



THE FUTURE OF WORK: DATA-DRIVEN LEADERSHIP

2016-2020

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Published: 12/21/2016

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EXECUTIVE SUMMARY

Futurum Research provides research, insights and analysis to the market that help tie leading and emerging technology solutions to strategic business needs. The purpose behind each of our reports is to help business executives and decision-makers gain a better understanding of the technologies driving digital transformation, connect the dots between the practical business requirements of digital transformation and the forces that impact employees, customers, markets and experiences, and take appropriate action regarding critical digital transformation opportunities.

Executive Summary

This *Future of Work* report is a structural and best-practices prescriptive overview of digitally-enabled data-driven leadership and decision-making. The report reframes the core objectives of leadership in the age of technological disruption, then provides an agile operational framework for the adoption of data-driven leadership that can be adapted to any business regardless of size or industry, then scaled across the organization. The report also provides a wealth of carefully curated data and insights from the trenches of digital transformation that identify common obstacles to digital transformation success, list the key strategic opportunities of a successful shift to data-driven leadership, quantify the risks of resisting the shift to data-driven leadership, and outline the future of technology-assisted decision-making. This report is a must-read for anyone currently in a senior management or high level leadership position.

Companies mentioned: SAP, Microsoft, IBM, Oracle, Salesforce, Dell Enterprises, HP Enterprise, Dassault Systemes/3DS, Alphabet/Google, Amazon, Facebook, GE, Apple, Tableau, Klipfolio, Domo, Sisense, Qlik.





The Future of Work: Data-Driven Leadership

PART 1: REFRAMING THE PURPOSE OF LEADERSHIP

Before we dive into technology, data, and how businesses are adapting to turbulent market disruption, we should start at the beginning: understanding the purpose of leadership. For the moment, forget everything you *think* you know about leadership. It isn't that any of it is wrong; in fact, all of it is probably right. We just need to reframe the nature and purpose of leadership in order to have a common baseline of thought before we move on.

Insight #1: The primary purpose of good leadership is to make and drive good decisions.

Our primary purpose isn't to "manage" people or organizations. While management and leadership can exist simultaneously, they are not interchangeable. *Leading* is about setting a destination and getting your organization from here to there. *Managing* is the process of making sure that the resources assigned can get the job done. rection in which they are going, not to mention the actual destination, will pay off. The more leaders show they can make good decisions consistently, the more likely it is their organizations will trust in their leadership. Leaders who don't demonstrate the ability to make consistently good decisions will find themselves replaced by others who can.

First and foremost, leadership must be about trust. An organization should be able to trust that the diThe primary purpose of leadership, then, is to make good decisions.

Insight #2: The primary purpose of good decisions is to drive positive outcomes.

Good decisions about destinations and the paths we take to reach them ultimately drive outcomes. What happens when you reach that destination? Was it a good decision to embark on the journey in the first place? Decisions result in outcomes, and outcomes can be measured: Is the outcome a net positive or a net negative? Can the success or failure of the outcome be quantified? (When it comes to business, the answer should always be yes.)

Insight #3: We cannot talk about leadership, good or bad, without focusing on business outcomes.

Good leadership is measurable. Leadership drives outcomes, and because those outcomes can be quantified, so can the leadership that drove them.

This point is vital to understand as we begin to shift our attention to data-driven leadership. Results, not merely good intentions, are the measure of effective leadership. A friendly boss isn't necessarily a good leader. A charismatic, well-spoken, inspirational executive is not necessarily a good leader, either. Even vision and intelligence don't necessarily make a CEO a good leader. These traits certainly are a plus, but unless an individual in a leadership role can deliver quantifiable results that are aligned with business objectives, that individual is not an effective leader.

The measure of an effective leader, then, is his or her ability to drive relevant, meaningful, and quantifiable business outcomes. Furthermore, driving positive business outcomes is a process; as with all processes, driving consistency should always be a primary goal.



Insight #4: Consistency is not an afterthought or a footnote. It is a measure of effective leadership.

If being right 50 percent of the time is better than being right 25 percent of the time, then being right 100 percent of the time is the ultimate goal of every decision-maker. The question then becomes: How does a decision-maker go from being right half the time to being right all the time? What best practices and tools can be applied toward this goal?

Consistency drives cycles. These cycles can either be *vicious* or *righteous*. Vicious cycles drive series of *negative* outcomes. Righteous cycles drive series of *positive* outcomes.

The effectiveness of an organization's leadership is gauged by its business outcome cycles. Vicious cycles obviously point to a consistent failure rate, which indicates problems with the organization's model of decision-making. Righteous cycles indicate the opposite: effective leadership driving positive outcomes.

