their customers. For example: *Are you okay with us using this geolocational data? If you are, these are the types of offers we will be able to extend to you.* This is a new model for customer interactions, and it requires new, more rigorous approaches to data management and analytics. To deliver this type of experience, companies need to be able to enforce even more structure in data management practices, with the ability to immediately explain to customers what type of data they are able to gather and how they can use it. Existing systems generally weren't built for this type of bold transparency and two-way engagement.



"More and more clients are coming to us to find out how to understand their own customers as humans first, consumers second. At first this may seem like a simple shift, but it can actually lead to profound changes in how these organizations engage with people. The more we can understand customers as humans, on their own terms, with the ability to see and understand exactly why we're giving them certain choices, the better the odds that we'll foster a true relationship with them—which is what we've all been after for years."

Monika Makuch
Analytics Senior Manager and Center of Excellence for SAS Customer Intelligence Lead, Accenture

Continuity of experience

Can you imagine a customer completing a process (purchasing, arranging services, etc.) with your company, from start to finish, in a single interaction? While this certainly happens, in a world of fragmented attention spans, packed calendars, competing priorities, multiple devices, and unprecedented access to information, this type of experience is no longer the norm. There are countless ways for your customers to get from Point A to Point B—the customer journey is more complex and fragmented than ever. Ensuring a high level of continuity from one leg of the customer journey to the next—from initial consideration to active evaluation, the moment of purchase, and on to the post-purchase experience—is of primary importance. By giving customers a greater ability to shape their own journey in the context of a cooperative experience, businesses can turn the complexity and fragmentation of the customer journey into an advantage.

At its core, delivering continuity of experience to customers is a mathematical problem. How accurately can your organization predict which next steps individual customers are likely to take? Is it prepared to make those steps obvious and available to customers, immediately? And when customers pick up where they left off with your organization, will you know exactly where they left off, and where they should pick back up? Analytics tools can help with all these issues and many more, as you pursue cooperative experiences with your customers. For example, when prospects or customers are in the evaluation phase of their journey, analytics can dynamically adapt marketing efforts to customer response—in real-time. Offer optimization techniques (think recommendation engines a la Amazon and Netflix) can match the appropriate offer based on historical customer response. Also, A/B and multivariate testing can assess a range of marketing variables, such as messaging and content types, before you roll out cooperative experiences on a wider scale.

"Too many executives mistakenly believe that analytics capabilities can simply be delivered as a feature within their customer experience strategy—the result of misleading market hype and short-term pressures to transform. In reality, it takes a broader, disciplined approach to customer insight to survive in an environment in which consumer information and access just don't abide by traditional boundaries."

Mike Blanchard
Head of Global Customer Intelligence Practice, SAS

Transparency for trust

Engaging consumers to more actively participate in shaping their experiences requires more data. And for consumers to offer up their data, they need to trust that it will be used in the right way. In that context, data transparency takes on added importance.

What do customers think about how companies use their data? These recent findings from the **Experience 2030** survey, conducted by Futurum Research in partnership with SAS, offer valuable insight into what consumers want and expect in terms of data transparency.

78%

feel they should be able to see what data a brand has captured about them and be able to change, update, or even delete that data whenever they want.

71%

believe that companies and brands should not be allowed to share their data with other companies or brands.

61%

feel they have no control over the level of privacy they need for themselves, their family, or their children.

54%

agree that brands can be trusted to keep their data private.

73%

are concerned with how brands use their personal data.

While these findings suggest that companies have hard work to do in gaining consumer trust, the value of creating a foundation of trust for a more cooperative experience makes it worth the effort for many companies.

Customer-centric decisioning

One fact about cooperative experiences that is too often overlooked is that customers simply don't care much about your organization. They don't care about the connections between your latest marketing promotion and the supply chain that will make good on its promises. When they call, they don't care whether they're talking to Marketing, Customer Service, Sales, or anything else. The only time they do care? When something goes wrong.

And yet all these parts of your organization (and many more) work together to create the experience customers have with you. That's one reason why so many organizations have developed decision-making structures that are inherently company-focused, rather than customer-centric—because they must work so hard to ensure all the organizational muscles work in tandem to deliver a desirable experience. This challenge has only grown since consumer technology advances and adoption have outpaced their enterprise counterparts. It's difficult just to keep up with these advances—but customers expect it.

At the same time, customers are generating more data than ever, which means that companies have the ability to learn more about their preferences and behaviors—if they have the ability to make sense of all that data. Combine that baseline of customer understanding with tools that allow customers to actively shape and inform their experiences, and you have the foundation for a more dynamic, truly cooperative experience—one that generates still more valuable data as it evolves.

Analytics and AI can also help you understand client expectations at individual points of interaction with your organization. Just as important, it can help you use that enhanced understanding to present customers with appropriate decisions at the right times based largely on their input into the experience they desire—or to spark a decision in your organization that accounts for customers' preferences.

Real-world cooperative experiences: Orlando Magic

Imagine you're a season ticket holder on the way to an **Orlando Magic** basketball game. Fifteen minutes before the start of the game, you receive pregame analysis powered by AI. A mile from the arena, your phone buzzes with your seat number, which is based on demand for the game. You both pay for valet parking and get turn-by-turn directions to your seat using the Orlando Magic app on your phone. Once in your seat, you use the app to order nachos. Each of these elements of your experience is informed by your own preferences, and can be dialed up or down based on your desire for interactions.

This isn't a future scenario—it's what the Orlando Magic organization is delivering to its guests today, with SAS, showing the real-world potential of cooperative experiences.

Cooperative experiences acknowledge the new consumer power dynamic

The growing power of the consumer, with access to more choices than ever and a growing arsenal of digital tools for informing and acting on their decisions, has by now been widely recognized across industries. Digitally empowered prospects and customers are calling the shots—which is why companies are increasingly obsessed with developing a richer understanding of consumers and their preferences. It's also why they are finding new ways to interact with consumers at the right moments across the customer journey, spanning physical and digital touchpoints, devices, and consumer- and brand-initiated engagement.

