AI: Ready for Business

It will take transparency, trust and personalization for businesses to see the full potential of artificial intelligence.
Executive Summary

Artificial intelligence (AI) is everywhere and nowhere at the same time. On the one hand, AI has jumped from esoteric laboratory to full embrace, with a speed and ferocity that has caught even its supporters by surprise. On the other hand, for many, AI’s behind-the-scenes and often ephemeral nature disguises its dramatic and long-term potential contribution to business. Whether fully embraced or lurking behind the scenes, the numbers are clear – AI is big, important and transformative. Companies ignore AI at their peril.

But accepting AI is not enough. AI is on the verge of a structural failure if it continues on its current path. Consumers may become confused by its behavior, which could harm the trusted personal and corporate relationships that drive and serve business. Employees may question whether AI is helping them or harming them, perhaps even replacing them. Hackers and other bad actors could “weaponize” AI to attack individual or corporate targets. Governments may first question, then regulate, the role of AI in making decisions that have economic impact.

Without transparency, trust and personalization, AI as we know it could fail. AI’s advantages, therefore, will only be won by organizations that look deeply into the souls of stakeholders across the value chain and embrace a human-centric, ethically-informed approach that minimizes unintended bias and seeks to augment the creative, emotional and constructive capabilities of human beings with the speed, accuracy and scale of machine intelligence. It’s human and machine at their best.

For early adopters who recognize that AI has left the lab and is establishing a palpable presence across front, middle and back offices, the rewards will be plentiful. They’ll be the ones to lock in partners, attract AI talent and set the public expectation for how new experiences will play out.

Let’s take a deeper look at AI’s three essential pillars: transparency, trust and personalization. A good analogy is to imagine the connection between buyer and agent when house-hunting.
Transparency means the buyer’s prequalified loan credentials are available for viewing. Although we may think of this as “trust” (qualifying for a loan and ready to buy), it’s really about transparency and data.

Trust, in contrast, is more subtle. It means the buyer has confidence in the real estate agent and vice versa to act in good faith and understand his or her underlying needs.

Personalization means the agent seeks to match buyer and opportunity in a way that respects the time and energy of all parties. Little matters without personalization, which entails finding the right connection at the right time (the right home, in this case). And building highly curated and relevant experiences is AI’s ultimate goal for creating intelligent and frictionless business processes.

What is hindering the achievement of personalization? It’s no secret that personalization requires collecting and analyzing massive amounts of data, much of it in the form of clickstreams, preferences, visual context and detailed product usage histories. Interpreting and understanding it can overwhelm any company, no matter how many talented business analysts are on board. As more and more data is generated throughout the vast digital economy, our ability to extract meaning from it lingers just out of reach, exacerbated, in part, by the ever-expanding shortage of technical and human resources.

What many organizations overlook is that AI’s core value proposition is the answer to the too-much-data-to-ignore conundrum. For AI, in fact, the more data, the better, as the technology can be trained for thoughtful interpretations that guide everything from next-best offers, to decisions, to detection of security breaches.

How can organizations put AI to work in a way that reaps business benefits on a hyper-personalized level while establishing if not reinforcing transparency and trust with key stakeholders? For our clients, this approach leads to quantifiable, formative contributions to business.

First, view AI through a human-centric lens. All business decisions are, ultimately, bets on human behavior. Start with an understanding of what people want and the methods they’ll use to achieve the desired outcome. AI should augment rather than replace human insights and experiences.
Then, focus on bringing business value at scale and speed. It’s easy – and tempting – to conduct a few small AI test cases or point solutions and declare success. But quickly scaling and deploying AI requires a strategic view that advances machine intelligence throughout the organization. It also requires sensitivity to the changes that AI introduces to everyone – consumers, employees and management. AI at scale and speed means code is built from insight into what’s really needed at a human level. Within the retail and consumer goods space, for example, changes in coupon value can be nearly instantaneous, or next-best actions can be calculated and displayed in milliseconds.

Finally, make sure AI is deployed with strict governance and ethical oversight regarding its intent and actions, while ensuring AI’s continuing operations are transparent and deserving of stakeholders’ continued trust.

Big data and analytics are traditional sources of insight for most organizations, yet they’re limited to telling us where problems reside, not why they occur. For AI to succeed, the “whys” need to be understood. The answers begin with human sciences, a function that’s new to many corporate employee rosters, as well as introspection into the business mission and objectives. Sociologists, anthropologists and ethnographers provide an essential anchor for a business’s initial conversations on AI-related business needs. They help to ground the organization in the questions that must be answered, and they provide insights into behaviors that occur between the organization and its stakeholders.