Vicious Cycles vs Righteous Cycles in Decision-Making



With a deeper dig into righteous cycles, an organization can quantify outcomes to gauge whether the leadership has improved its decision-making ability over time; this can also be an important operational insight.





Insight #5: Making better decisions that drive consistently positive business outcomes is the biggest challenge facing business leaders today.

Whether the focus of the day is to accelerate digital transformation, improve customer retention, boost employee morale, or invest in the right product strategy, the primary worry of every decision-maker is the same: What if I'm wrong? turies, making decisions has relied mostly on hunches, educated guesses, probability models—and a lot of crossed fingers, hoping for the best. Win some, lose some, repeat. The not knowing if they made the right decision or the right investment is what continues to keep executives, entrepreneurs, and business owners up at night.

This question has always haunted leaders. There is no such thing as a crystal ball in business. For cen-

CEO Perceptions 2015-2020: Levels of Concern Not concerned Not very concerned Somewhat concerned Very concerned 19% 20% 24% 30% Reactive: Aware of the velocity and scale of technological distruction 39% 40% 38% Non-reactive or hyper-reactive: 33% 29% 28% Either in denial, or already 23% enjoying an advanced state 9% 10% 10% 5% of readiness New Market Availability of Speed o Shift in Entrants Key Skills Technologica Consume Spending Rehav PWC Global CEO Survey 2016.

The challenge for leaders and decision-makers then, is to improve their ability to consistently make better decisions. Here are some ways they can do it:

- Surround themselves with top-notch advisors and analysts
- Invest in better business and market intelligence tools
- Improve the quality of their data





- Improve the quality and velocity of their data analysis
- Invest in top-notch innovative talent that is aware of the market's ebbs and flows
- Adopt and implement successful methodologies and processes

Put these options together and you get an ecosystem that can help decision-makers improve the likelihood of positive outcomes.

Insight #6: Having access to better data and information provides decision-makers with a significant strategic advantage.

We live and work in the information age, which means data is power. Decision-makers need accurate data to know where to go next or how to respond to threats and crises. Given the preponderance of data available to decision-makers now, as well as significant advances in data visualization, data analysis, and predictive modeling tools, there is nothing standing in the way of creating data-driven leadership ecosystems.



Executives who embrace the value of data, understand the role data plays in making informed business decisions, and invest in data-driven ecosystems have a better chance of delivering consistently positive business outcomes than executives who rely mostly on gut feelings, instinct, and experience. There is no organization anywhere on Earth that benefits from knowing less about its market and the world around it. In business, ignorance is *not* bliss.

Insight #7: Shifting from a decision-making model based on instinct to a decision-making model driven by data is no longer hindered by cost or technical limitations.

One of the most significant barriers of technology adoption for senior executives has traditionally been the perception that technology is complicated. To a certain extent, this is true, but thanks to an increase in the consumerization of IT, this is no longer the case – or at least not nearly as much as it once was. Data analysis, data visualization, and predictive modeling tools are now much more accessible and user-friendly than they were even a year ago, and don't require deep or complex technical knowledge to use. This is especially true of solutions designed specifically for executives and senior leadership roles.

Moreover, most of these tools now live in the cloud and are offered as a SaaS model, effectively lowering, if not eliminating, traditional financial barriers of entry. It doesn't matter if you are a Fortune 500 enterprise or an SMB with a narrow local footprint: data-driven decision-making tools are available for every type of organization, every line of business (LoB), every market and vertical, and every budget.

The two biggest obstacles when it comes to adopting a data-driven decision-making model today are *mindset* and *culture*. As both tend to be rooted in the upper tiers of organizations that struggle with this technological shift, it falls on leaders and decision-makers to overcome their own discomfort and preconceptions about technology to both adopt and build effective, competitive, and successful decision-making ecosystems for their organizations.

Insight #8: Overcoming resistance to change is a key function of leadership

For better or for worse, responsibility is a staple of leadership. One bad bet or poor decision can cost people their jobs, make investors lose millions of dollars, or set a company's mission back years. This is why change is hard. After all, change is always as a risk as much as it is an opportunity. While opportunity gets leaders out of bed in the morning, it's risk that keeps them up at night.

Transitioning from gut feelings and instinct to sou-

The first step to addressing the issues of mindset and culture is to acknowledge that they exist.

The second step is to get to the root of the objections that drive any resistance to change. Identify the objections, address the objections, find adequate solutions to those objections, and finally agree on a plan to enact these solutions.