For years, these efforts have been focused heavily on using a wide range of customer-generated data and relevant information from other sources to construct a sharper view of customers, sometimes at the individual level. This will continue to be important. But giving consumers agency in constructing their own experience is a new frontier in the quest to cultivate stronger relationships between consumers and the organizations that serve them. It can open a whole new door to relationship building—if companies know what tools they need to open the door, and what to do once they go through it. That's where analytics can play a huge role—helping organize and understand consumer-generated preferences, probing the data generated by empowered consumers, and building on that baseline of understanding for years to come, over the full lifetime of the relationship. That's how brands will best position themselves in their customers' paths—and how they will reap the rewards of brand preference, loyalty, and profitability for years to come.

"The ability to scale is fundamental to delivering cooperative experiences—especially when you consider the large role AI plays in these experiences. In a recent survey from Accenture, business leaders who have been able to scale their AI capabilities report achieving nearly three times the return from AI investments compared to their 'non-scaling' counterparts. Delivering cooperative experiences at scale means delivering AI at scale—and that takes strategy, governance, and the right mix of technological capabilities."

Georgios Passalis
Managing Director, Accenture

AI and Me

Reimagine the business through human and AI collaboration

How will humans interact with AI systems in more meaningful, productive ways in order to deliver on the full promise of these powerful capabilities? That question is at the core of the "AI and Me" trend included as part of the **Accenture Technology Vision 2020** report, which suggests that businesses today are only realizing a fraction of their AI potential—leading to the need for them to reimagine AI's role in the organization and tap into people's ability to steward, direct, and refine AI. Today, as an increasing number of AI capabilities are adopted by companies across industries, around the world, leaders are gaining a more sophisticated understanding of the limits of AI capabilities being deployed in isolation.

For many, this is not surprising: Did anyone truly expect to put AI capabilities in place and simply let them do their work, with minimal human interaction? But even among those who entered the realm of AI with a clear understanding of the limits of these technologies and the continuing importance of human oversight and engagement with AI, the level of human engagement required in successful, high-functioning AI systems can still come as a surprise.

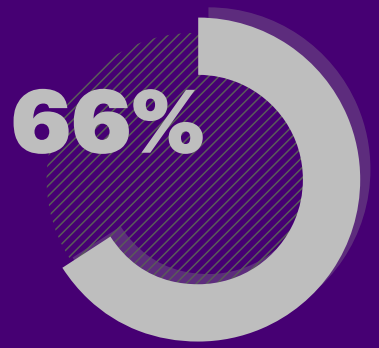
The connections between AI and analytics capabilities are widely recognized—in fact, many view them as one and the same. Without analytics, there is no artificial intelligence—no way for these systems to learn, make data-informed decisions, or take action. But analytics has an even larger role to play, especially when it comes to enabling more productive human-AI interactions. Augmenting AI systems with other analytics disciplines helps organizations and their people better interpret, monitor, and govern AI-driven decisions—improving transparency and building trust among those who are increasingly relying on AI inputs in decision making. This is a key aspect of analytics and AI that researchers at SAS are actively exploring today. When working with customers looking to get more value from their AI investments, SAS and Accenture have identified several areas in which analytics and AI can facilitate stronger human-AI engagement.

First, it may be useful to consider two of the most fundamental models for human-AI engagement. In the first model, human activities and decision making are augmented by AI: AI systems deliver insights and tee up decisions to people, who combine these inputs with their own insights and human intuition and proceed accordingly. The second model is more AI-centric: AI systems are granted the ability and authority to act within clearly defined guidelines by people, who then continually provide inputs to these systems that further refine and improve their actions as a result. In one case, humans are supported by AI, and in the other, AI capabilities are supported by human activity.

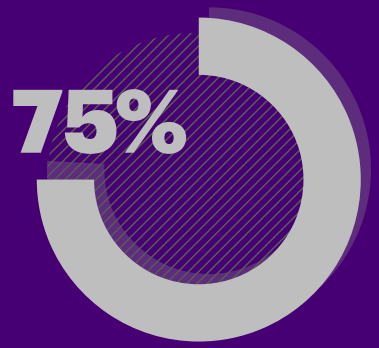
Survey Stories

AI demands a more connected organization

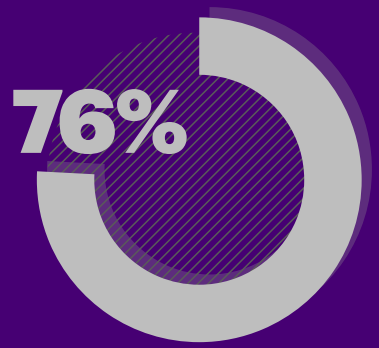
In a recent MIT SMR Connections—SAS survey*, with contributions from Accenture, respondents pointed to a range of ways their organizations—and their people—will have to change in order to take full advantage of AI capabilities, with an emphasis on bridging functions and disciplines.



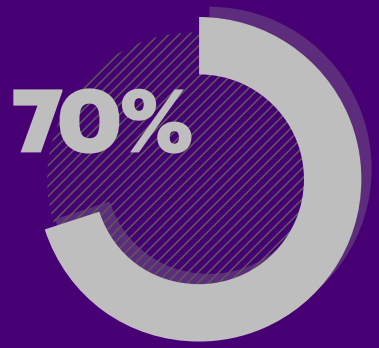
expect an increase in organizing people into multidisciplinary teams.



expect more collaboration between functions.



expect more enrichment training for functions impacted by AI.



expect more cross-training across disciplines.

*Source: "How AI Changes the Rules," conducted by MIT SMR Connections on behalf of SAS. 2020

"Intuitive, approachable analytics tools can easily convey the changing outcomes of AI systems—not just for data scientists, but for everyday users. That's the level of visibility and governance required at this stage of AI adoption."