Indeed, to advance the needs of the individuals who will benefit from AI, every system must be understood and designed in terms of human needs, whether it’s a consumer-facing app, an employee-facing administrative website, or compliance and regulation monitoring. Even pure machine-to-machine interactions require an understanding of the human benefits in order to prioritize features such as cost, reliability and speed.

AI may be the greatest story of our time, but the business benefits and the actions to take remain somewhat cloudy. This white paper offers a clear path forward. In it, we address how organizations can make the most of AI’s behind-the-scenes nature to solve real-world business challenges, such as improving customer experience, optimizing operations and boosting growth.
Starting the AI journey: One step leads to many paths

Within most organizations, there’s typically a single business issue or goal that kicks off the initial AI journey. It might be a call center need that eventually leads to an uplift in quality, or a repeatable process that could benefit from robotic process automation, such as claims administration or loan approval recommendations.

From that first step, the art of the possible begins to take shape, and the AI initiative morphs into a complex, comprehensive rethink of the company, from front to back. Its development rarely follows a straight line.

We believe the smartest strategy is to look beyond traditional technology process paradigms, and to instead view AI as a new way of thinking and acting that can fundamentally reshape the business’s ability to personalize customer offerings, services and experiences. (For more on the AI journey, see our white paper “The Road to AI.”)

The three pillars for AI success: transparency, trust, personalization

The digital world can seem fragile at times. We’re never really sure why the reception bars on our smartphones vary wildly within the space of a single, stationary call. Apps we rely on regularly crash for no apparent reason – and then boot up again. Alexa inadvertently records our conversation and sends a transcript of it to someone in our contact list. We accept these mysteries because we value the convenience.

It’s into this already delicate balance that AI enters.

We know even less about how AI applications and systems do their jobs than we do about the workings of our digital lives. How exactly does an algorithm, or set of instructions, work? Why did the system prioritize one algorithm over another, or one outcome over another? Confusion still exists over the basic definition of AI.

With this lack of understanding as backdrop, it’s no wonder that trust in AI systems is such a hot topic. Systems of intelligence, or machines that make decisions beyond our understanding, can – and do – unnerve us far more than digital’s everyday mysteries.

It’s a fault that throws our understanding of machines off balance. More important, it increases the risk that AI will move toward the verge of a structural failure: If we don’t trust AI systems to do their jobs, they will fall far short of their promise – and the benefits companies are looking to achieve.

Transparency, trust and personalization provide the counterbalance AI needs.
Transparency: understanding the whys behind AI’s decisions

“Why” a decision is made is often more important to us than the decisions themselves. For many of us, knowing the backstory provides the emotional and intellectual foundation we need to make sense of our world. AI systems, however, are black boxes. They’re sometimes composed of deep neural networks that obscure the reasons behind their decisions and actions. Most times, we don’t learn the backstory behind AI’s decisions, and that opaqueness is a looming problem that threatens to undercut AI’s value.

Take the banking industry, for example. To protect consumers against systemic bias, banks maintain strict requirements regarding decision-making transparency. Yet AI has a history of bias against minorities, in cases where AI was trained with historical data that illustrates the same bias. 6

AI’s lack of transparency isn’t relegated to regulatory and compliance requirements. It runs through all of our encounters with the technology, whether as consumers or employees or mere Internet users. Wouldn’t it be cool to be able to ask Amazon why it’s suggesting, say, the pair of running shoes that its recommendation engine just offered? What if we could inquire to Siri about Wi-Fi lags? Suppose we could query a system about food safety?

That kind of bidirectional communication is what will make AI systems become our companions. Beyond auditability, this capability will let us probe into what AI systems are and what they know about us.

Trust: qualitative, not quantitative

While transparency helps us process the decisions we encounter, trusted relationships become the cornerstone for our lives. We carefully build our lives around trusted resources, including our family, friends and advisors, as well as the companies we pay to meet our needs in food, insurance, banking and leisure. We rely on them.

Our intelligence lets us see the connections between our environment and our aspirations, and to build a path forward. It lets us assemble the community of trusted resources.

What does trust mean in an era when the voice on the other end might be synthetic? For us to trust AI, it too has to fit within that universe of reliability. It needs to feel more natural, more human. It needs to be part of consumers’ and employees’ wider net of experience. Perhaps most important, trust is earned, not conveyed.

Like any entity, AI needs to earn our trust.