The third and final step is to remove any and all obstacles to the organization's journey of adaptation and improvement. This may require investments in the following areas: education and skill development, product training, new processes and staff roles, technology, and a transformation road map that focuses specifically on this adaptive phase.

lless data and software is no different. It isn't just change; it is also an abdication of power. Leaders who believe in their own ability to make good decisions are suddenly asked to trust in machine and processes, which means they need to surrender some of their own power. That isn't easy. It takes a good deal of courage, work, and testing to get to a point where decision-makers can truly trust new technologies and tools. This aspect of digital transformation and technological adaptation shouldn't

be minimized. It is the source of major resistance from executives, and it is a valid objection to the risk that "gut-feeling" leaders take when they shift to decision-making driven by data and technology.

Another source of resistance among executives manifests itself as denial. It's the "everything is fine" objection to change. A 2015 study by the Global Center for Digital Business Transformation^[1] found that 45 percent of business leaders didn't feel that digital disruption is a board-level concern. Forty-three percent felt that their company's leadership either didn't recognize digital disruption as a concern or wasn't reacting to it appropriately, while 32 percent felt that their company was taking a follower approach. Only 25 percent reported that their company was actively responding by disrupting their own business.

Whenever resistance to change gets in the way of this process, always go back to your data. Are the company's outcomes currently in a vicious cycle or a righteous cycle? If it's a righteous cycle, are business outcomes improving or are they flat? How much room is there for improvement? What is the opportunity cost of not working toward better business outcomes?

Don't hesitate to validate your purpose for driving positive transformation in your organization as often as needed. The use of data to drive decision-making is an effective proof of concept in and of itself.

^[1] Bradley, J., Loucks, J., Macaulay, J., Noronha, A., & Wade, M. (2015, June). Digital Vortex: How Digital Disruption is Redefining Industries (Rep.).

The Future of Work: Data-Driven Leadership

PART 2: AT THE INTERSECTION OF LEADERSHIP AND TECHNOLOGY

What technologies should be part of a data-driven decision-making ecosystem?

The technology ecosystem of data-driven leadership generally leverages the following technology categories:

- Internet of Things (IoT
- The cloud
- Mobile

Big Data

- Learning machines
- Artificial intelligence (AI)

To facilitate the adoption of data-driven decision-making technologies, CEOs, corporate boards, and senior executives must partner with CIOs and CTOs to create and execute on a technology transformation roadmap specifically catered to the needs of decision-makers.

Part of this task involves identifying technology solutions designed to improve senior decision-makers' access to pertinent data, as well as tools that can help them transform this data into actionable insights. Ultimately, a key aspect of that responsibility focuses on simplifying data and insight delivery for decision-makers; in other words, it isn't a CEO's responsibility to worry about how data sets, technology, and APIs work together. What decision-makers need are accurate information, timely intelligence, and actionable insights. When addressing the issue of connecting decision-makers to data and insights, the focus should then be on making that connection as simple, clear, and purposeful as possible. Executive dashboard software like Klipfolio, Domo, Sisense, Qlik, and Tableau are a good place to start, as they organize and deliver data in a way that decision-makers can understand. Everything they need to know is prefiltered and cleanly organized on one (or several) screens. Enterprise-level solutions providers like SAP, IBM, Salesforce, Dassault Systemes, Microsoft, HP Enterprise, and Oracle also provide robust BI dashboards for executives who prefer a more unified business software ecosystem.

On the back end, the effectiveness of such a dashboard relies on its ability to integrate with multiple sources of data, from Google Analytics, social media channels, and sales systems to CRM, IoT, and whatever other sources happen to be available.

On the front end, an executive dashboard's effectiveness is gauged by its ability to deliver data in a clear and coherent manner to a decision-maker facing a deadline. To a secondary extent, it is gauged by its ability to allow said decision-maker to dig deeper into a business-specific topic.

Executive dashboards are often highly customizable, allowing decision-makers to select the types of data they want and what types of visualizations are best to qualify and quantify it onscreen. Their user-friendly design falls in line with the consumerization of IT that we mentioned earlier in this report, and its purpose is to facilitate technology adoption by all. In this instance, its purpose is to eliminate technical barriers between decision-makers and complex data sets, especially for those who may not yet be as comfortable with technology as some of their younger executives. Regardless of where they may currently fall on the digital fluency spectrum, today's business leaders understand the need to modernize and adopt digital tools to improve business outcomes.

Moving beyond executive dashboards, cognitive computing and natural language AI interfaces like IBM's Watson and Google's Deep Mind will soon be able to help executives create predictive mo-

Moving beyond executive dashboards, cognitive computing and natural language AI interfaces like IBM's Watson and Google's Deep Mind will soon be able to help executives create predictive models.

dels. These models will feature likely outcomes and possible scenarios to be explored virtually, and the direct and indirect impacts of hypothetical decisions will be identified and quantified. In essence, decision-makers will soon have access to deep learning computers equipped with natural language interfaces that will essentially function as advisors.