Scott Chastain
Director, Global Technology Practice, SAS

Analytics insight for real-time oversight of AI systems

AI systems are increasingly used to augment and inform human decision making. In some cases, humans are finding ways to assign routine decision-making tasks to these systems, allowing them to focus on more high-value work requiring human discernment and insight. As people increasingly rely on AI to make decisions and execute tasks, the need for real-time oversight increases as well, which is where analytics can play a significant role. For example, if an algorithm has improperly discounted a retail item, potentially leading to lost revenue, distribution, and supply chain problems, or both—analytics capabilities can quickly identify the issue for immediate remediation. If a flawed trading model is leading to poor trades on the stock market, analytics can similarly pinpoint the issue and point the way to human intervention quickly. These types of scenarios are not at all new to the business world—only the increasing role of AI has changed. As always, human oversight is required, and with advanced analytics capabilities in place, this type of oversight can be executed much more quickly, with more accurate results, than ever.

AI uses analytics insights to inform human decision making

Much has already been said about the role that analytics can play in supplying people with the insights they need to make smarter decisions—with good reason. The benefits of analytics in improving decision making have been widely documented, leading to a groundswell of investment in analytics capabilities. But what happens when you *combine* AI and analytics in order to inform human decision making? AI has the potential to supercharge analytics insights, moving past the ability to merely serve up insights and hope people make use of them in the right ways. Together, analytics and AI can create an environment in which human decision makers are presented with a more dynamic set of choices rooted in live data.

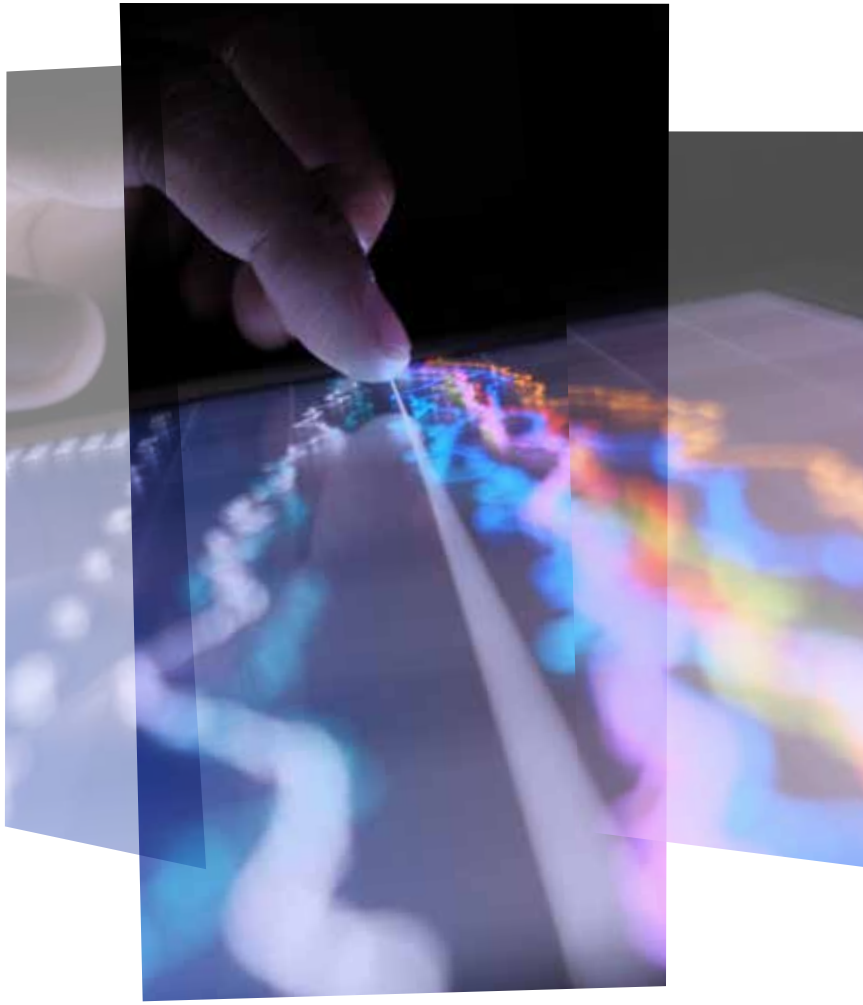
For example, a repair person working on a sophisticated engine observes that a specific part failed, using analytics data applied to the vehicle's data systems—a simple use case for analytics. But what if an AI system, fed with analytics data, suggests that the repair person replaces three other closely related parts that appear to be working today, but are at strong risk of failure, based on data from 20 other repair centers spread across the country? This is a simple example of the powerful potential of AI to inform human decision making, enabled by analytics capabilities—and it can be applied to a host of large and small decisions that take place in any organization every day.

"Many of our clients are actively looking to accelerate from insight to action with AI. They're seeking a level of acceleration that just can't happen without even stronger human interaction with these systems—human insight is needed to guide these systems at this early phase of AI development."

Peter Guerra
North America Chief Data Scientist, Accenture AI

Providing user-specific context for AI-based decisioning

Once implemented, AI systems can offer an organization's people guidance and support on a tremendous range of decisions, driven by analytics. But therein lies the challenge: With so many different stakeholders able to make use of AI systems, how can the systems distinguish between users in order to deliver meaningful, role-specific decisioning capabilities? Because the choices a CFO makes are entirely different from those that a technology manager must make, for example. Even when different users are focused on the same business process or issue, they still need to view it through a different lens. Analytics can be used to help AI systems quickly identify users by role and begin generating individually appropriate, role-based decision options and a recommendation engine for users. Analytics is the lens that helps put AI-generated recommendations in a useful, correct context—by user. Just as important, this lens can be refined even further based on preferences registered by individual users: Users feed the system with more data on what's useful, what isn't, and what they need, and the AI system becomes an even more powerful tool.



