What is Intelligent Exploration?

And why it will save your data and AI strategy

VIRTUALITICS®

There are big expectations of AI's ability to contribute to business strategies—a Gartner survey found that 80% of executives expect that AI can be applied to decision-making, but only 12% of businesses have achieved enough maturity to start seeing an impact on the bottom line. Gartner reports that just 54% of AI projects are making it out of development and into production, and that's up just 1% from 2 years ago. The promise of AI delivering value across the enterprise is stalling.

Enterprise AI is Stalling

When yet another AI project fails, fingers are typically pointed at the usual suspects—talent shortages, data quality, a lack of organizational readiness. But the truth of the failure is deeper than that. We're trying to build a modern AI program on the backs of old tools and techniques that just can't support the weight.
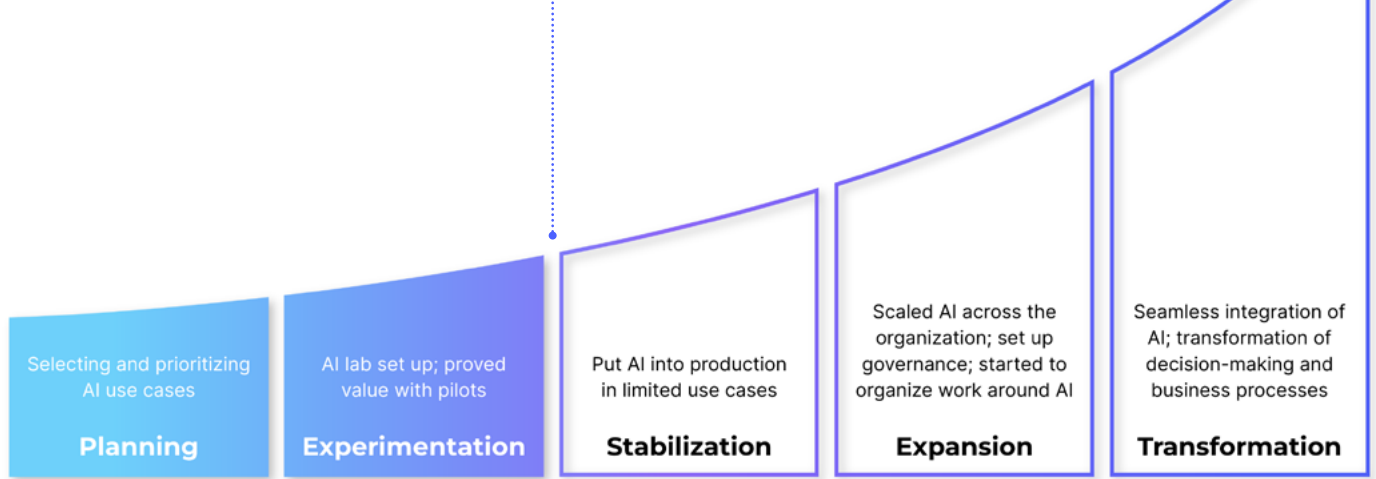
We're capturing and storing more data than ever before, and impactful AI rests on making good use of all of that data. It's crucial that before we start on any AI initiative that we take into account the interconnectedness of the business, assess the quality of the data, and consider enough of the right data points to ensure a usable prediction or prescription. This takes thorough data exploration.

But the way we're exploring the data hasn't really changed in the last 50 years. We're trying to explore ever expanding and interwoven data sets using the same tools and techniques that we use to create dashboards and reports. In fact, in our rush to get AI into the business we may be limiting our exploration more than ever before. We're starting off on the wrong path from the beginning and every step in the process takes us further off course.

AI Adoption Maturity Curve

Over 85%* of organizations are here

Selecting and prioritizing AI use cases	AI lab set up; proved value with pilots	Put AI into production in limited use cases	Scaled AI across the organization; set up governance; started to organize work around AI	Seamless integration of AI; transformation of decision-making and business processes
Planning	**Experimentation**	**Stabilization**	**Expansion**	**Transformation**

* Gartner Artificial Intelligence Survey

According to Gartner, most organizations are stuck in experimenting with AI, struggling to create a stable AI strategy.

Where is data exploration going wrong?