This capability is giving rise to an ecosystem of intelligent recommendation systems that leverage Big Data, machine learning, and predictive analytics to not only help decision-makers analyze and understand data and model outcomes, but to anticipate logical decisions and quantify their probabilities of success in order to recommend the best possible courses of action.

Five years from now, advanced digital decision-making tools will give their users a significant edge over decision-makers who still use outdated analysis and practices.

CIOs and CTOs acting as technology enablers for senior leadership

In addition to their other responsibilities, CIOs and CTOs should provide senior executives and decision-makers with adequate training and resources to ensure their fluency regarding these technologies to further leverage the insights they can provide. This means that CIOs and CTOs should be responsible not only for the direction and implementation of digital transformation strategies and milestones across the organization, but also for that of their fellow executives by way of training and skill building. This includes the CEO and corporate boards.

It must be a priority to ensure technological fluency at the senior executive level for every digital transformation initiative. It cannot be done as an afterthought or a secondary objective, and it cannot be brushed aside by decision-makers who

would prefer to delegate technological fluency to subordinates and surrogates. Decision-makers, whether they are CEOs or board members, cannot afford to be the least informed and the least technologically capable members of their organization. Failure to connect executives with the very data-driven technology ecosystem that was built for to improve outcomes can only result in chronic failures of leadership.

Moreover, a data-driven culture cannot be effec-

Layering data-based leadership

It is important to note that data-driven decision models operate in layers. At every level of an organization where someone has a decision to make about a course of action, timely access to relevant and accurate data can make all the difference. Sales and business development representatives need access to data that is relevant to their tasks and objectives. Customer service representatives need access to data that is relevant to the cases tively built and fostered in an organization if that organization's leadership does not fully embrace it. Beyond the practical aspects of ensuring that decision-makers take full advantage of these technologies, no organization can be fully engaged in digital transformation and data-driven decision-making if the CEO isn't their chief evangelist within the organization. Leaders set priorities and lead by example. What is personally important to them always trickles down across their organization. What is not does not, and there is no getting around that.

they are working on. Product development teams, marketing teams, content developers, web and mobile UX developers, business analysts, accounts receivable coordinators, facility managers, recruiters and HR managers—everyone needs access to pertinent data to leverage in real time.

The bird's-eye view is that data-powered software solutions should be deployed across the organiza-

tion. Every function at every level requires a dashboard and some manner of software that caters to each employee's function. For instance, product managers need data to gauge the effectiveness of their product's market performance, as well as identify obstacles, anticipate possible problems, and look for new or otherwise tangential opportunities for improvement. This includes a host of data including sales figures, order history, inventory breakdowns, supply chain data, returns, customer feedback, and demographic breakdowns of likely versus actual users.

Thanks to the proliferation of IoT and sensors, new categories of data points can now be monitored and leveraged by product managers. Product usage is one example: Where and how is the product being used? How long is it being used? How often is it being used? Is the product functioning properly or prone to crashes or errors? All this information can be compiled into on-demand reports and management dashboards.

With sales data, product teams can make real-time adjustments to product price points. They can accelerate or slow down production. Based on where orders are coming from, product teams can prioritize shipments and optimize their logistics. Based on how many complaints or customer support calls the company is getting about the product, they can assign adequate customer support resources to address customer needs. They can decide to create content and update their FAQs to help educate users and improve their ability to troubleshoot on their own. With feedback from users and retailers, they can also identify areas of improvement for the next iteration of the product, from performance and design features to packaging and pricing.

Everything that can be measured can be quantified, and everything that can quantified can be improved. Pricing, packaging, sales, features, UX, delivery, customer support—every detail that ultimately contributes to the success of a product's performance can be measured and applied to making decisions that will drive improvements and consistent positive outcomes.

None of this would be possible without access to pertinent data. Product management teams would be flying blind, or at least they would still rely on customer surveys, anecdotal information, and pure instinct to make critical decisions and timely course corrections. This is the power of data-driven design, and it scales to every corner and layer of the organization, from the receptionist greeting prospective clients in the lobby to the CEO and Board of Directors contemplating their company's next series of bold strategic moves.

Data-driven leadership is enhanced leadership

The idea behind data-driven leadership, then, is to use advanced data analysis tools, predictive modeling software, and recommendation systems to enhance decision-makers' situational awareness, as well as magnify their knowledge and help close the probability gap between guessing and knowing.

For the sake of clarity, we have broken this down into

simple quadrants that should help visualize how to build a 360° data-driven decision-making ecosystem. It addresses four critical functions of the ecosystem: awareness, adaptability, agility, and measurement. Because we are dealing with technologies that significantly enhance these four functions, we will address the quadrants as hyper-awareness, hyper-adaptability, hyper-agility, and hyper-measurement.