As businesses think through how to integrate AI into their organizations, the question isn’t whether machines can deliver next-best offers but whether they can fit into the complexity of the moment. Trust is often derived through context and connection rather than through confidence in the suggestion itself. Can we trust the algorithm to be accurate and to fit into the nuances of our lives and decisions?
Wouldn’t it be cool to be able to ask Amazon why it’s suggesting, say, the pair of running shoes that its recommendation engine just offered? What if we could inquire to Siri about Wi-Fi lags? Suppose we could query a system about food safety?
Personalization puts it all together

At any given moment, we make decisions that fit our needs, whether it’s choosing a breakfast cereal based on its nutritional content or picking our next car or truck. They’re the choices that define us. They personalize our lives. When “artificial” is added to human intelligence, AI, too, must lead to decisions that fit our needs in meaningful and contextual ways.

This is why it’s a mistake to treat AI as a point solution. Because it doesn’t understand the wider context, a point solution may include a sensible recommendation but fail to deliver that suggestion at an opportune time, which is as important as identifying the suggestion itself. If AI says the right thing but at the wrong time and in the wrong way, it’s a structural failure, which is why an AI-driven system needs contextual awareness. If we tell a bank’s chatbot that we want to close the account of an elderly parent who has passed away, and the bot cheerfully responds with an offer of six free months, triggered by the phrase “close an account,” that’s an AI failure, a reflection of a system unsuccessfully trained to understand context. It lacks emotional intelligence, which is still an innate human quality, but without it, AI systems are unable to personalize. The difficulty of training a system to understand signals on life events and respond in an appropriately personalized way is a complex task (see Figure 1).

The complexity of learning at scale

AI learns by complex and varied example, just as humans do. The analogy is important: In the same way we rely on a combination of family and society to raise children and encourage socialization with peers, AI must be trained in steps and in layers to understand basic functions before it begins building its own learning paths. For both children and AI, overall supervision and guidance is also needed to keep us and AI on the intended path and to correct bad behavior while rewarding good behavior.

![Figure 1](image-url)
Hallmarks of a balanced T+T+P approach

How can an organization put the transparency-trust-personalization (TTP) approach to work to create AI systems that anticipate their fit and acceptance by other systems, intelligent or not, and by the people who use them?

The TTP approach relies on the following principles:

1. **Good data in; better decisions out.** The real breakthrough in AI is its ability to learn by example rather than through explicit programming. Examples include using training data to distinguish a stop sign from a pedestrian, and picking up on social, behavioral and economic signals to sort successful loan inquiries from high-risk ones. Such tasks are impossible to complete with traditional rules-based programming.

   Guiding AI to do the right things, however, raises several factors related to trust:

   - **Completeness.** Are the examples given to the AI system thorough in their scope? Consider the job of identifying a successful loan applicant. The traditional approach explores lists of loan recipients and their attributes and then applies regression analysis to identify probabilities. The TTP approach encourages organizations to tap a richer set of data that reveals intent, sentiment and context by detecting voice stress or emotion via natural language processing techniques. It allows for subtler definitions of what we mean by outcomes, such as whether price reductions lift unit sales but also mark the company as a discount brand, causing reputational risk. Because it draws on a broad base of data, TTP examines more complex topics such as the impact of an action on brand reputation, in addition to momentary business decisions.

   - **Bias.** Do the data and examples inadvertently carry human biases? Within decades of loan approval decisions, for example, decision makers’ biases can be revealed that negatively impact certain ethnic or gender groups. The TTP framework emphasizes the need to examine the training data, enabling organizations to explore whether it’s valid, unbiased and helpful for improving the quality of decisions.

   - **Relevance.** Formal AI training requires both a human-centric view of data insights and a technology-centric view. For example, AI can use image recognition to detect cancerous vs. benign skin diseases. But it takes human analysis to discern individuals’ motivation for visiting the doctor in the first place, such as social pressure and fear of uncertainty. With the TTP perspective, the intended end-user experience is explored before and after an interaction. Only by identifying the AI systems’ intended outcomes can we determine the training data that will support those results.

2. **An unrelenting focus on ethics.** It’s AI’s nature to be flexible, adapting to new information through feedback from interactions and associated human behaviors. As it learns from environments littered with noisy examples and rapid changes in market conditions, will the system continue to do the right thing?
Gaining trust in an AI system requires us to trust its training and boundaries. We recommend that organizations establish advisory teams – including ethicists and sociologists – who partner with technologists to monitor whether AI systems mimic desired behaviors. High-profile examples have already emerged in which AI systems were influenced by data that, intentionally and unintentionally, led to wrong behaviors. The racist rants of Microsoft’s Tay chatbot are one example, as is Facebook’s use of AI to unintentionally allow advertisers’ targeting of hate groups.

