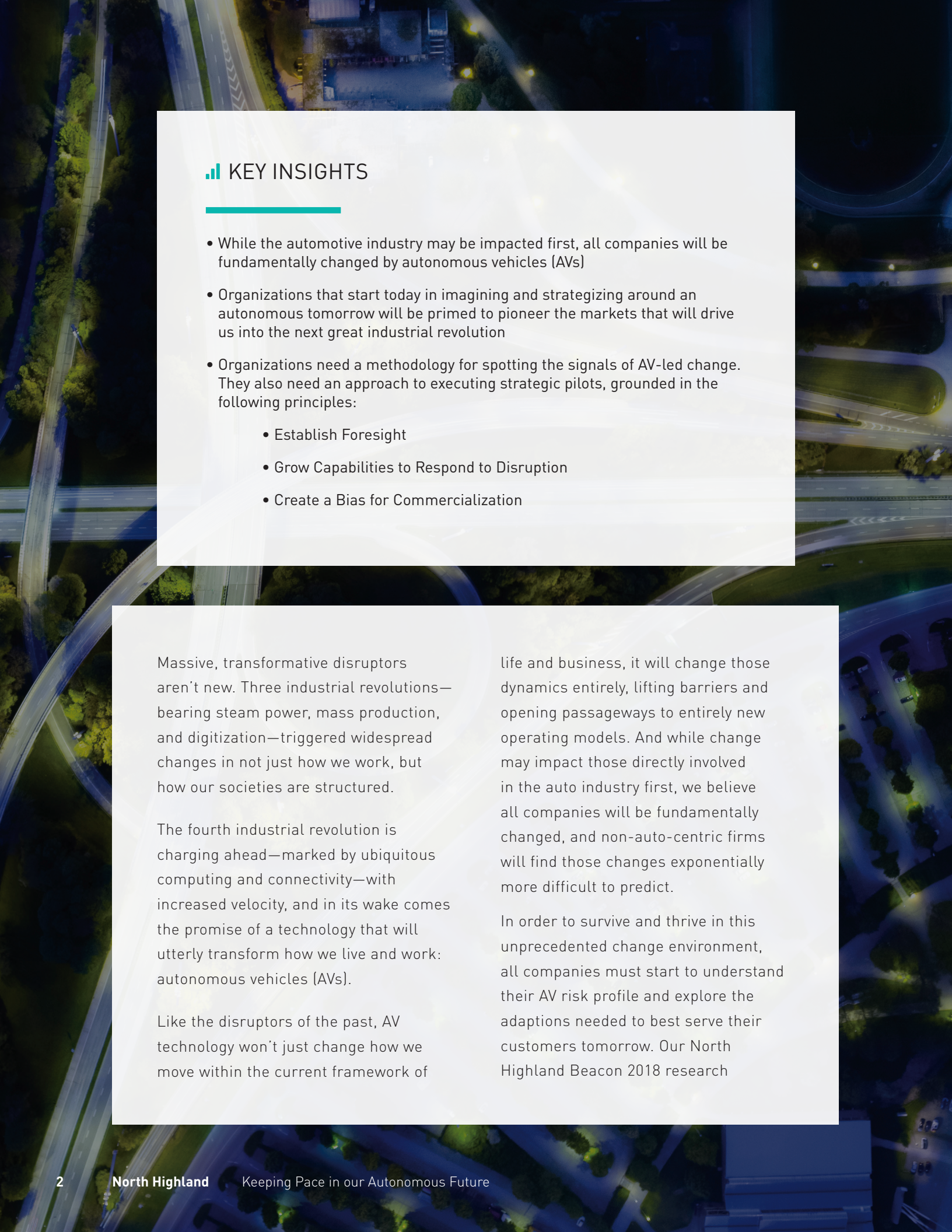


An aerial night-time photograph of a complex highway interchange. The roads are illuminated with streetlights, creating a network of glowing lines against the dark landscape. Below the main interchange, there is a large parking lot with several cars parked. The overall scene is a blend of modern infrastructure and urban planning.

