AMALGAM INSIGHTS

Analyst Insight

The Era of Decision Intelligence: Empowering Employees with AI-Enhanced Business Decisions

Author

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EXECUTIVE SUMMARY

Key Stakeholders: Chief Information Officers, Chief Technical Officers, Chief Data Officers, VP of Analytics, Analytics Directors, Analytics Managers, Digital Transformation Heads, Director of Engineering, Enterprise Architecture Directors and Managers, Application Architecture Directors and Managers, Financial Systems Directors and Managers

Why It Matters: Decision intelligence will be the most important value driver for enterprise analytics and machine learning in this decade. Amalgam Insights projects that the adoption of Decision Intelligence will provide machine-learning-aided personalized decisions to a majority of employees by 2030. However, businesses must be aware of the artificial intelligence, business logic, and social science aspects of Decision intelligence to take full advantage of this new technology.

Key Takeaway: Amalgam Insights firmly believes that Decision Intelligence will drive the next decade of analytic adoption and that early adopters will see the greatest gains in financial Return on Investment. Businesses seeking to maximize value, return on assets, and profit based on their enterprise data need to start taking a business-wide Decision Intelligence approach and avoid the mistake of siloing Decision Intelligence.

The Era of Decision Intelligence: Empowering Employees with AI-Enhanced Business Decisions

INTRODUCTION: HOW IS DECISION INTELLIGENCE DIFFERENT FROM ANALYTICS AND BUSINESS INTELLIGENCE?

Over the past decade, businesses have been pushed to become more data-driven with the emergence of Big Data and Cloud Computing, the resurgence of Artificial Intelligence, and the increased demands for real-time and personalized services. Both the hype and the practical demand for making information-driven decisions have made this capability a strategic advantage for the enterprise. In the 2020s, AI, Big Data, Process Automation, and Cloud Computing have created a business environment where the average employee is simultaneously engulfed by data and algorithms and yet unable to find the most important data to make the best business decisions in real-time.

Employees know they are not taking full advantage of the data at hand yet lack the tools or skills to extract the relevant data and analyze it to determine what to do next. To compensate, enterprises have been trying to both acquire AI-enabled tools to conduct specific activities or hire date scientists to effectively code their way to AI insights. Although both approaches provide short-term value to solve specific business problems, neither path represents a long-term scalable path to provide directional guidance and recommendations to a large employee base on a real-time basis.

Because of this, a new technological enabler has evolved from the analytics, Big Data, and machine learning tools developed over the past decade to help companies make smarter decisions: Decision Intelligence. Amalgam Insights defines Decision Intelligence as:

> the ability to
>
> 1) **use relevant and available data** to
>
> 2)**identify and explain optimal actions** that
>
> 3) **improve business outcomes**.

Relevant data, explaining optimal actions, and improving business outcomes all matter, as Decision Intelligence has to take full advantage of the data gathering and management improvements made in the past decade, use analytic and machine learning capabilities to provide a recommendation, and provide recommendations that are directly translatable to business goals in language that is comprehensible to the business manager.

Decision intelligence has emerged as a capability to provide semantic business context to data, translate data into specific next steps and recommended actions, and use feedback and conversational natural language inputs to improve personalized results and requests. Amalgam Insights estimates that the

scalability of Decision Intelligence combined with the breadth of use cases that are covered within Decision Intelligence will make this capability the most valuable new addition to enterprise analytics environments over the next decade.

AN BRIEF HISTORY OF DECISION INTELLIGENCE

Decision Intelligence was made possible by three key advancements in enterprise analytics: Big Data, Machine Learning, and self-service analytic discovery. All three of these concepts had existed in some form for decades but saw massive uptake in the 2010s due to technological advances.

The phrase "Big Data" is often attributed to John Mashey, who used this term in the late 1990s, but Big Data did not truly come into being as we knew it until the mid-2000s when the Internet and web traffic drove the need for orders of magnitude increases in data usage at the enterprise level, rather than only at research facilities and telephone carriers. Hadoop was first released in 2006, leading to a host of competitors and the "Big Data" era as we know it today. From a practical perspective, Hadoop and cloud computing provided enterprises with the ability to collect data and files at massive velocity leading to a time where at once point, IBM estimated that 90% of the world's data had been created in the past two years. As data 10x'ed in growth every two years, business investments in analytics and the data analysts needed to contextualize that data did not keep up.