3. Moving from black box to open-air thinking. The best outcomes in testing an AI system are often generated through models such as neural networks, which provide great accuracy but don’t easily convey how the outcome was achieved. Yet for many categories of AI decision-making, such as a job or loan application, the decision-making process must be transparent. It’s possible and desirable to address the dilemma with models that combine black-box accuracy and clear descriptions of the logic used for the decision. For example, to see if the same results are returned, AI solutions can be tested and documented through structured sequences of steps, such as selectively altering gender, name or ethnicity, while keeping other factors constant.

The DIAL model: personalized AI at scale

Personalization in AI is a far cry from the 1:1 marketing concepts popularized in the late 1980s. Back then, personalization emerged from clearly identified elements, such as demographic data and consumers’ purchase history. Today, personalization capitalizes on what we call Code Halos, the massive swirl of data generated by every individual’s digital behavior, device and organizational affiliation. Personalization through Code Halos requires businesses to consider factors such as intelligence quotient (IQ) and emotional quotient (EQ) to offer faster, more contextual and more meaningful experiences for consumers, employees, customers and business stakeholders.

What are the elements of personalized AI at scale? And how can companies overcome the barriers to acquiring them? One way to answer these questions is by using the DIAL model, which provides a simple way of considering the AI process: Data uncovers insights, which lead to action, which leads to feedback that AI can use to learn (see Figure 2, next page).
## The DIAL model

| Data | Sales transactions are a time-honored source of market data. But today’s marketplace generates data on everything from clickstreams to social sentiment to viewing habits. Traditional data management techniques are ill-equipped to handle the complexity and variety of signals in the Code Halos of modern commerce.  

AI plays two roles:
- It cuts through the clutter to identify and process data that can affect the quality of decisions.
- It can bring “hidden data” to light and determine real-time sentiment and other behavior signals that drive reactions and interactions. |
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<tr>
<td>Insights</td>
<td>Traditional systems are poorly equipped to offer predictions and prescriptions on how to affect business change. AI serves a critical role by building out insights into causality and key drivers so future outcomes can be predicted and shaped. Guided, contextual recommendations require the combination of intelligence and emotion (IQ + EQ) that AI systems can provide at scale.</td>
</tr>
<tr>
<td>Action</td>
<td>An insight without understanding is useless, as is an understanding without a change in action. AI’s market surge is largely attributable to the opportunity it presents to offer insights and recommendations through digital channels, rapidly and inexpensively. Pricing changes can be nearly instantaneous compared with slow-moving SKU catalog updates. Next best actions can be calculated and displayed in milliseconds, putting AI’s quick thinking to use. Instances such as these are where speed and scale transform AI’s theoretical potential into something truly useful.</td>
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| Learning | In AI parlance, learning refers to closing the loop that connects the input with the final result, and ensures systems can be personalized to the behaviors of customers, employees and partners. (Note that learning is different from training, which covers the initial load of examples used to build a baseline algorithm.) Learning requires:
- AI that can monitor and modify its own behavior.
- A network of specialists such as business analysts, sociologists and ethicists tasked with guiding the AI-based system to ensure its behavior remains appropriate and profitable.
- Technical mechanisms to connect input, decisions and outcomes at a scale and speed that would be impossible to do manually. |
Looking ahead: an AI action plan

The fact that AI is “everywhere and nowhere” at the same time is its strength. It can radically reshape the intelligence and warmth of the interactions organizations have with consumers, employees and partners, while also dramatically reshaping fundamental business processes that serve faithfully in the background, enabling digital to fully permeate key business interactions and transactions.

By developing AI systems built on transparency, trust and personalization, businesses can create a path forward and make AI an integral part of their digital transformation.

A successful AI approach requires moving quickly and in the right direction, using the following guidelines.12

1. **Determine the right direction.** Where can AI add value? Think in terms of business or IT optimization. Ideas can and should come from not only all functions within your organization, but also from brainstorming sessions and interactions with others outside your company. The expanding list of AI ideas is most valuable when it’s gathered and discussed in a structured manner in which participants review:
   - Your company’s processes and touchpoints with stakeholders.
   - Customers’ perspectives on their experiences with your organization.
   - Employees’ and partners’ goals in their relationships.

   The objective isn’t to centralize or limit creative thinking but to more easily compare the value of one idea with another and to look for common connections. (For more details on gathering ideas, prioritizing and funding, see our white paper “Applied AI: Beyond Science Fiction to Business Fact.”)