KEEPING PACE IN OUR AUTONOMOUS FUTURE

Capitalizing on the Autonomous Vehicle Revolution

NORTH HIGHLAND



KEY INSIGHTS

- While the automotive industry may be impacted first, all companies will be fundamentally changed by autonomous vehicles (AVs)
- Organizations that start today in imagining and strategizing around an autonomous tomorrow will be primed to pioneer the markets that will drive us into the next great industrial revolution
- Organizations need a methodology for spotting the signals of AV-led change. They also need an approach to executing strategic pilots, grounded in the following principles:
 - Establish Foresight
 - Grow Capabilities to Respond to Disruption
 - Create a Bias for Commercialization

Massive, transformative disruptors aren't new. Three industrial revolutions—bearing steam power, mass production, and digitization—triggered widespread changes in not just how we work, but how our societies are structured.

The fourth industrial revolution is charging ahead—marked by ubiquitous computing and connectivity—with increased velocity, and in its wake comes the promise of a technology that will utterly transform how we live and work: autonomous vehicles (AVs).

Like the disruptors of the past, AV technology won't just change how we move within the current framework of

life and business, it will change those dynamics entirely, lifting barriers and opening passageways to entirely new operating models. And while change may impact those directly involved in the auto industry first, we believe all companies will be fundamentally changed, and non-auto-centric firms will find those changes exponentially more difficult to predict.

In order to survive and thrive in this unprecedented change environment, all companies must start to understand their AV risk profile and explore the adaptations needed to best serve their customers tomorrow. Our North Highland Beacon 2018 research

shows that adapting to changing customer needs is the second highest priority for business leaders in 2018.¹ As such, strategy and innovation leaders, particularly those responsible for the performance of a P&L susceptible to external dynamics, should be designing and deploying bets that will help their organization chart a successful course.

In his best-selling book, *The Design of Everyday Things*, Don Norman references a quote about resilience engineering: “One measure of resilience is therefore the ability to create foresight—to anticipate the changing shape of risk, before harm and failure occur.”² For companies today, facing disruption from AVs, building resilience requires a methodology to listen for and spot the signals of change, both close-in and further out. Resilience requires strategies that protect and generate new revenue streams. And it demands a path forward, charted through strategic pilots executed strategically—and quickly.

In the following, we detail the current state of AVs, and chart the course for strategy and innovation leaders in all industries to establish a methodology for gaining resilience, generating foresight, and responding to future opportunities, before it’s too late.

THE STATE OF AUTONOMOUS VEHICLES

When Ford’s automobiles first rolled off the assembly line, people called them “horseless carriages.” The moniker made sense. These contraptions did what carriages did, minus the hooves. It turned out that few inventions would be as transformative as the car; and its impact on the economy, the environment, and culture were unimaginable.

The term “driverless car” will soon seem as archaic as “horseless carriage,” and the ways AVs will transform the world feel equally unimaginable.

Every significant automaker is pursuing the technology, eager to rebrand and rebuild itself as a “mobility provider” before the idea of car ownership goes kaput.⁵ Ride-hailing companies are hustling to reduce their dependence on profit-gobbling human drivers. Tech giants like Alphabet (through its subsidiary Waymo), Intel, IBM, and Apple are looking to carve out their slice of the pie as well. Countless hungry startups have materialized to fill niches in a burgeoning ecosystem, focusing on computer vision, sensors, geographic and mapping data, vehicle communications, and vehicle maintenance service centers.