Broader AI adoption translates into accelerated decision making

Ultimately, one of the most compelling benefits of stronger human-AI engagement is the ability to minimize the amount of time between the production of an insight and the resulting action based on that insight, or set of insights. The tighter the alignment between humans and the AI systems that contribute to actions on behalf of the organization, the faster the resulting actions—on a larger scale. Today, in the hierarchy of decisions that take place in any organization, AI systems are generally allowed to act only on lower-level decisions, leaving more strategic issues to humans. While this fundamental dynamic is unlikely to change, as AI capabilities become more sophisticated it seems inevitable that they will be applied to increasingly complex decisions.

To use a simple example, today many retail organizations already rely on AI to tee up decisions for their people: *"Should we extend coupons to this group of consumers?"* Soon, though, AI systems could act on their own to extend coupons to that group of consumers, with human interaction required only for oversight and monitoring. And these types of actions can be taken much more quickly without the requirement for significant human involvement, leaving humans to engage with AI systems on higher-order decisions that will always require human discernment.

On this front, some industries are clearly further along than others. But "second-mover" industries and companies may have an unexpected advantage, as they haven't committed to early-stage AI technologies that are already becoming outdated. AI capabilities have advanced so significantly in such a short time that organizations that have been sitting on the sidelines can make their first move while also taking advantage of more powerful capabilities that are now the norm, with minimal reverse engineering. Regardless of where companies are on the AI maturity curve, it's important to have a plan for tightly aligning human and AI capabilities.

The Dilemma of Smart Things

Overcome the “beta burden”

In the "Dilemma of Smart Things" trend in the **Accenture Technology Vision 2020** report, we discuss the "beta burden"—the unintended consequences when products and their contained experiences are constantly in flux. The beta burden is a practical, pressing challenge for companies delivering products that are expected to keep updating and evolving long after they are purchased. Because as companies move into the post-digital era, they are beginning to design updateable products with the ability to expand services and experiences in the future, so that enterprises can respond to changing customer demands and expectations at a moment's notice. This sets the stage for feedback loops that support true partnerships, where customers can see the value and utility of products grow over time rather than fade. That's a good thing. So how can companies turn the so-called "beta burden" to their advantage?

It helps to consider the roles the individual supporting capabilities play in making "smart things" smart. In an Internet of Things (IoT) context, "things" are just IoT assets that *do* something. Smart things, meanwhile, combine IoT assets with AI, machine learning, and other analytics capabilities to create platforms for ongoing capabilities. And while the dilemma of maintaining these products and using them to deliver services over the long haul may be relatively new, the rules for operationalizing and sustaining their underlying technologies are not particularly new. If anything, they have even more relevance now, as we enter the era of products-as-software, constantly updated to keep up with the opportunities introduced by new advances—and shifting customer needs.

For SAS, successfully operationalizing AI and analytics has meant focusing on a handful of fundamental principles—governance, an open ecosystem, and cloud enablement. These principles have a significant role to play in any effort to operationalize consistent, sustainable, ongoing post-purchase product evolution.

Analytics governance

While governance in product development may have never been simple, it was at least more straightforward than in this age of smart things, because governance activities traditionally ended at the point of purchase by a consumer. These activities were heavily focused on product engineering, using proven, time-honored conventions and leading practices. But with smart things, new dimensions of governance enter the picture, especially in light of those new smart services—starting with data. The first question: *Who can legally and ethically do what with the data? How is all the data being collected actually used? What is legally allowed, and how long is it kept? What tools are used to analyze data, and how is their use governed?* Developing good governance practices in the context of smart things requires understanding that the products are typically differentiated by the data and AI capabilities within them. To the consumer, one smart speaker may be just as desirable as the other, for example—the real difference is in the voice recognition and AI capabilities inside. Analytics has a significant role to play in data and AI governance for smart things, allowing organizations to capture value over the long term. Security, productivity, bias, versioning... these are just a few of the governance attributes that must be managed successfully in order for organizations to launch and sustain "smart things" products long after the first sale is made.

“Robots in the wild” offer view of what’s next

While robots represent only a sliver of the world of smart things, advances in the fast-growing field of robotics offer a preview of issues that other smart things will likely encounter as they grow smarter and enjoy wider adoption. For example, companies that are deploying robots with open-world autonomy (those that roam not only in controlled spaces such as the manufacturing floor, but “in the wild”) must consider a new audience: Those with whom they have no employee or customer relationship. How should data about this potentially enormous audience be handled? What types of interactions are allowed with this audience—if any? Questions like these foreshadow the complex issues that come from increasingly intelligent things deployed in a wider range of environments.

“In the wild” deployment also poses unique challenges in terms of development and testing. Experience to date suggests that this area demands a combinatorial approach to testing—a commitment to continued data collection and refinement of solutions after devices are in use, and for solutions that are not yet fully autonomous, early experimentation to inform large-scale rollouts when the technology and regulations allow.

Even for those currently managing limited smart-things deployments, issues like these from the field of robotics should be considered as they plot broader rollouts.

Open ecosystems and development

Smart products tend to flourish when they are developed and sustained in a framework that allows a wide range of partners and providers to develop capabilities, integrate with one another, and ultimately monetize their innovations. Companies can use this to create competitive advantage, relying on third-party products and technologies not only to expand the utility of their products, but to create entirely new revenue streams. In most cases, this requires a mix of physical engineering capabilities (to integrate required physical attributes) and software engineering. This has direct implications for the application of analytics, as well—companies that develop analytics could benefit from an analytics platform for managing the complete lifecycle from development to deployment and beyond, simultaneously allowing them to protect and analyze their own data while sharing other data selectively and openly with partners, to inform their own decision making and drive innovation.