360 Degree Data-Driven Decision-Making Hyper-Awareness Observe Collect Organize Discover Learn Hyper-Hyper-Measurement Adaptability Measure Analyze Quantify Understand Validate Visualize Plan 00 Model Test Hyper-Agility Innovate Build Execute Accelerate Scale

Hyper-awareness focuses on the ability to identify and anticipate shifts, trends, opportunities, threats, problems, potential partners, and every other kind of factor that could, in some way, affect the outcome of a decision. Hyper-awareness combines observation and situational awareness regarding everything from sales and production to employee morale and retail foot traffic with market data, social data, industry news, analyst predictions, investor feedback, and so on. Think of it as a control room for all the data in the world that could in some way be relevant to the organization. This

also includes data and news that may not be on the decision-maker's radar but should be.

This aspect of the quadrant is about discovery, data collection, and sorting; it is Big Data applied to a 360° view of the organization's internal and external universe. Management dashboards tend to address this function, although the breadth of information they provide should be significantly broadened. The injection of AI should help cast a wider net and identify bits of information and business intelligence that have traditionally remained beyond the scope of traditional dashboards or were deemed too small or remote to matter. In the information age, no bit of data is too small or remote to matter. Every customer complaint can be noted and addressed, as can every consumer recommendation regarding product design, delivery speed, website UX, and price.

Hyper-adaptability focuses on the ability to analyze and understand that data, then make appropriate course adjustments where applicable. Hyper-adaptability relies on machine learning and low-level algorithms to identify patterns, trends, and hidden

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connections in large sets of data. This process of analysis and pattern recognition organizes its findings and alerts decision-makers about potential opportunities, problems, market shifts, and changing economic conditions. It provides a layer of insight that functions both as a catalyst for response and a vehicle for short- and long-term adaptation to shifting market needs. As cognitive computing and Al bring more functionality to this analysis and insights layer, we see the function shifting from mere delivery to actual recommendation. Increasingly, this part of the data-driven decision-making technology quadrant shifts from simply telling decision-makers about the data to advising them what to do with it.

Hyper-agility refers to the ability to accelerate innovation, deploy new technology solutions, explore new business models, test ideas and scenarios virtually, and inject consistent success with both velocity and scale. This is the part of the quadrant where knowledge and analysis are turned into action. It is the rubber-meets-the-road aspect of data-driven leadership. Up to this point, technology's role has been to inform and recommend. Now technology's role is to help organizations execute and bring about the desired outcomes we have been discussing until now. This includes, but certainly isn't limited to advanced project management tools, intuitive productivity tools, gamification, self-correcting pricing algorithms, smart manufacturing (Industrial IoT-IIoT), chatbots, augmented reality, design virtualization, 3D printing, mobile solutions, remote working solutions, smart automation, and Al.

Beyond technology, whose purpose is to facilitate and accelerate a company's ability to move with speed and precision towards its intended goals, hyper-agility also requires a culture and operational framework designed to eliminate obstacles to agi-

lity. As data-driven decision-making and leadership scales across the organization, doers tend to be better equipped to self-manage and complete tasks on time. When human failures occur, hyper-agile organizations have mechanisms in place to self-correct. For instance, automation features in advanced project management tools are designed to prompt team members who may be deemed at risk of falling behind schedule to prioritize task and assign additional resources to complete that individual's secondary tasks. Expectations and training tend to change as data-driven organizations become increasingly agile. Agility can be taught, just like any other skill. But agile companies don't just equip workers with tools to improve their agility and efficiency; they also equip them with training, operational guidelines, and a culture that both fosters and rewards fluency in problem solving.

Note that without data-driven leaders guiding their organization through a digital transformation process, no company can or will achieve this degree of operational efficiency; without it, the stated objective of consistently improving outcomes will not be achieved.

Hyper-measurement refers to the ability to measure and quantify performance at scale. The outcome of every activity must be measured and quantified for decision-makers to gauge their effectiveness. The reactions and ripple-effects of every decision also should be measured to gauge their impact across a wide variety of data sets. Mapping these fields of cause and effect help decision-makers and the learning machines they work with to understand, visualize, and interpret the effectiveness of their decisions.

This function helps decision-makers not only analyze and understand what works and why (or what doesn't work and why), but also fine-tune their decision-making, make timely course corrections, and work toward consistently improving outcomes over time. This kind of decision-making leadership cannot exist outside of a data-driven measurement culture; the two are indivisible.

What are examples of key outcomes that result from data-driven leadership?