IT’S HAPPENING: AUTO MAKERS AND MOBILITY PROVIDERS BEGIN TO COMMERCIALIZE

In early 2018, Arizona officials authorized a plan by Google’s self-driving car unit Waymo to operate the first driverless ride-hailing service in the U.S.³ Audi’s 2019 A8 is the first widely available consumer vehicle with the capability to completely monitor a driving environment while enabling the driver to actively engage in non-driving tasks. In 2019, General Motors will begin deploying a fleet of up to 2,500 self-driving cars that will have no steering wheel or pedals, making them the first true robo-taxis to hit the streets.⁴

Still, current AV applications—everything from 24-hour mining operations driven entirely by AVs⁶ to driverless pizza delivery⁷—remain niche or in-development applications.

The skeptics are loud. Christian Wolmar, a British-based author and transport expert, told *The Spectator* magazine in December 2017, “The hype is being driven by carmakers, desperate to lay claim to the future, and tech giants who have all this footloose capital that

they don’t know what to do with. It’s as much of a fantasy as the jet-powered backpacks that used to be in 1960s comics.”⁸

At North Highland, we wholeheartedly disagree. We believe AVs and their associated capabilities will be as transformative and disruptive as the “horseless carriage,” if not more so. All industries need to be on alert, especially those that are adjacent to, peripheral to, or dependent on automobiles.

THE FACTORS DRIVING AV FORWARD

- 1 MOST TRAFFIC FATALITIES ARE CAUSED BY HUMAN ERROR.** According to the NHTSA, in its most recent study released in 2016, more than 90 percent of fatal automobile accidents are attributable to human error.² There is abundant support for increased roadway safety with AVs. The development of crash avoidance technologies are supported by the NHTSA, and safety is a key policy goal for lawmakers seeking to regulate AVs.
- 2 AMERICA’S LOVE AFFAIR WITH CARS IS COOLING.** The portion of U.S. high school seniors with a driver’s license declined from more than 86 percent in 1976 to 71 percent in 2016.¹⁰
NASCAR—the best known racing series in the U.S.—has lost more than 45 percent of its audience over the last ten years.¹¹
- 3 WE’RE LEARNING TO SHARE.** The ridesharing sector is projected to grow eightfold to \$285 billion by 2030.¹² Over a quarter (26 percent) of U.S. adult internet users—or 56.5 million people—used a sharing economy service at least once in 2017.¹³
- 4 THE INTERNAL COMBUSTION ENGINE IS UNDER ATTACK.** In seven years, starting in 2025, nations including the Netherlands and Norway will ban all internal combustion engine (ICE) sales.
Oil producers and research organizations around the world are revising their electric-vehicle forecasts upward as improving battery costs challenge previous assumptions about growth.¹⁴
- 5 ENABLING HARDWARE COSTS ARE FALLING.** Aptiv, formerly known as Delphi Automotive, has committed to cut the cost of self-driving cars by more than 90 percent to around \$5,000 by 2025.¹⁵
- 6 PARTNERSHIPS ARE DEVELOPING THAT ARE SEEKING TO DEFINE THE SPACE.** In Miami, Ford will test two types of AVs,¹⁶ one a research vehicle with hardware and software technology by Argo, the other a self-driving car delivering Domino’s Pizza, in Spring 2018.
Intel announced a collaboration with entertainment company Warner Bros. to develop in-cabin, immersive experiences in AVs.¹⁷
Waymo has already established partnerships with AutoNation and Avis for fleet servicing, maintenance, housing, and repair services.¹⁸
Lyft is partnering with a Tier I auto supplier to develop its technology further.¹⁹

AUTONOMOUS VEHICLES: IMPACT ANALYSIS

The impact of autonomous technology will have a ripple effect, beginning with auto-centric companies and moving outward to others. As AV commercial viability advances, the impact to other industries will be rapid. Based on the weak signals we've observed in the market, a few non-auto industry predictive forecasts include:



RETAIL

Retailers will decrease supply chain labor costs and revolutionize the B2C experience, with personalized mobile assortments, sponsored AV trips to reward customers, and new cross-selling opportunities at the point-of-delivery. Current auto-related assortments will be severely impacted.