In the analytics space today, coding languages and frameworks are a battleground—and the battles go well beyond arguments about open source issues. These debates have a direct bearing on the development and ongoing management of smart things. The analytics tools and processes a company adopts when developing a product have a longer-lasting impact than even a few years ago, since the company will likely rely on those same tools as they continue to update, improve, and maintain the product after its purchase. In this context, minimizing the gap between product development (R&D) and operations is a critical factor in accelerating time-to-market and successfully refreshing smart products in the field. That's where DevOps, over-the-air software updates, and digital operations have a huge role to play. Companies that have cultivated highly sophisticated capabilities in each of these areas, bringing R&D and operations even closer together, are those that have the advantage in a smart-things world. So which criteria should leaders have in place when making weighty decisions about analytics capabilities? After all, different coding languages (for example) have their own strengths and weaknesses. One of the most successful approaches we've seen acknowledges that the tools are only as strong (or weak) as the people using them. That means allowing skilled engineers, technologists, and business leaders to use the capabilities they're most comfortable with—which in turn requires providing them with a technology environment that allows them to manage and operationalize their creations regardless of the tools and technologies they used to create them.

It also requires acknowledging that building an analytics model is typically one of the easiest and most satisfying steps in deploying analytics capabilities. Both the data work that happens before models are deployed, and the steps to operationalize successful models on a larger scale after they have been developed and proven to work, are less-examined but equally important aspects of ensuring a high level of development productivity. Analytics platforms that manage the complete lifecycle, not just model development, while supporting the full range of programming languages, are most successful in developing and deploying smart things over the long haul.

Autonomous driving: A test case for on-the-edge, in-the-field analytics

Both in the development phase and once out in the world, smart products are generating data that can be instrumental in creating, deploying, and constantly improving them. Sounds great in theory, but how does it work in practice? Autonomous driving pushes in-the-field data collection and analysis to the limit—with results that can be useful to those deploying far less complex smart things into the world.

Given the sheer volume of data used to develop autonomous vehicles, researchers from SAS and Accenture are working to develop an "intelligent events detection system" that allows auto makers and suppliers to pre-process data as it's generated onboard the vehicles. Using SAS Event Stream Processing in tandem with a properly trained model, the vehicles can recognize objects (such as other vehicles), lanes, and specific events such as lane cut-ins. This system relies on a simulator engine to emulate realistic driving environments, with an edge device capturing all relevant information just as it would in a real-life driving scenario—video events, metadata text files about events, and much more are all fed into the system, which ultimately displays live vehicle and scenario detection on-screen, in real time. Our ambition is to team with specialized auto suppliers to develop a new, sophisticated logging station to be used in the process of gathering data from sensors in the development of a new highly automated vehicle.

For those developing smart things, this sophisticated model reinforces the potential power of capturing and analyzing data on the edge. Rather than ingesting 100% of the raw data being produced, in an edge computing model only data from meaningful scenarios is captured and used, reducing offloading time as well as infrastructure costs.

"Some of the most promising developments we're seeing in the field of smart things are occurring at the edge. In developing autonomous vehicles, for example, there's just a crushing amount of data that can be gathered at any given moment, on any given trip. What do you do with all that data? Send it back to a central data repository on the cloud, then analyze it, then act on it? That's not only inefficient, but it's costly and time consuming. On the edge we're able to process data during test campaigns to select and retain only what is meaningful for decision making—and today there are great, reliable tools that are ready to handle data at the edge."

Raffaele Menolascino
Managing Director, Accenture

Cloud

It is fair to say that the emergence of cloud capabilities has ushered in the era of smart things. This ubiquitous, low-cost, powerful source of compute is the primary method for delivering smart services and developing new capabilities or services. As a result, this means that the analytics tools needed to enable smart things must be cloud-ready—all-cloud, multi-cloud, hybrid, on-prem, edge, or any combination. While this should be invisible to consumers, for developers behind the scenes this leads to some critical decisions about architecture, based largely on use cases and product requirements. Technology leaders should also avoid getting locked into any specific environment. Technology capabilities are changing so quickly that these leaders should be ready to move to newer, cheaper, faster compute environments at any moment in order to ensure that their smart products remain competitive—and to add value to their customers' lives.

Cultivate a wide range of analytics strengths

Is there a one-to-one relationship between a single analytical model and a valuable outcome? Not in our experience. The mistake too often made in developing and deploying smart things is to lose sight of the end user experience. In practice, a host of analytical capabilities are typically required to generate a single desirable outcome. A self-parking car may rely heavily on computer vision to serve as the "eyes" for the car—a significant analytical accomplishment on its own—but computer vision alone cannot park the car. These capabilities must be deployed in tandem with a host of related analytical capabilities (for understanding space, distance, speed, angles, and much more), each of which is generating its own stream of data that must be analyzed and then integrated with the vehicle's control system in order to park the car—the desired outcome of the end user (the driver).

The lesson? Achieving successful individual outcomes in a *smart things* environment requires a host of analytics tools, methods, and processes, all of which must be deployed in an environment that can handle the massive amounts of data being generated to guide decision making and actions in real time. Just as important, leaders need to reorient their teams to focus on the full product lifecycle, not just go-live or the point of sale, in order to turn the beta burden into a beta advantage.

"We're already seeing customers deploying combinations of technologies that would have been unimaginable only a few years ago—the Artificial Intelligence of Things (AIoT), for example. AIoT-enabled smart things are capable of generating rich new layers of data to fuel analytics and created incredible capabilities. It's truly a lifecycle: As data and analytics continue to evolve, new value will be created."

Bill Roberts
Director, Global IoT Practice, SAS

Innovation DNA

Reshaping your company into an engine of innovation

One core area of focus in the **Accenture Technology Vision 2020** report is the importance of identifying, combining, and applying the new building blocks of innovation. Just as human DNA determines individual traits, with chemical building blocks combining to set much of the course for who we will be as individuals, innovation DNA will define the enterprise as it grows into the future. The building blocks of innovation are

- Maturing digital technology that is more commoditized and accessible;
- Scientific advancements that are discrete yet deeply disruptive; and
- Emerging DARQ (distributed ledgers, artificial intelligence, extended reality, and quantum computing) technologies that are poised to rapidly scale and bring organizations into the post-digital era.