At the executive level, key potential outcomes of data-driven leadership include:

- Accelerating innovation
 Show the second second
- Identifying and contextualizing potential threats
- Improving overall organizational adaptability and agility
- Reducing risk
- Anticipating and reacting to market disruption
- Improving digital and technical adaptation

- Shifting from reactive to proactive models of adaptation and industry disruption
- Identifying technical inflection points internally and in the market
- Validating potential partnerships and acquisitions
- Modelling and testing strategic plans virtually
- Identifying problem areas within the organization
- Course-correcting in real time

At the LoB level, key objectives of data-driven leadership include:

- Accelerating and improving product design
- Improving the effectiveness of marketing spend
- Improving customer experiences across all channels
- Improving customer relationships, particularly in regards to retention, loyalty, and buy rate
- Using predictive modeling to optimize outcomes
- Improving the accuracy of campaign and employee performance metrics
- Improving employee retention

- Consistently identifying and recruiting top industry talent
- Accelerating customer service ticket resolutions
- Improving cost efficiency
- Improving production and logistics
 efficiency
- Improving workplace safety
- Improving productivity and facilitating collaboration across the organization
- Accelerating internal training and skill building
- Boosting employee morale

PART 3: ENABLING CULTURE CHANGE AND TECHNOLOGY ADOPTION IN THE C-SUITE

Moving technology into the C-suite

One of the greatest challenges of digital transformation lies in moving technology into the C-suite. Without the right vision and the right mindset to open the door to new technologies and new thinking, helping leaders become technologically fluent can often feel like a putting a square peg in a round hole. We cannot stress enough, however, that no digital transformation initiative will succeed unless every decision-maker, from the most junior team leader to the most senior executive, fully embraces digital technology and the new best practices that come with it. If technology has now become an integral component of effective decision-makingand it has-then technology must also be integral to every leadership ecosystem. Half-in, half-out mindsets won't work anymore, and neither will lukewarm technology adoption approaches.

Most importantly, no senior executive can afford to merely delegate technology adoption or data-driven decision-making to subordinates or surrogates. Technology-averse leaders must either embrace this change or hand over the wheel to a new generation of leaders who will.

In most instances in which C-level executives transi-

No senior executive can afford to merely delegate technology adoption or data-driven decision-making to subordinates or surrogates.

tion to data-driven decision-making models, it may help to focus on solving clear tactical problems common to decision-making than to make it about "change." Aides or technology-friendly advisors can help introduce technology-averse decision-makers to some of these technology solutions and help acclimate them to their usage one function at a time. Whether this process requires a few dozen training

sessions or months of training and support doesn't matter if the result is technological fluency.

Using decision-making tools to test (and kill) assumptions is a good place to start this process; testing prejudices and confirmation bias is another. It's okay to start small, build confidence out of competence and ease, and then build on those successes until the decision-makers become comfortable and fluent with key uses of these tools. Specificity and repetition help narrow their focus on specific skills, which in turn accelerates practical knowledge and fluency.

For instance, a recent study conducted by IBM reveals that 80 percent of senior executives still favor brainstorming to identify new trends over every other kind of fact-finding methodology. Sixty-three percent also use predictive analytics, while 51 percent employ simulations, 46 percent rely on prescriptive analytics, and only 13 percent leverage

80 percent of senior executives still favor brainstorming to identify new trends over every other kind of factfinding methodology.

cognitive computing to make better decisions.^[2] While the broad adoption of predictive and prescriptive analytics solutions points to a welcome shift towards driving better decision-making through technology, the fact that brainstorming still dominates fact finding indicates that senior executives are still ultimately basing much of their data analysis and decision-making on gut feelings and instincts rather than on advanced analytics tools. This must change.

It is also important to create a system of performance measurements that will allow organizations, either through advisory boards or other specially-appointed bodies, to ensure that their decision-makers make use of these tools and are held accountable for the degree to which their use of

Only 13 percent of senior executives leverage cognitive computing to make better decisions.

said tools ultimately yields the desired results. In an ideal world, data-driven decisions should yield positive incremental outcome trends that can be tied to specific business objectives and targets.

This type of accountability program can be tricky, as senior executives must be willing to submit themselves to potentially risky levels of scrutiny; however, in a data-driven world, performance measurement and accountability are not optional. Results-driven leaders generally welcome the opportunity to leverage analytics to improve their performance. Ego-driven leaders, however, may be resistant to the idea. Again, the success of an organization's digital transformation, and ultimately its very ability to adapt to the new realities of data-driven markets, depends on its leadership's willingness to embrace new technologies and data-driven decision-making models, which cannot be divorced from data analysis, performance measurement, and accountability. Leaders who resist or reject this operational requirement will fail, and their organizations will likely fail right along with them.