HEALTHCARE

AVs will remove transportation barriers for lower income and less mobile populations. Health assessments, monitoring, and well-being services (gym, yoga, mindfulness) can be integrated into AVs. The safety of AVs will decrease the number of vehicle crashes and fatalities. Such reductions will impact the availability of human organs for patients in need of transplants.



HOSPITALITY

Hotel companies can bring their brand of comfort to the interiors of AVs and, likely in partnership with a fleet company, drive loyalty through access to amenities. Comfortable long-haul AV rides may lead to closure of hotels and motels along interstates.



MEDIA/TELECOM

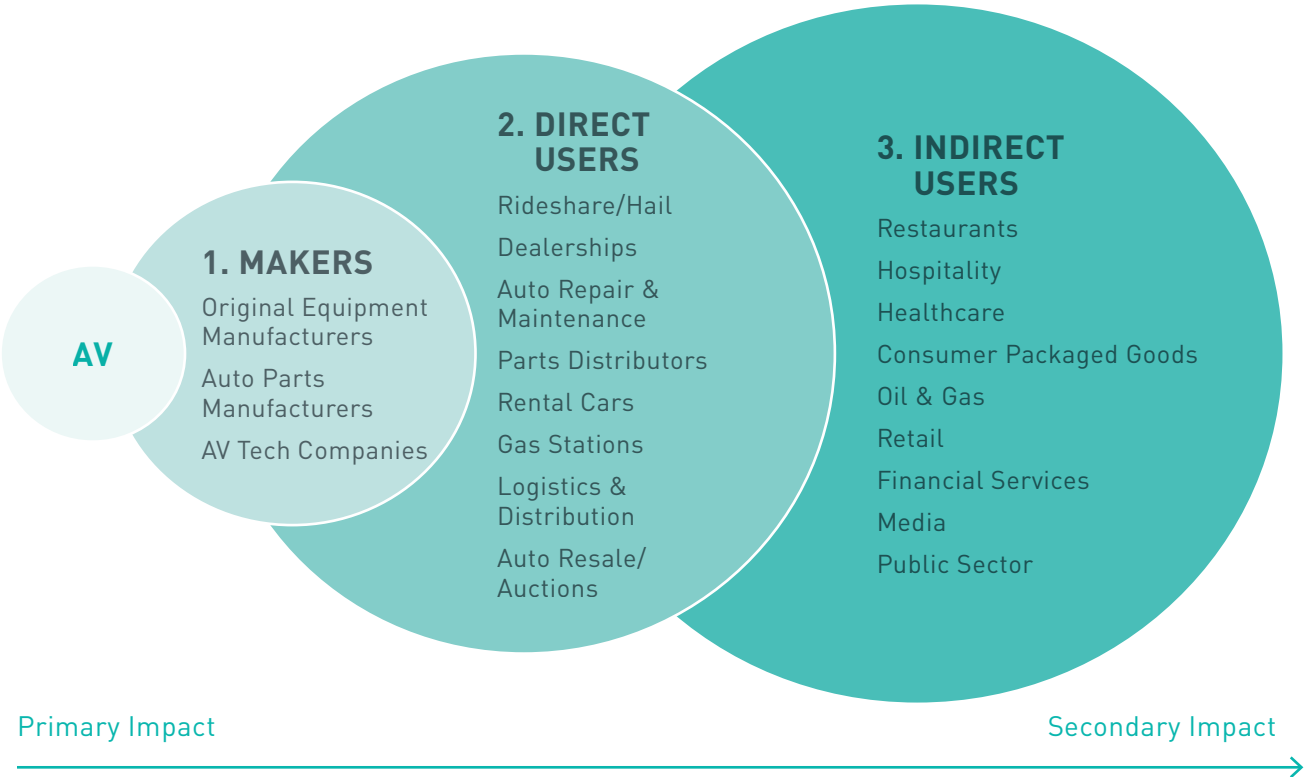
AVs will allow media companies to serve up content through the duration of a ride. Content may be interactive and potentially enabled through VR applications. Huge amounts of data will be needed to power the system, creating new opportunities for telecom firms.