Leaders across industries are beginning to weave these areas of innovation together, forming their own unique triple helixes of innovation DNA and setting their course for the future. But these building blocks are at varying levels of maturity and adoption. For example, today AI is widely understood to be the most mature of the DARQ building blocks, enjoying wide adoption compared to the others, with a cadre of companies springing up to provide AI capabilities, more IT workers honing their AI skills, and large solution providers leaders building AI capabilities into their technology. Today, most AI capabilities running at scale fit into the category of machine learning.

Distributed ledgers and quantum computing, meanwhile, are on the path to broader adoption but still primarily in proof-of-concept phase. Extended reality is already important in the gaming sector, but elsewhere it is still in the very earliest phase of experimentation and adoption.

Even at this early stage, the potential benefits of combining these technologies are tantalizing. For example, the advanced computing power introduced by quantum computing, working in tandem with AI capabilities, can allow users to analyze different aspects of business issues or problems at the same time—not in the linear, serialized manner often deployed today, which is required given the complexity of manipulating data interactions at that level. Leading solution developers are developing AI capabilities with quantum computing in mind, so that when quantum becomes more viable at scale, it can be embedded in existing solutions.

"Most leaders today understand that AI will be a competitive differentiator, opening the door to real innovation in product and services. But they also want to know how to sustain it—which is where deploying, monitoring, and governing AI assets become even more important. These are all key analytics-processes which are required to deliver AI innovation at scale."

Deepak Ramanathan
Senior Director, SAS Asia Pacific

As companies begin to apply these building blocks in new ways and combinations in order to advance their capacity for innovation, they must take care to avoid some familiar obstacles—starting with the challenge of innovating at the scale required to drive real, measurable competitive advantage over the long run. Because as successful innovators know, "sandbox" innovations, however compelling, are not enough on their own to have an impact. Companies need to have a plan for *operationalizing* their innovations after identifying which have succeeded, measuring and managing as they go. As a practical matter, this is the difference between having a good answer for "What decisions will we be able to make throughout our organization after this innovation has been deployed?" rather than "How many innovation models do we have in place?" It's about the business impact of a portfolio of innovations—not the portfolio itself.

Today a wide range of technologies, processes, and capabilities are intersecting and combining in new ways, brought together to enable entirely new opportunities. For participants in innovation initiatives, this is exciting. It can also be daunting—especially for CIOs and COOs who know the difficulties of corralling such a range of technologies, many of which may be new to the organization and may have never been used in tandem with one another. Call it the "innovation ecosystem"—all the enabling technologies and standalone capabilities that facilitate the creation of innovation DNA.

How will these technologies in this ecosystem work together? How will they share data, and how will the enterprise make sense of all that data? How will they do it at scale? Analytics has a significant role to play in each of these issues and more, because data is the thread running through all the building blocks of DNA. With reliable, scale-ready analytics capabilities in place, technology leaders can more easily enforce the discipline needed to curate, govern, and deploy each of these building blocks—a level of maturity not currently in place at most organizations when it comes to these emerging elements of innovation.

SAS, longtime leaders in analytics and pioneers in operationalizing analytics and other innovation-enabling capabilities, have identified the fundamental requirements that must be in place in order to *operationalize* innovations, building on advanced data and analytics capabilities. These insights are drawn in large part from SAS' work in AI, the components of innovation DNA that is perhaps most mature and most widely adopted today.

Decision management

How will the data generated by new technologies and innovations lead to smarter decision making? From distributed ledgers and AI to all the other digital tools that serve as the building blocks for innovation, all are likely to generate different types of data, in different formats, at different times. All that data must be combined in a unified platform where testing, change management, auditing, and decision validation take place. This is accomplished through rules-driven analysis and comprehensive version control across all decision flows, business rules, and individual decision components. Ultimately, this also requires combining custom code, business rules, and analytics.

Distributed ledgers offer a useful example of the importance of decision management capabilities. Due in large part to the level of coordination between different enterprises required by distributed ledgers, both within the same organization and between organizations, business processes will be redefined. The global finance department in a large manufacturer must marshal a wide range of teams and data types to confidently understand the relationship between imports/exports and shipping, for example—exactly the type of complex interaction supported by distributed ledgers. The entire ecosystem must work together to orchestrate more complex interactions, relying on these new processes. All of which will require advanced decisioning capabilities, enabled by machine learning—and lots of data. What's more, the distributed ledgers will also *generate* an enormous amount of data including different types and formats of data. As a database of records that keeps an audit trail of everything that happens, distributed ledgers generate their own critical mass of data. For companies that know how to manage that data, this opens up new opportunities for insight—but given the volume of data, machine learning capabilities will be required.

"Now is the time to embed analytics capabilities throughout the value chain, so that when the new DARQ building blocks are more mature and ready to scale, organizations can snap into action quickly in order to take advantage of them."

Edwin Van der Ouderaa
Senior Managing Director leading Digital, Customer Insight, and Growth, Europe, Accenture

Business rules and analytical model execution

Decision making requires that all necessary business processes, data sets, rules, and analytics models be brought together from across multiple teams and systems into a single decision engine. In a SAS environment, users publish decision flows to different targets including real-time decision services, giving them the ability to deploy decisions to the right channels in real time.