With all of this data at our disposal we should be able to investigate problems from every angle, but we don't. Every analysis starts with a hypothesis that is used to narrow the scope of the exploration. From the data points we include in our data set, to the questions we ask of the data, to the conclusions that we spot, the hypothesis is in the driver's seat.

Given the limits of the analytic tools we had, it's no surprise that analysts and data scientists have taken to using informed hypotheses to limit the scope. But hypothesis-driven exploration has always injected some risk and, as AI has amplified the potential uses of data, these risks have been amplified as well.
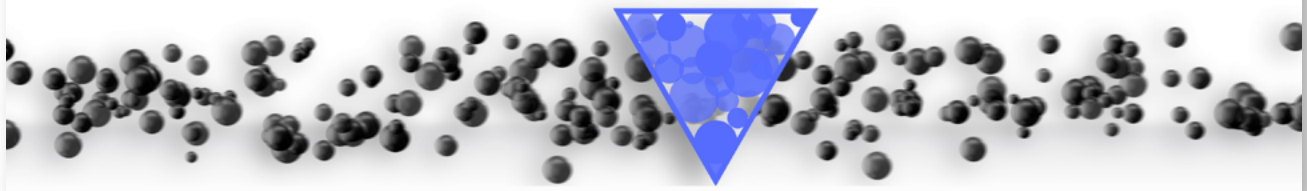
Hypothesis–Driven Exploration
So what is hypothesis–driven exploration?
It's when the data is explored with a particular theory in mind:

1. Observe the problem (or opportunity)	Some orders keep arriving too late!
2. Formulate a hypothesis	We have an issue with our supply chain
3. Gather only the data relevant to that hypothesis	Explore the supply chain data
4. Explore the data with that hypothesis in mind	Where is the weak link in our supply chain?
5. Move forward with a project based on your results	Diversify the supply chain under certain circumstances. But are we targeting the right problem? Will this resolve the issue of late orders?

An effective AI strategy rests on your data exploration

Because exploring every relevant attribute is too time-consuming, the hypothesis is used to determine what is included, and what gets left out.

Given the time and effort data exploration takes using traditional BI tools, it's not a surprise that data scientists and analysts have leaned on hypotheses to keep scope in check. It's also just human nature–you have to focus your attention somewhere and it's hard to set aside your theories to explore with an open mind. Even data scientists who develop AI algorithms to explore data will be directing their exploration using hypotheses to some degree or another.

But there are real risks to allowing a hypothesis to direct exploration:

▶ **Missed Opportunities**
You could be looking in the entirely wrong direction—what the problem is or how you should go about solving it.

▶ **Underwhelming AI or Meaningless Insights**
Your exploration may yield *some* insight, but if it's not insight about the real issue then any action you take will have weak or non-existent results.

▶ **Overlooked Risks**
You may have left out data that pointed to big issues, or that could have left you to draw completely different conclusions. That means the real problems are left unchecked.

▶ **Biased AI**
Conversely, limiting exploration could allow some data sources to have an outsized impact on the results.

Exploration should form the foundation for all of your data–driven initiatives but when it's being done on the narrow premise of a hypothesis, everything built atop it is at risk. And when you're planning to build AI that will *automate business decisions* across the enterprise the repercussions of getting it wrong are just too great.