Likewise, computational machine learning and artificial intelligence have been studied since the 1950s, but general access to statistical libraries remained relatively scarce until R became a stable production language in the 2000s and was one of the core languages supported by Jupyter notebooks in 2014. Google further opened up access to machine learning in 2015 when it opened up TensorFlow as an Open Source project. These technologies, along with subsequent competitors, greatly opened up both enterprise access to machine learning from a programmatic perspective and business understanding of the potential for machine learning as projects came into production. Over the past few years, machine learning has quickly transformed from a potentially interesting capability to a technology that is either in production or on the roadmap of every large organization on the planet.

A third important context for Decision Intelligence comes from the self-service analytics movement of the 2000s and 2010s driven by the likes of Tableau and Qlik. This movement greatly democratized business intelligence by allowing data analysts and employees to start exploring their own data without requiring the specific skills associated with advanced data reporting and visualization. This age of self-service data decisions was increased by pop-culture phenomena such as Michael Lewis' Moneyball, which showed how data could lead to unexpected solutions and success that surpassed long-held industry assumptions. However, as these solutions ran into challenges in usability and business context, they reached a ceiling of adoption that fell short of reaching a majority of employees and providing direct guidance.

The actual practice of Decision Intelligence is an evolution of both analytics and decision management solutions. The term was first popularized by Google in the late 2010s as it sought to bring machine learning, social science context, and economic business decisions together into a single framework to find optimal recommendations based on imperfect data.

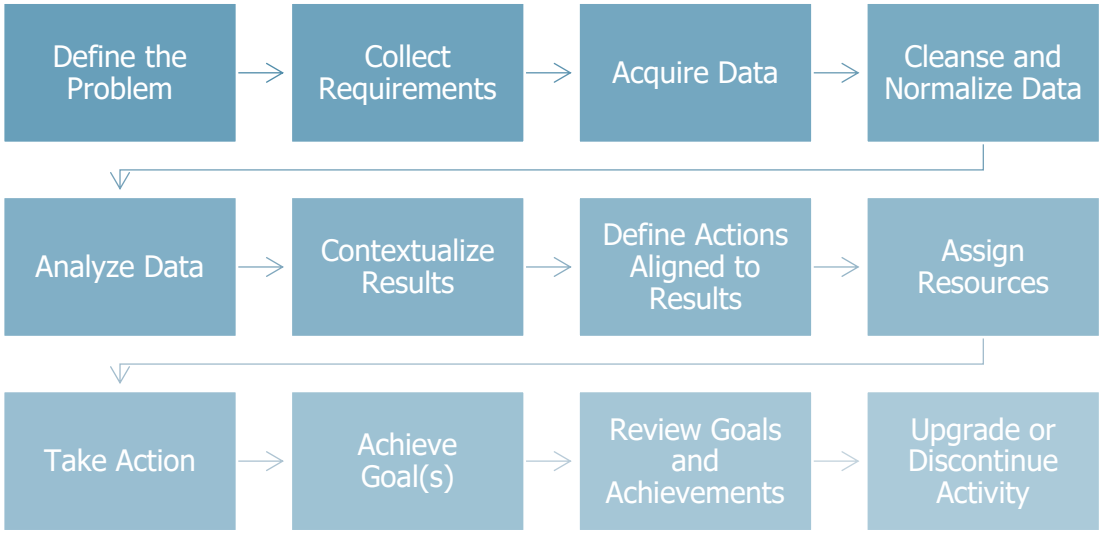
As a result, organizations have found themselves with more data than they can sort on their own, the expectation that machine learning can help with deep analysis mitigated with the challenge of lacking dedicated data science and machine learning resources, and the increasing employee demand for self-service help to make better data-driven decisions.

KEY CHALLENGES THAT DECISION INTELLIGENCE CAN SOLVE

One of the key challenges in enterprise analytics is the relative lack of adoption relative to investment. Over the past decade, analytic adoption has increased from roughly 20% of employees in 2010 to 30% today. The majority of employees still do not use analytic solutions because they lack access, lack the knowledge to use technical analytic solutions, and most importantly, do not see how their challenges and problems can be answered with the standard analytical software that is in the market.