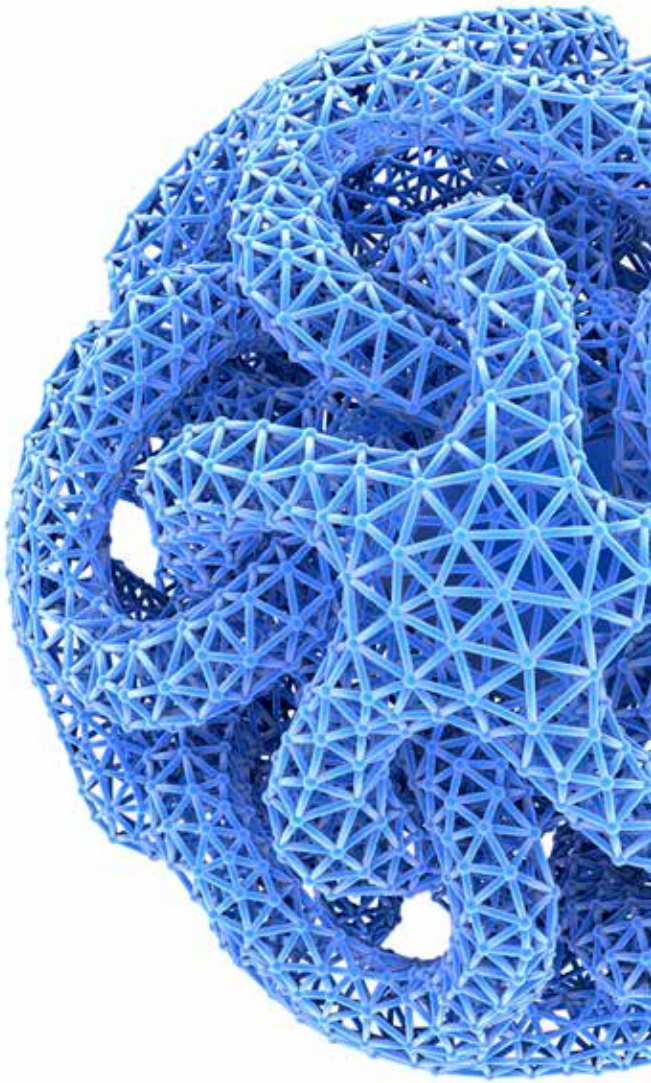
Along the way, the system also records and tracks information about a decision, including when a treatment or action is presented to a customer as part of a decision execution. Because many businesses need to record what decision was made and why, for audit and regulatory reasons. Using this approach, it's possible to see which decision rules were applied by each individual. It also allows users to track how individuals respond to each decision treatment presented to them.

Such a decisioning strategy must transcend departments and teams: Marketing, Fraud, Credit, Risk, and so on. So, the ability to combine business processes, data sets, and analytical models from across multiple teams and systems is also critical.

Innovation DNA: Bringing it all together

It's one thing to talk about applying different building blocks of innovation DNA—but how do you actually start *doing* it? It helps to collaborate in an environment where many of these capabilities are readily available for combining, testing, and experimenting. Accenture's AI Studio in Pune, India, is built for just this purpose. Building on the success of Accenture's global center network, visitors to the studio work in collaboration with our deep SAS skilled development teams and experts in design thinking and innovation. Using SAS to tackle such business problems as anti-money laundering or regulatory compliance for example, clients are able to experiment with extended reality, AI, IoT, blockchain, quantum computing, and more—along with SAS analytics solutions.

With sessions being laser focused on driving tangible return on investment, many are leaving with accelerated innovation outcomes, and recasting business models—big, transformative initiatives that require new ways of thinking and a deep understanding of the capability of SAS.



Automation of high-volume interactions

Many organizations need to automate high-volume interactions, scaling to an enterprise level economically using data that is either in motion, at the edge, or at rest. When relying on a disparate group of technologies across the organization, this can present serious challenges. But in a platform environment, the organization can ingest millions of events each second—delivering decisions on more than 5,000 interactions each second—all from one central location. The result? The ability to drive decisioning in real time, using extremely large data volumes. Using SAS, users can also use machine learning techniques in stream to instantly identify insights that can trigger new decisioning flows.

Successfully combining innovation DNA requires analytics

It is difficult to overstate the importance of cultivating the ability to scale innovations. Using novel combinations of innovation DNA in order to launch new ideas is important, but it is also only the first step. To add to the complexity, today's leaders must find ways to operationalize innovation building on a mix of commercial and open-source tools. Commercial tools are generally built to scale, but open-source capabilities—from R and Python to TensorFlow and any number of similar tools—tend to present unwanted, unexpected challenges when it's time to scale up. This could help explain why so many companies are stuck in proof of concept mode when it comes to AI. A recent Accenture survey of 1,500 C-suite executives (**AI: Built to Scale**) found that 80-85% of companies are still in this mode. Meanwhile, only 15-20% are in "strategic scaling" mode, having moved beyond proof of concept to achieve a much higher success rate of scaling AI, with the returns to show for it. Still fewer are in the "industrialized for growth" stage—fewer than 5% have reached this point, where they have a digital platform mindset and are actively creating a culture of AI and analytics across the organization.

The difficulty in operationalizing innovation using the building blocks identified here, from AI to analytics and beyond, underscores the importance of starting with a foundation of data and analytics—with capabilities that are able to accommodate the full range of data types, regardless of the source, integrating whatever custom, open-source, or commercial tools are being used as part of the AI initiative. This is exactly the type of challenge SAS solutions are built for, and it's why SAS tools are increasingly used by companies that are serious about delivering their innovations at scale.

5%

fewer than 5% of companies have reached the stage of being industrialized for growth.