BUILD
AI MODEL

ADD TO
AI QUEUE

APPROVE
PROJECT

DEFINE
PROJECT

EXPLORE
DATA
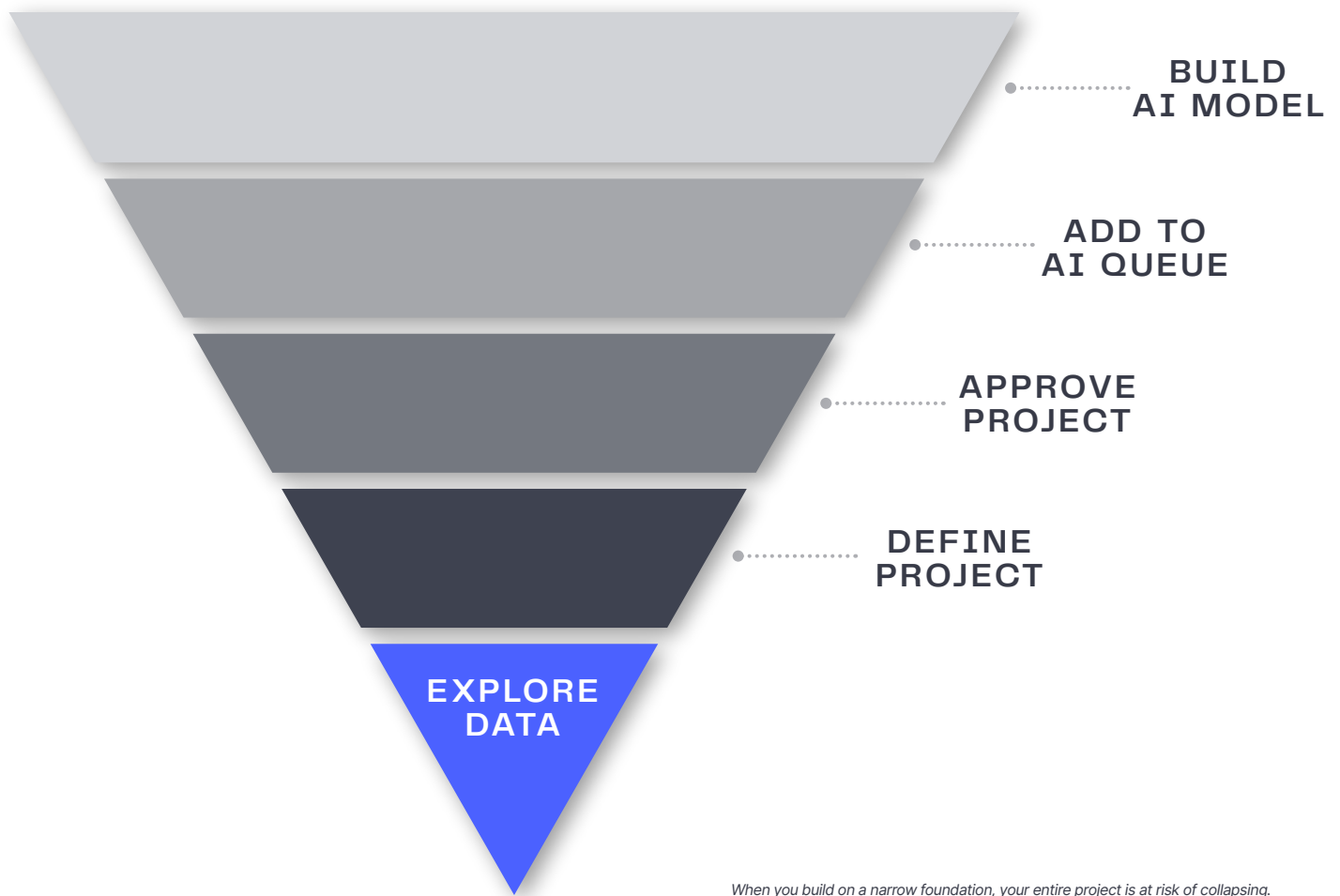
When you build on a narrow foundation, your entire project is at risk of collapsing.

Examples of AI Gone Wrong

AI failures can lead to catastrophic losses, lawsuits, or reputational hits. Getting it right from the beginning is critical!

▶ Zillow's home-buying debacle shows how hard it is to use AI to value real estate

▶ The Dutch Tax Authority Was Felled by AI—What Comes Next?

▶ Sexist AI: Amazon ditches recruitment tool that turned out to be anti-women

▶ Payout for Estée Lauder women 'sacked by algorithm'

▶ Is Airbnb using an algorithm to ban users from the platform?

▶ When It Comes to Health Care, AI Has a Long Way to Go

The Talent Crisis

The lack of data scientists is hindering AI innovation and all the more reason to invest in Intelligent Exploration.

The number of data science job openings in 2022 is over 70% higher than in 2021[1]—and the year isn't over yet. In short, data science teams are maxed out. They can't afford to go down rabbit holes looking for the next big AI opportunity when they're maxed out on basic requests.

Intelligent Exploration amplifies the power of your data science team. As author and data scientist Tobias Zwingmann expressed in a recent webinar, AI can be a powerful co-analyst. Use it to find opportunities, root out bias, and test results. You'll get better results and put them into the hands of users while they're still relevant.

"There's no way to keep pace with the demand for data scientists. You gotta flip the problem and use this intelligent exploration to farm out those capabilities."