From these forecasts we can begin to bet on some obvious, short-term impacts. Individual car ownership will decrease.²⁰ AVs will become a valuable channel for content.²¹ Massive parking structures will be obsolete.²² Cities and roadways will get smart.²³ Unfortunately, organizations need more than the obvious. They need the ability to see into the future. And they need strategies

and agility to successfully create a space for themselves there.

In the next section we draw on our work in strategy development, our expertise in the travel and transportation industries, and best practices from our Futures practice to present a methodology for harnessing the potential of an autonomous future.

THE PROGRESSION OF AV IMPACT BY INDUSTRY



POSSIBILITIES PREP: THE METHODOLOGY FOR SUCCEEDING IN AN AV FUTURE

Likely unbeknownst to Ford at the time, his Model T transformed how we live and work. In its wake sprung up entirely new industries—everything from fast food and roadside motels to oil change shops and auto part providers.

Organizations today have an opportunity to see an AV future in ways Ford never could. By coupling futures thinking with operational agility and strategic commercialization, organizations can capitalize on a future poised for transformation on a scale the world hasn't yet seen.

Our methodology comprises three steps:

- 1 Establish Foresight**
- 2 Grow Capabilities to Respond to Disruption**
- 3 Create a Bias for Commercialization**

1 Establish Strategic Foresight through Futures

Futuring has nothing to do with clairvoyance. It's a pragmatic approach to preparing for the unknown, providing organizations with the ability to flex and bend in a wide variety of future scenarios.

When helping our clients navigate the unknown, we apply a variety of tools and techniques to enable thinking that turns theory into previously unfathomable opportunities.

A. LOOK FOR SIGNALS

Companies seeking success in an AV world must foster a conversation about plausible, possible futures informed by data and science, and begin scouting for weak signals. In the automotive vehicle space, signals indicating a move away from combustible engines are fairly strong, for example. However, weaker signals—like those being picked up by an engineer designing in-car exercise equipment to transform AV time into gym time²⁴—offer organizations the opportunity to create entirely new markets on their terms.

These indicators of change couldn't even be called emerging trends; however, imagining them as mainstream can help organizations creatively depict possible future outcomes.

B. CREATE DISTANCE

Valuable futures thinking takes companies well outside of their comfort zones—and theoretical time zones. According to Leigh Cook, Futures and Experience Strategy Lead at North Highland's experience design division Sparks Grove, "Rather than looking out a few months or even a few years, we push our clients to imagine at least 10 to 20 years in the future. The fact is that if you are looking at a future only a few years out, you are practically thinking about the present, and you'll never respond quickly enough to the true disruptions lurking a decade or more out. Seeing the bigger picture allows you to ask bigger questions and to imagine scenarios outside the current confines of your industry or product."

"It's never looking at automotive; in fact, we try to stay away from that for the work I do... [So] we come up with the insights, and then I pass off to the designers, engineers, and the marketing teams, who take their subject matter expertise and turn it into something magical in terms of product offerings."²⁵

SHERYL CONNELLY

Futurist

Ford Motor Company

C. DEVELOP THE FUTURE IN LAYERS

It isn't enough to simply imagine the future. The future should include people with emotional stories. Making that possible future real and holistic requires taking a layered approach that could be imagined through various lenses, including:

Multiple World Views

We begin with broad depictions of multiple futures and leverage scenario tools such as growth, decline, transformation, and discipline archetypes to understand the range of possibilities a business may face.

System View

Here we go deeper, describing how the future world plays out in terms of political, social, cultural, and economic systems.

Interaction View

Once we have imagined the world and described how it works, we now need to place people in that world and tell a story about them. What do they care about? What products or services would they engage with daily? How does the future shape their wants, needs, and values? How will our organization show up?