Conclusion

Converging technologies, converging partners

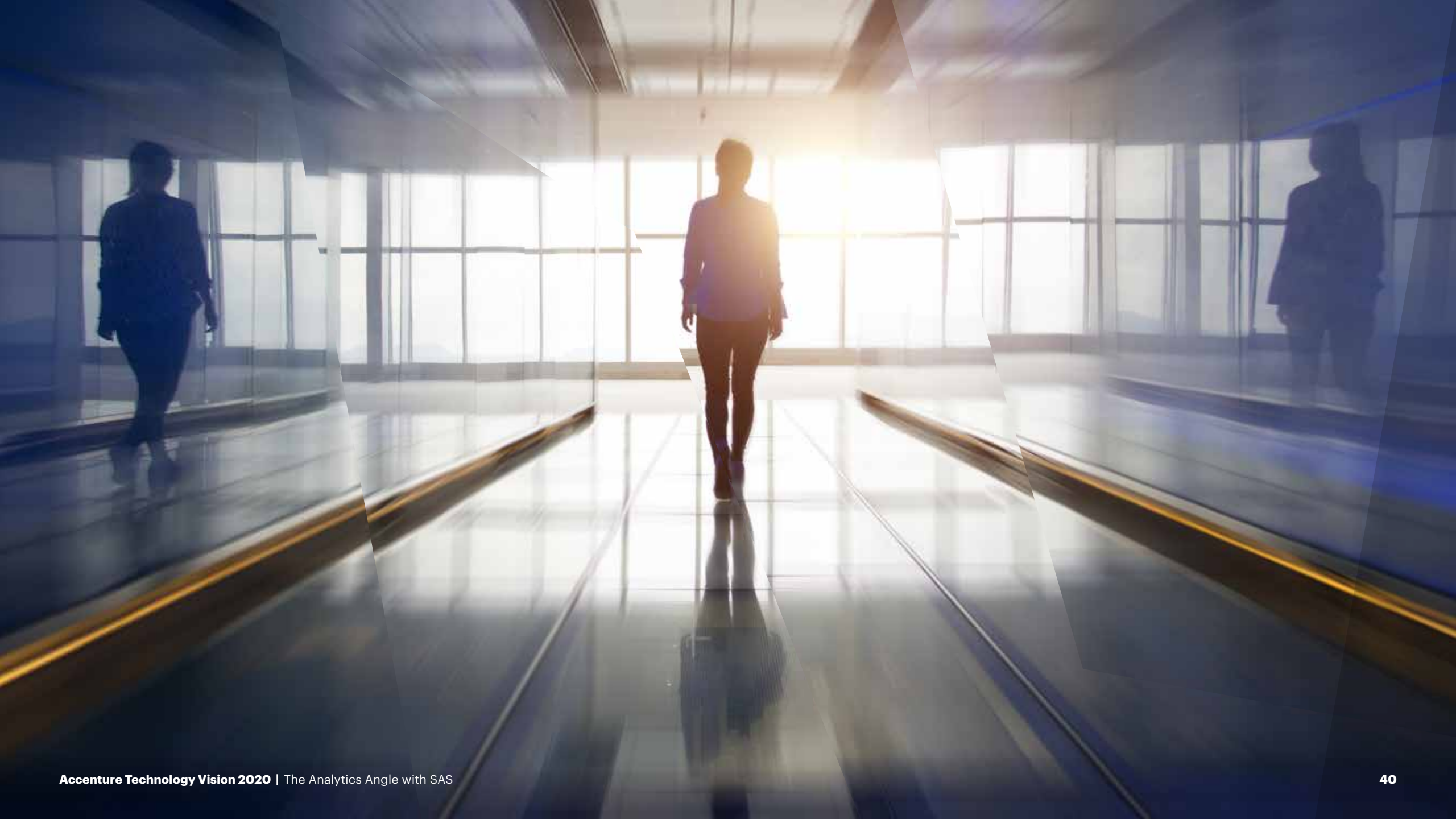
Our 2020 Technology Vision report is full of examples of technologies and capabilities converging in unexpected ways to unleash new potential. Understanding these new points of intersection and deploying them in new ways are critical factors in creating competitive advantage today.

At the same time, there's no way for any single organization to stay on top of these developments. Activating such a wide range of constantly evolving technologies requires a correspondingly broad coalition of partners—people who are not only conversant in these capabilities, but who have directly contributed to their evolution and know how to shape them in the real world to maximum advantage.

While there are many partnerships that will make similar claims, the fact is that Accenture and SAS together are the powerhouse of talent needed to take full advantage of these advances, uniquely placed to respond to these trends and shape the future together. Because data—and an organization's ability to gather, manage, and make sense of it—is the single thread running through all these trends. Without an ability to confidently manage and derive insight from massive volumes of data, it's difficult to imagine any organization truly harnessing the power and potential of these trends. It is just as important to be able to test, implement, and scale these developments in the challenging, real-world environment in which organizations operate on any given day. At SAS, the global leader in analytics, and Accenture, the world's leading technology consultancy, we live for this type of complexity. No other combination brings the immeasurable talent and ability required to marshal data and insights in service of practical innovation.

We're ready to help—together. If you'd like to discuss how any of the trends identified in this report could be put to work by your organization, let's talk.

www.accenture.com/techvisionsas



Accenture and SAS Innovation Across the Globe

Key

- AI Transformation
- Platform Modernization
- Supply Chain Analytics
- Profitability Analytics
- Customer Analytics
- Fraud & Risk

Greece

Center of Excellence
Customer Analytics
Athens

India

Advanced Technology
Centers & AI Studios

Ireland

Center of Excellence
Accenture Analytics
Dublin

Italy

A>Race
Milan

Latvia

Center of Excellence
RDG
Riga

Philippines

Advanced Technology
Center
Manila

Poland

Center of Excellence
Customer Analytics
Warsaw

Portugal

Center of Excellence for AI
Transformation with SAS® Viya
Lisbon

Singapore

Innovation Center for
Situational Awareness with SAS

Spain

Center of Excellence
Accenture Analytics
Barcelona

USA

Center of Excellence
Finance & Risk
New York

Accenture Federal
Washington, D.C.
SAS Accenture Federal


Warsaw, Poland
Riga, Latvia
Dublin, Ireland
Washington, D.C., USA
New York, USA
Lisbon, Portugal
Barcelona, Spain
Milan, Italy
Athens, Greece
India
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