Aakash Indrukhya, Co-head of AI, Virtualitics

Hear more from this conversation

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1 KD Nuggets

Virtualitics' Intelligent Exploration looks at *all* of your data

Intelligent Exploration can explore vast amounts of data at once so you can explore all relevant attributes and ensure that you're getting to the truth of the matter.

Unlock Potential with Intelligent Exploration

It's time to change how we interrogate data. Our world is interconnected and we can't afford to narrow the scope of our exploration. Intelligent Exploration—the use of AI to explore and visualize, and mine it for insight—must be the start of any data-driven initiative.

Intelligent Exploration flips the old hypothesis-driven exploration process entirely:

1. Observe the problem (or opportunity)	Some orders keep arriving too late!
2. Gather all of the relevant data	Gather inventory, order, and supply chain data
3. Use Intelligent Exploration to uncover drivers behind late orders	The biggest driver of late orders is on the order management side and changing suppliers would make no difference at all.
4. Pinpoint the source and the change needed	Orders for certain parts need to be placed 4 weeks in advance to get on time and so inventory levels need to be flagged earlier.
5. Move forward with a project based on your unbiased results	Develop an algorithm that tracks equipment usage and flags the projected need for the parts 4 weeks out so that the warehouse staff can order in advance to have on hand, avoiding downtime.

BUILD AI MODEL

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INTELLIGENT EXPLORATION
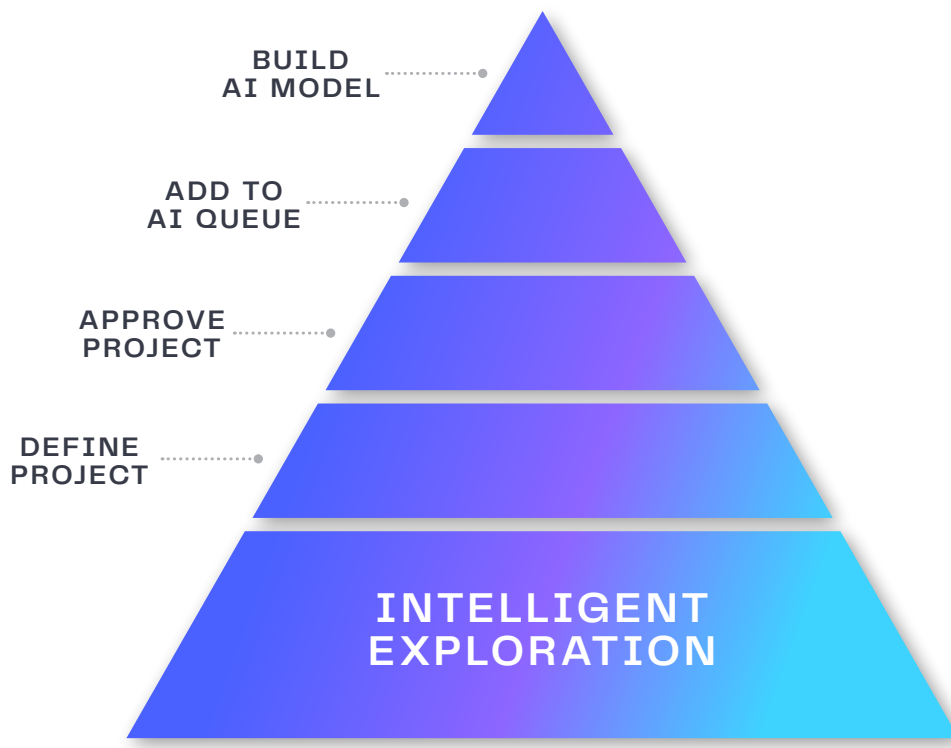
Intelligent Exploration creates a more complete picture and facilitates better decision-making because:

▶ It can comb through complex datasets so that there's no need to impose our own thoughts or assumptions on what data should be included.

▶ Intelligent Exploration doesn't just look at more dimensions, but it can look at the many possible relationships between those dimensions.

▶ It cuts through the noise of complicated data and pulls out the significant insight, so data science teams know where to focus, instead of spinning cycles trying to find the 'Aha!' insight.

▶ AI has no preconceived ideas about what trends or relationships it will find, keeping human bias out of data exploration. This means that Intelligent Exploration may find relationships that people won't even think to look for.