It is also important to understand that adapting to technologies is a game of moving targets. As technology improves and the capabilities of decision-making tools expand, organizations and their leaders must be aware and agile enough to shift their focus accordingly. Today's most promising

^[2] Redefining Boundaries: Insights from the Global C-Suite Study (Rep.). (2015).

new analytics tool might be obsolete a year from now, so it is incumbent on Digital Transformation agents to update their programs accordingly. This means that executive-level technology adoption and acclimation programs must also be agile. Luckily, the progression of digital decision-making

tools appears to be following a predictable pattern, so it is relatively easy to monitor advancements and plan for incremental upgrades. These tools essentially follow progress made in the AI and machine learning space and can be divided into three distinct categories. In order of sophistication, they are: analysis, prediction, and recommendation.

When it comes to moving decision-making tools into the C-suite, it is vital to create an adoption plan that encompasses all three categories.

Note that cognitive computing—i.e., advanced computing that mimics human thought processes and natural language—is finding its way more and more into all three categories. The impact of cognitive computing on decision-making tools in years to come should translate into more natural interfaces for decision-makers, a vastly more complex problem-solving and prescriptive functionality than what exists today, and a far better probability of achieving optimal outcomes.

Timeframe

Although digital transformation is a long-term journey that may continue well into the coming decades, the pace of change has significantly increased in the last two years. Most senior decision-makers we have spoken with admit that keeping up with the ripple effects of digital transformation is one of the greatest challenges they will face in the coming three to five years.

Note: This three-to-five-year timeframe comes up a lot, partly because of our propensity to measure time in easy-to-frame five-year increments, as well as because 2020 is roughly 3 years away. So, three to five years it is.

Based on a recent Dell Enterprise study of some 4,000 business executives around the globe, a whopping 45 percent believe that their business may become obsolete in the next three to five years. Forty-eight percent aren't sure what their industry will even look like in just three years. This dramatic trend towards uncertainty is mostly due to 52 percent of them having already experienced significant disruption in their industries in the last three years due to new technologies and the businesses that were quickest to adopt them. Sixty-two percent report having witnessed the entry of new competitors because of new technologies. One of the most significant findings of the study is that 78 percent of them see digital startups as a threat to their business, either now or in the future.^[3]

What sets these startups apart from incumbent brands? Two traits: The first is the ability to adopt and deploy new technologies faster than companies with established technology frameworks and tried-and-true operational models. The second is the agility to innovate at a faster pace.

One critical aspect of this new-versus-old equation is that any established company, no matter how old or large, can become as agile and technologically savvy as the most aggressive digital startup. The incumbent's advantages range from having an established customer base and a mature market to a breadth of insights and experience with an industry that startups typically lack. The only two missing pieces are a startup mindset and a startup's operational agility. The mindset piece requires a results-driven leadership that will foster a technology friendly and innovative culture. The operational agility piece will require the introduction of new technologies, processes, and skills, which are the core principles of an effective digital transformation.

If we assume a willingness to adapt and make the necessary changes, we see time as a critical factor

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in every adaptive organization's ability to successfully navigate the massive challenges ahead. Specifically, the ability of organizations to either catch up or maintain an adequate pace of change will be critical to their survival in the next three to five years.

If we focus on the data provided by the Dell Enterprise study, we note that despite the obvious wave of disruption threatening to potentially force millions of businesses into obsolescence in the next decade, 47 percent of businesses are still either so slow and/or reluctant to adapt that they qualify as either digital laggards or slow adopters. Let us call them the most at risk group.

You will easily note how similar this number is to the data from the 2015 Global Center for Digital Business Transformation's study^[4] we mentioned earlier in this report. That data pointed to 45 percent of business leaders who feel that digital disruption is not a board-level concern, and 43 percent of employees who feel that their company's

[3] Embracing a Digital Future: Transforming to Leap Ahead (Rep.). (2016).

^[4] Bradley, J., Loucks, J., Macaulay, J., Noronha, A., & Wade, M. (2015, June). Digital Vortex: How Digital Disruption is Redefining Industries (Rep.).

leadership either didn't recognize digital disruption as a concern or wasn't reacting to it appropriately. The connection between the percentage of business leaders who appear unconcerned with digital disruption and the percentage of business most at risk of being disrupted into obsolescence by said digital disruption is almost one to one. Companies that fall into this category are extremely likely to fail if they do not drastically adjust course in the next six to 12 months.

On the other end of the spectrum, the Global Center for Digital Business Transformation's study reports that nearly 25 percent of companies they surveyed are taking a highly adaptive and proactive self-disruption approach to the challenges ahead. The Dell Enterprise study, for its part, identifies 19 percent of business leaders as being either digital leaders or mature digital adopters. Based on these two studies, we can safely assume that 19 to 25 percent of organizations are currently on pace to not only survive but thrive because of digital disruption, thanks in great part to their leadership's focus on digital transformation. Let us call this the most operationally agile group.