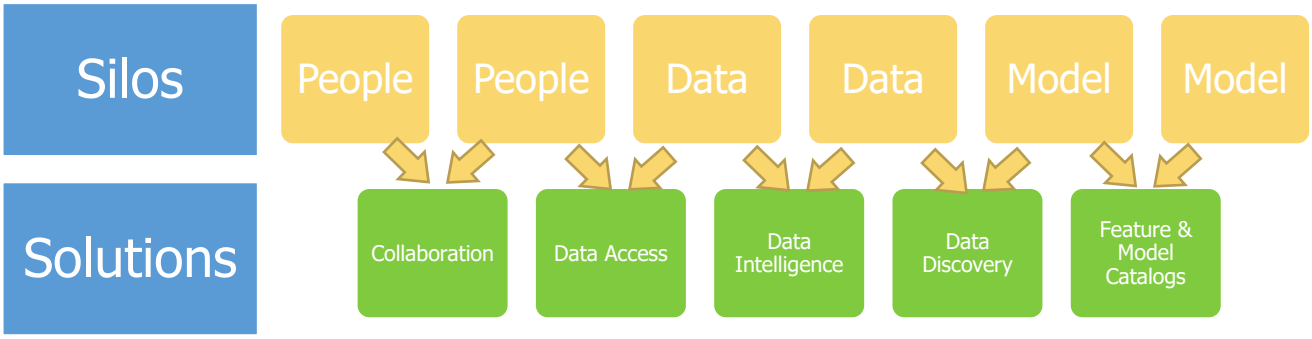
A second challenge is in managing the lifecycle of data-driven decisions. Amalgam Insights sees this lifecycle as consisting of the following stages: Define the Problem, Collect Requirements, Acquire Data, Cleanse and Normalize Data, Analyze Data, Contextualize the Results, Define Actions Aligned to Results, Assign Resources, Take Action, Achieve a Goal, Review Goals and Achievements, Upgrade or Discontinue Activity

FIGURE 1: THE DATA-DRIVEN DECISION WORKFLOW



A third challenge is how people, data, and the models and algorithms that support decisions are all separated from each other. This can be thought of as a set of silos where people are separated from each other, data are separated from each other, and models are separated from each other. And then each of these silos can be brought together through a solution.

FIGURE 2: SILOS AND SOLUTIONS FOR DECISION MANAGEMENT



This combination of solutions is a massive undertaking to take on as a net-new set of capabilities, but these are all table stakes to support true data-driven Decision Intelligence that is supported by modern machine learning and augmented analytic capabilities. Ideally, Decision Intelligence should be run through a solution that allows for collaboration, provides access to all relevant data, gives employees business context, and improves over time, both through data discovery and model improvements based on the Decision Workflow.

A fourth challenge is that the types of decisions that need to be supported through data differ both in the types of support and analysis that exist. Amalgam Insights typically breaks out analysis into six categories: Binary, Variance, Portfolios of Options, Expected Outcomes, Decision Optimization, and Next Best Action.

Binary decisions are based on identifying whether an object or scenario has occurred or not. It either has happened or has not happened. The challenge here occurs as the scenario becomes more complex, such as in trying to identify a face or to detect if somebody is happy or sad. And from a Decision Intelligence perspective, it is important to know if the data seem to be related to taking the next action that the business is planning to take.

Variance decisions seek to show the level of uncertainty associated with a decision. Rather than simply state an answer, variances show the range of expectations that a scenario could occur. Often, the variance and uncertainly associated with a potential outcome can be more important than the calculated probability of the outcome.

Portfolios of options allow users to compare a variety of similar potential next steps based on their probability, variance, and feasibility. Portfolios based on probability and variance are what enterprises