▶ Data quality is the single most important factor in an AI model. Every model that has gone off the rails has failed because it relied on either the wrong data or weak data. Intelligent Exploration is ideal for assessing data quality effectively and efficiently.

Intelligent Exploration keeps your data science team focused on the right problems and prevents issues early on instead of when an AI app is lurching towards deployment after months of investment. With a solid data-based foundation, your business can amplify the impact of your AI programs—and your business analysts. Start strong with a data-proven baseline and you will be leading the pack in successful AI.

How Virtualitics' Intelligent Exploration changes the game

When you explore your data using tools that restrict your breadth and depth of exploration, you're automatically limiting the value you'll gain from your efforts. You also miss out on opportunities for AI because you can't see what relationships are most impactful.

Most organizations are using BI tools meant for reports and dashboards–providing snapshots into the current state–to do complex exploration intended to uncover opportunities to be predictive and prescriptive. Virtualitics is designed to do the kind of complex exploration on which organizations can build successful AI programs:

Exploring Data Today	Exploring Data with Virtualitics
Teams are forced to limit the dimensions they explore, making educated guesses about what matters the most because available tools are time-consuming and limited to how many dimensions they can look at at once.	Intelligent Exploration leverages out-of-the-box AI routines to explore data, allowing users to explore vast, complex data sources with all potentially relevant dimensions included. The results not only have considered unlimited dimensions, but the visualization is presented in 3D, making consumption of those results even easier.
Limited exploration of a smaller dataset can mean that: ▶ You've left out data that could significantly impact your conclusions or, ▶ One of the remaining dimensions is having an outsized effect on the insight Your preconceived hypothesis has directed your investigation and shaped your conclusion.	Virtualitics' Intelligent Exploration explores: ▶ More dimensions, reducing the likelihood that significant data will get left out ▶ Without bias, allowing all relationships to surface, even the counter-intuitive ones ▶ Pulls forward the significant drivers to provide direction rooted in data, not hypothesis
Manual analytics is very dependent on the experience level of the analyst, which can mean that outliers, key drivers, insights, interactions between dimensions can be missed or require more time and resources than most organizations have at their disposal.	Intelligent Exploration easily discovers relevant insight within dozens of dimensions: ▶ **Anomaly detection** provides outliers that may otherwise go unnoticed. ▶ **Smart mapping** discovers key relationships ▶ **Network extraction** constructs communities and community relationships

Exploring Data Today	Exploring Data with Virtualitics
Users need to determine how to visualize their queries to best explore the results, and share them with others.	Once Virtualitics' Intelligent Exploration discovers the insight in your data, it applies the visualization best suited to it to display the results.
Visualizations are limited to 2X2 plots requiring multiple visualizations to express relationships between 3 or more dimensions.	3D visualizations allow for plots that show how multiple dimensions interact with each other and can be rotated and explored from all angles, making relationships clear. In addition, 3D visualizations have been shown to increase understanding and retention.
Data exploration is limited to data scientists or advanced analysts who are capable of manual coding.	Natural Language Querying allows anyone to input a request in plain language (no coding skills needed!) to jumpstart exploration using Virtualitics' Intelligent Exploration.
The meaningful, or statistically significant, insight is left to the human eye to discover, meaning that human oversight or lack of data literacy skills will limit what is uncovered.	The Insight routine within Virtualitics will surface insights, presented in plain language, of statistical significance for user review. Insight cards can be pinned to findings for future use and edited further.
It can be difficult to communicate findings with stakeholders and executive teams to get their buy-in. AI projects, in particular, require trust and understanding from the start and the complex nature of the data relationships that will be leveraged can be exceptionally difficult to communicate.	Virtualitics' visualizations are designed to illustrate the multidimensional relationships that will drive AI. The 3D visuals clearly illustrate findings in an engaging way, while annotations and linking provide additional explanation and insight, allowing you to get the alignment and buy-in you need to get started.

About Virtualitics

Virtualitics, Inc., the Intelligent Exploration company, harnesses the power of AI- and machine learning-guided data exploration to transform organizations. For more information about Virtualitics, visit virtualitics.com.

Our customers create measurable results with accessible AI

Virtualitics, Inc. is an advanced analytics company that helps enterprises and governments make smarter business decisions faster, with ready-to-use AI that can be understood by analysts and business leaders alike.

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