2. **Assess your high-level organizational readiness for AI.** Use the Three M model to evaluate whether your organization has the components in place to deploy AI at scale.14
   - **Machinery:** The AI computing power and talent to use it.
   - **Material:** Separating signal from noise in Code Halos to reveal the satisfactions and frustrations of your key stakeholders.
   - **Model:** An approach that enables machinery and material to seamlessly connect.

Finally, consider ways to demonstrate AI value. Depending on the proposed idea, a small proof of value can really ignite interest in and understanding of AI, and also cultivate a willingness to expand it. Some AI benefits can’t be tested and will require a corporate commitment to large-scale integration. A thoughtful and strategic view of AI’s fitment, value and deployment can provide a meaningful start for all ideas, small and large.
Establishing transparency, trust and personalization are vital to ensuring that AI faithfully addresses critical operational challenges in a way that doesn’t lead to unintended consequences.

3. **Recognize the importance of sideways thinking**. Because AI is a dynamic system and not a one-time programming task, your organization needs to build a relationship with it (see Figure 3). Businesses also need to develop policies and procedures for how they will validate and guide the AI system. Without this continuous involvement, AI runs the risk of failing on its promise and becoming the target of consumers, government or NGO advocates in ways that constrain its value.

### Categories of AI failure

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<tr>
<th>Problem</th>
<th>Mitigation Approach</th>
<th>Solution Class</th>
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<tbody>
<tr>
<td>1. Bad initial training data</td>
<td>Bias checking (statistical). Training in steps. Human-centric planning.</td>
<td>Bottom-up</td>
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<tr>
<td>2. Bad continuous training examples</td>
<td>Constant companionship: human governance, ethics, mentoring.</td>
<td>Sideways</td>
</tr>
<tr>
<td>3. Incomplete or incorrect limits on how to achieve the desired outcome</td>
<td>Strong top-down rules enforcement.</td>
<td>Top-down rules</td>
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Figure 3

The promise of AI belongs to companies that move quickly, set the pace for their industry and prepare for AI’s long-term success. Establishing transparency, trust and personalization are vital to ensuring that AI faithfully addresses critical operational challenges in a way that doesn’t lead to unintended consequences, clearing the way for better decisions and optimized business and IT processes that enhance business performance.

*To learn more, please visit the AI & Analytics section of our website.*
Endnotes


2. Sample client engagements include:
   - A P&C insurer that used AI-informed analytics to audit call center dialog between policyholders and customer service reps with nearly 90% accuracy, enabling a better understanding of customer sentiment and improved customer retention.
   - A global professional services organization that drastically reduced the time it takes to conduct due diligence research. With our solution, complex reports that once took the company several weeks to prepare are now often completed in days, with 14% completed in one hour. The company is able to generate 30% more reports a year.
   - A pharmaceuticals company that used our automated data analysis solution to shorten its drug development time to two years from three, and reduce cost per patient by as much as 10%, all while improving patient selection for clinical trials.

For more detail on these engagements, as well as how we’re helping our clients apply AI in their businesses, please visit the Cognizant Digital Business, AI & Analytics “Featured Work” section of our website.


10. For more on Code Halos, see the Code Halos section of Cognizant’s website: https://www.cognizant.com/code-halos?gclid=Cj0KCQjwl7nYBRCwARlsAL7O7dECgKeeBLq024ozlaelHk8RQql6cnhcrEuM7n8Z5as8mYSdIoCmx9waApOgEA_Lw_wcB.

11. The DIAL model was developed by Manoj Saxena, CEO of CognitiveScale, and used with his permission.


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Acknowledgments

The authors would like to acknowledge the research and theme formation provided by Brian Piechocki, Manager, Cognizant Digital Business AI & Analytics Strategic Initiatives.
About Cognizant Digital Business

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Cognizant Artificial Intelligence Practice

As part of Cognizant Digital Business, Cognizant’s Artificial Intelligence Practice provides advanced data collection and management expertise, as well as artificial intelligence and analytics capabilities that help clients create highly-personalized digital experiences, products and services at every touchpoint of the customer journey. Our AI solutions glean insights from data to inform decision-making, improve operations efficiencies and reduce costs. We apply Evolutionary AI, Conversational AI and decision support solutions built on machine learning, deep learning and advanced analytics techniques to help our clients optimize their business/IT strategy, identify new growth areas and outperform the competition. To learn more, visit us at cognizant.com/ai.

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Cognizant (Nasdaq-100: CTSH) is one of the world’s leading professional services companies, transforming clients’ business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 193 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at www.cognizant.com or follow us @Cognizant.