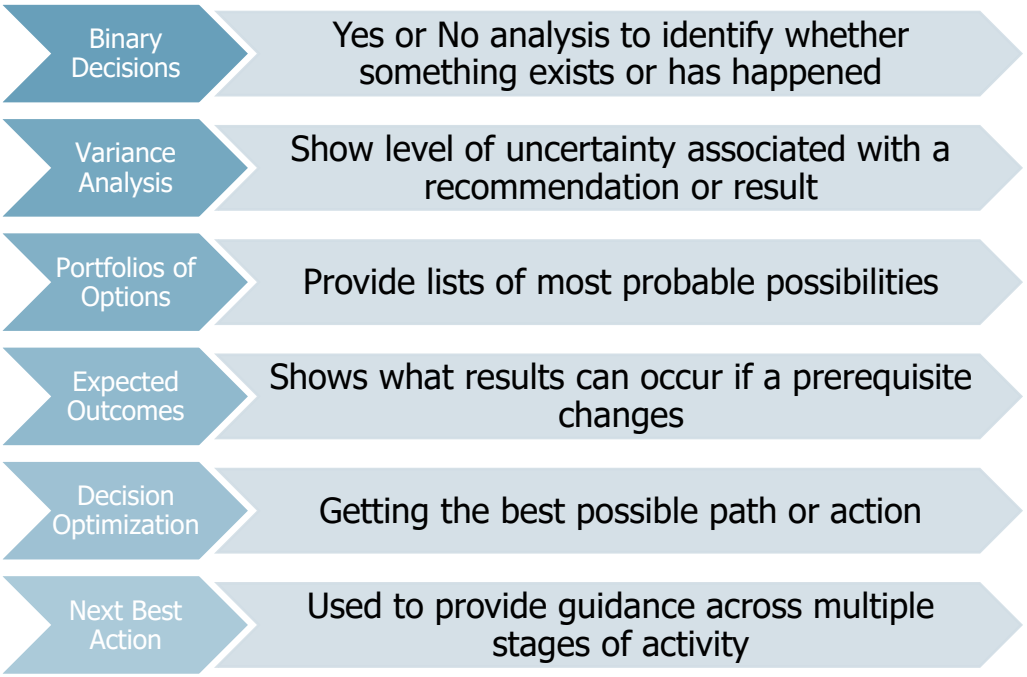
often currently see when they seek guidance from decision management solutions: statistically driven portfolios that provide a set of options, but lack the context to understand the viability, context, or long-term repercussions associated with pursuing each option.

Expected outcomes speak to the what-if challenge of trying to figure out the "butterfly effect" of data changes. As one aspect of a decision changes, analysis of expected outcomes allows companies to see how the end result or next recommended step should change as a result.

Decision optimization speaks to the need to simply make the best decision at any given time based on real-time data. Although this sounds simple, the challenges of asking the right question, accessing current data, translating the results into actionable business activity, and actually acting often make it difficult to make good data-driven decisions that optimize success.

Next best action is a well-known issue to understand what should be done to optimize a lengthy workflow with many steps. This can be a marketing, sales, manufacturing, supply chain, logistics, finance, operations, information technology, or other challenge. A key challenge here is that businesses often have an optimization solution for each of these areas, but they each work separately with their own version of the truth, which leads to the model and data silo issues previously mentioned.

FIGURE 3: DECISION TYPES FOR DECISION INTELLIGENCE



In this complexity of lifecycles and solutions, the importance of Decision Intelligence is ultimately focused on supporting a simpler process: Ask a question, analyze and contextualize all data in real-time, and get a solution.

FIGURE 4: DECISION INTELLIGENCE: SIMPLIFYING THE DATA DECISION WORKFLOW

WHAT IS DECISION INTELLIGENCE?

As defined before, Decision Intelligence is the ability to use relevant and available data to identify and explain optimal actions that improve business outcomes. From a practical perspective, this means bringing together the data, metadata, analytics, and machine learning capabilities needed to create a system that can recommend the best action to achieve a goal and then update over time to ensure that it continues to provide the best action over time as more productive actions become viable over time or as the situational context changes.

From a technical perspective, organizations seeking to improve Decision Intelligence need a toolkit or solution that allows them to:

Combine data from multiple data sources and make them available. The average enterprise uses over 700 data sources and 900 different Software as a Service apps at this point. Decision intelligence tools need to help with bringing in the right data and context for making a decision.

Enrich data based on the roles, departments, or projects that are driving the use of Decision Intelligence. This includes building a personalized semantic layer for each user to provide guidance on the types of guidance that they are looking for. Ideally, this can be done with a single toolset or platform to support employees across the company, rather than having to break out Decision Intelligence into a separate supply chain solution, a separate marketing solution, a separate sales solution, a separate governance solution, et cetera...