The third category of businesses is the soft middle, where technology adoption and digital transformation are occurring, but at a slow rate. The Dell Enterprise study calls them Digital Evaluators. The Global Center for Digital Business Transformation Studies simply refers to them as "taking a follower approach." Their numbers come up to 34 percent and 32 percent, respectively. We refer to them as the generally at risk group, and here is why: This group is on the right track, but its pace is too slow. At its present speed of transformation, it will not catch up to the highly adaptive category, and it may spend the next decade struggling to do so. It is critical for organizations that have been slow to change and adapt to pick up the pace, but this will only happen if their leaders drive them to accelerate their digital transformation journey.

The good news is that we anticipate that roughly one-third of businesses in the generally at risk group will accelerate their pace in the next 24 to 36 months and will transform into innovative, highly operational agile businesses by 2020. The bad news is that this leaves the other two-thirds in limbo as we approach the twilight of the current three-to-five-year transitional window. Leadership is the most critical difference between the segment that will catch up to the most operationally agile group and the bottom two-thirds that will slide back and fall in with the most at risk group.

IN CONCLUSION

Our discussion brings us full circle to several of our original insights:

- The primary purpose of good leadership is to make and drive good decisions.
- The primary purpose of good decisions is to drive positive outcomes.
- Access to better data and information provides decision-makers with a significant strategic advantage.
- Shifting from a decision-making model driven by instinct to one driven by data is no longer hindered by cost or technical limitations.
- Overcoming resistance to change (including personal resistance) is a key function of leadership.

One of the biggest challenges facing organizations, specifically decision-makers tasked with ensuring the success and longevity of these organizations, can be boiled down to abandoning old habits in favor of better ones. While brainstorming, instincts, and gut feelings should remain as solid elements decision-making, those who are making the decisions must now shift to cognitive computing, prescriptive analytics, simulations, and predictive analytics as their leading resources.

While IBM puts the global market on better decision-making at \$2 trillion, we consider its impact on business to be exponentially larger. There is a butterfly effect of costs and opportunities here that stretches far beyond the market opportunity for data-driven decision-making technology. The impact of technology on making better decisions has already been demonstrated by some of the most successful companies in human history, from Alphabet/ Google, Amazon, and Facebook to Microsoft, GE, and Apple. This impact is measured by the ripples of disruption in various industries caused by the digital technologies and businesses that were first able to leverage them well. Every enterprise-level business intelligence and technology solutions provider, from IBM and HPE to SAP and Cisco, is moving to both drive and expand this shift towards creating better outcomes for decision-makers. Those organizations that refuse to move in the same direction simply cannot hope to compete in the new economy that will be created in the next three to five years.

Also worth a mention is an acceleration in the cross-pollination of technologies and markets that promise to scale not only access to cognitive computing, but also its democratization across the enterprise. One notable example of this new phase in the overall consumerization of IT is IBM's recent announcement that its cognitive computing solution Watson will soon be integrated into its enterprise iOS mobile applications. This promising partnership between Apple and IBM will likely not only help to redefine the enterprise mobility market, but also to eliminate most barriers, real or perceived, that prevent executives from integrating cognitive computing into their decision-making. As this new ecosystem of Big Data, cloud, cognitive computing and decision-making tools continues to make its way into every business layer, we expect to see a lot more of this type of connective tissue to form and grow between technology giants in the coming vears.

The choice that now faces business leaders is binary. They must either adopt new technologies and decision-making models to thrive in the turbulent new reality of global technology disruption, or they can continue with the same decision-making practices and hope for the best. Given the preponderance of data and modeling that points toward a much higher probability of success with the first of these options, the choice should not be difficult.

RESOURCES

Business Intelligence and Executive Dashboards:

Alphabet / Google:

https://www.google.com/analytics/ http://research.google.com/pubs/MachineIntelligence.html

Dassault Systemes:

http://www.3ds.com/products-services/netvibes/ http://www.3ds.com/products-services/exalead/

Domo: https://www.domo.com/

HPE:

http://www8.hp.com/us/en/software-solutions/it-operations-business-value-dashboard/

IBM:

http://www.ibm.com/analytics/us/en/technology/products/ cognos-analytics/ https://www.ibm.com/marketplace/cloud/watson-analytics/ Klipfolio: https://www.klipfolio.com/_

Microsoft: https://powerbi.microsoft.com/____

Oracle:

https://www.oracle.com/solutions/business-analytics/business-intelligence/index.html

Qlik:

http://www.qlik.com/____

Salesforce:

https://www.salesforce.com/products/analytics-cloud/overview/

SAP:

http://www.sap.com/solution/platform-technology/analytics/ business-intelligence-bi.html

Sisense:

https://www.sisense.com/

Tableau: <u>http://www.tableau.com/</u>

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