By challenging companies to look through multiple lenses, futuring creates both a strategic and creative process to anticipate and plan for the long term. We can narrow down what is possible to what is plausible, and ultimately identify probable futures that can inform present-day decisions. In AV, this means moving beyond a "driverless car" to imagine the possibilities—both direct and tangential.

FUTURES SCENARIOS GUIDE PLANNING FOR AUTO COMPANY IN AN UNKNOWN FUTURE

A leading \$7 billion automotive services company turned to North Highland to provide a future vision of mobility, one 20-years ahead, to provoke new ideas amongst senior leadership and to guide their strategic planning process.

Our team incorporated key trends and drivers of change into futures sessions with key stakeholders, out of which came a range of future mobility scenarios.

These scenarios were brought to life as visual narratives and were presented along with business implications. The concepts led executive leadership to pursue additional planning and guided follow-on investments designed to define their position in an unknown future.

2 Grow Capabilities to Respond to Disruption

Many current industries and traditional revenue streams will be disrupted by AVs. The companies that will survive and thrive will be those that understand the scale of change to their industry and honestly assess how quickly they can react to those changes.

North Highland’s disruption response assessment helps companies benchmark their readiness to innovate at this scale. **The tool plots the scale of change facing a company against the internal ability to react to disruption.** Companies broadly fit into four quadrants:

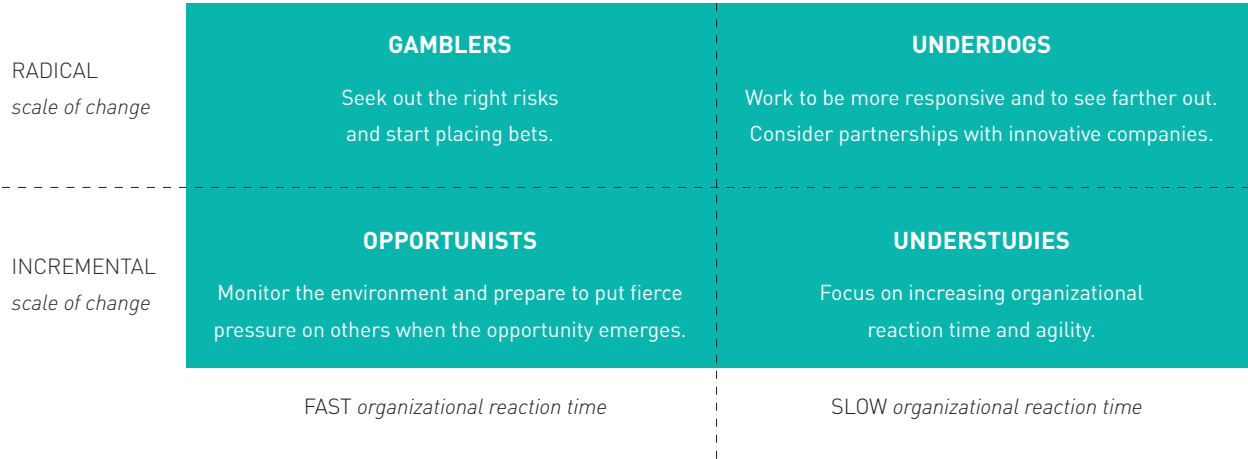
1. The Opportunists: Among firms in industries that face incremental or peripheral changes, those that can react quickly should prepare to put fierce competitive pressure on others, moving early to define and exploit the space before it goes mainstream.

2. The Understudies: Companies facing incremental change and exhibiting slow organizational reaction need to learn to be more responsive. Such learning must begin with a diagnosis of cultural and organizational headwinds, along with a catalytic plan for human-centered change.

3. The Gamblers: Within radically changing industries, agile companies should start placing bets in the AV space. These bets should be designed to help the organization learn, even if they fail, and be executed with commercialization in mind. Speed is important as competitors will be similarly motivated.