Allow end users to ask questions in natural language to get answers. As mentioned before, one of the key obstacles to analytic adoption has been the user interface associated with accessing even the

most basic of analytic capabilities. Lowering the barrier to entry brings data-driven recommendations to more people.

Get Recommendations using the language and context that employees would typically use. Decision intelligence only provides actionable real-time guidance when it provides business users with directional guidance that they can understand without breaking out a statistics textbook or a data schema.

Use machine learning and feedback to iteratively improve over time. We are well into the 21st century: it is time that technology takes over to automate iterative tasks and to improve itself over time without constantly requiring human data entry and authorization for every manual task associated with improving results. Decision intelligence should be an opportunity to improve human judgment by enhancing it with appropriate data, not a chore where users have to constantly train a system to provide relevant information in the fast-changing work environments that we all have.

RECOMMENDATIONS FOR THE AMALGAM INSIGHTS COMMUNITY

Decision Intelligence will be the biggest value enhancement in enterprise analytics in this decade, the 2020s. This is a practical use for bringing the buzzword of artificial intelligence into the enterprise in a way that solves common business problems and prioritizes data appropriately at a time when even trained data experts can struggle to find and sort the data available to them. Decision Intelligence also provides the opportunity for companies to expand access to both data and analytics outputs that may have already been available to employees but were not contextualized or positioned to provide actionable guidance. As organizations pursue Decision Intelligence to gain strategic advantages and continue evolving their enterprise analytics environments, Amalgam Insights provides the following recommendations.

Build Decision Intelligence on top of existing data structures, semantic layers, taxonomies, ontologies, queries, and algorithms. Analytic users are suffering from information overload and in the process, they may simultaneously have too much data to sort and too little data for the specific problems as they try to find needles in a haystack. The new challenge is to prioritize data and actions for users and to provide the data-driven consultancy that every employee would like to have before making key business decisions.

Bring together decision optimization, decision management, and Decision Intelligence efforts. Today's fragmented analytics and decision management environment often makes it impossible to develop best practices as each solution and department creates its own version of the truth and algorithms to support business decisions. This is not a scalable or repeatable approach. The 2010s were a time for rapid experimentation and breaking fast, but the 2020s are a decade for practically augmenting

human effort with production-grade software and analytics that improve over time. The days of one-off data science efforts driven by superhero data scientists need to give way to a more repeatable and governable mode of supporting complex analytics and algorithms.

Do not ignore the social science aspects of Decision Intelligence. Decision intelligence is a combination of business logic, artificial intelligence and data, and social science context. The first two tend to fit into the mantra of "IT-business alignment" that every enterprise technology department is familiar with. However, the social science context of Decision Intelligence includes presenting recommendations effectively, with the right language, and at the right time. These are aspects where end user feedback, communal knowledge, and the internal politics associated with specific actions are important to consider. As an extreme example, if a Decision Intelligence solution recommends laying off hundreds of employees and your organizational culture eschews laying off employees without desperate measures, this is an area where the most "economic" solution may need to be corrected by providing additional training and context to the Decision Intelligence solution.

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ABOUT AMALGAM INSIGHTS

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Amalgam Insights is a leading research and advisory firm focused on the financial, programmatic, and cognitive tools that multiply the value of enterprise technology. Our research includes the following practices: Technology Expense Management, Analytics and Data Management, Data Science and Machine Learning, Accounting and Finance Technologies, DevOps and Open Source Development, Talent Management, Learning & Development, and Extended Reality.

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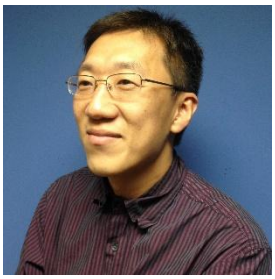

Hyoun is the Founder and CEO of Amalgam Insights. He focuses on Technology Consumption Management challenges of procurement and utilization based on 20+ years of vendor, enterprise IT, and industry analyst experience.

Prior to Amalgam Insights, Hyoun led IT analyst practices at the Aberdeen Group and Blue Hill Research with over 300 research documents across analytics, mobility, finance, and collaboration; managed multi-million-dollar technology budgets at Bose and Teradyne; supported billing data operations for two resale telecom CLECs; and built prediction models for the first Fantasy Baseball website, mosey.com

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