4. The Underdogs: Slow responders facing radical change need to shift their focus and hone the ability to identify and interpret farther-out, weaker signals, while simultaneously working to build their agility. These companies need to find a way to punch above their weight class and should strongly consider partnerships with more innovative companies that may benefit from the scale they can provide.

NORTH HIGHLAND’S DISRUPTION RESPONSE ASSESSMENT



Create a Bias for Commercialization

All roads ultimately lead to commercialization. But in the great unknown of AV, commercialization is best approached through a methodology that allows organizations to explore efficiently, think iteratively, and act quickly.

We believe successful commercialization is enabled by a series of divergent and convergent processes that validate the problem being solved, generate many ideas, lean on iterative, inexpensive, and rapid testing, and drive progressively finer financial resolution. Companies are already experimenting and learning in-market, including tests with non-AVs and deep ethnography.

No AV Needed:

Domino's is partnering with Ford to test how pizzas will be delivered via autonomous vehicles, using human-driven Ford sedans though the delivery drivers do not interact with customers. Not only did Domino's validate that people are open to AV delivery, but they also gained learnings about how people would interact with vehicles. They learned that people who order pizza in the summer are more often barefoot and don't like to walk on the hot asphalt to retrieve a pizza, prompting new service design questions.²⁶

Ethnography:

Ethnography is the study and systematic recording of human cultures through in-field research to understand behaviors conducted within the context they would naturally occur. AV companies are funding immersive research to understand how humans will interact with AVs. Ford is partnering with Stanford to understand how pedestrians and AVs will interact.²⁷ **North Highland is working with a client in the AV space to conduct global ethnography of extreme transportation users.** The research will uncover how transportation value shifts are occurring and how those emerging changes will impact AV adoption and deployment.

HARNESSING YOUR DRIVE TO THRIVE IN AN AV FUTURE

If futures, the ability to respond to disruption, and commercialization for the unknown feels uncomfortable, consider again the tailwinds. Every day around 10 million people take an Uber.²⁸ Electric cars will very soon to be the only cars.²⁹ Companies in all industries, particularly technology and automotive, are already in on the ground floor.³⁰

Organizations need to be a part of these nascent AV-driven disruptions, otherwise they risk being too late. Organizations that start today, imagining and strategizing around an autonomous tomorrow, are primed to pioneer and rule the markets that will drive us into the next great industrial revolution.





ABOUT OUR TRANSPORTATION AND FUTURES SERVICES

Social, economic, and technology trends are disrupting the norms of mobility across transportation, which connects a vast ecosystem spanning sectors, business models, and industries. From smart cities to driverless vehicles, interconnected mobility brings challenges and new opportunities for transportation entities, manufacturers, suppliers, and their constituents.

At North Highland, through our Sparks Grove Futures practice and our Transportation practice, we work with global corporations aiming to tackle these emerging mobility challenges. Our consultants bring the expertise needed to define new technologies to drive better performance and provide a competitive advantage, launch products and services that build volume and consumer loyalty, enable people development initiatives to meet higher expectations and rapid change, and build today's growth strategies with an eye towards the future.

Sparks Grove is the experience design division of North Highland.

ABOUT NORTH HIGHLAND

North Highland is a global management consulting firm known for helping clients solve their most complex challenges related to customer experience, performance improvement, technology and digital, and transformation. We add value and support our clients across the full spectrum of consulting, from strategy through delivery. We bring the big ideas, then we make them real. North Highland is an employee-owned firm, headquartered in Atlanta, Georgia, with more than 3,000 consultants worldwide and 60+ offices around the globe. The firm is a member of Cordence Worldwide (www.cordenceworldwide.com), a global management consulting alliance. For more information, visit northhighland.com and connect with us on [LinkedIn](#), [Twitter](#) and [Facebook](#).

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