



FORMIDABLE FORECASTS

HOW AI DELIVERS BETTER, FASTER FORECASTS



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WHAT DOES THE FUTURE HOLD FOR FORECASTING?

What does the future hold? Whether in times of sustained growth or huge volatility, organizational leaders attach enormous value to acquiring ever-more accurate forecasts, delivered almost on-tap for demand, supply, sales and service utilization.

Forecasting is a critical activity, especially when you consider that this process underpins both operational efficiency and financial understanding. It shines a light, illuminating factors that impact capacity planning, cash flow, margins and capital expenditure. In highly volatile times when demand swings wildly and supply chains are strained, the need to predict the future becomes more apparent. There is more attention on the forecasting process, with greater interest in improving accuracy and in understanding the range of uncertainty in forecasts.

FORECASTING IS NEEDED LIKE NEVER BEFORE

Increases in the variety, magnitude and pace of change across industries—from technology to regulations to natural disasters and public health crises—have increased the value of analytical forecasting to organizational leaders. The need for more certainty delivered faster is rooted in the quest for improvements in operational efficiency, as well as increasing demand from customers and constituents to get products and services delivered through the right supply channel when they want them.

But it's not just about forecasting customer demand and planning inventory. Demand forecasting is also critical for energy, water and telco providers in planning for service consumption and infrastructure investment. And it's also crucial in the financial services sector. For instance, as attitudes towards risk change, insurers will need to understand what that means for their product lines and bottom lines. Banks need to understand changing demand for credit and payment holidays.

Public sector organizations need to forecast demand for entirely new services, such as those created recently to give employees support in tough economic times. In healthcare, hospitals need to plan for surges in demand for beds, clinicians and drugs across populations, locations and health conditions—and as a result, so will social and welfare services.

On the flip side, inaccurate, slow or biased forecasts lead to poor decisions that ramp up costs, erode profits, and are likely to undermine customer service. Though organizations may require many thousands of forecasts each year, they simply cannot afford to retain the legion of experts they would need for manually creating the required number of forecasts. In addition, as volumes continue to explode, wrangling data for use with analytics is becoming an increasing challenge and source of additional cost. Therefore, many are looking to the automation capabilities of AI for both model selection and forecast generation to augment the work of their experts. Let's take a closer look at what AI can achieve in forecasting.

THE
NEED

WHY AI?

It is this speed of change and the need to produce forecasts based on ever-changing circumstances that is driving the need for more sophisticated and more dynamic forecasting. This need has a resultant effect on analytics teams that may be swamped with forecasting requests—many are burdened by manual processes, others might be hamstrung by lack of repeatability in their process. These issues can be addressed very effectively with AI and by following the analytics lifecycle from data through discovery and to deployment.

By adding AI capabilities to traditional forecasting processes, it's possible to automate the production of large-scale time-series analyses and hierarchical forecasts, which will create efficiencies.

In the next section we examine common forecasting myths in order to highlight ways to improve forecasting moving forward. First, let's showcase how transformative AI can be.

EFFECTIVE CPG MARKETING BEGINS WITH MORE ACCURATE FORECASTING

A leading consumer packaged goods company relies on forecasting to plan production and organize logistics amid seasonal influences, weather fluctuations, demand swings, other retail trends and the perishability of products.

With a wide portfolio of products with many different demand patterns, the SAS Forecast Value Added (FVA) methodology has proven to be useful. FVA describes the degree to which any given step in the forecasting process reduces or increases the forecast error, allowing the organization to streamline the process and avoid wasting resources.

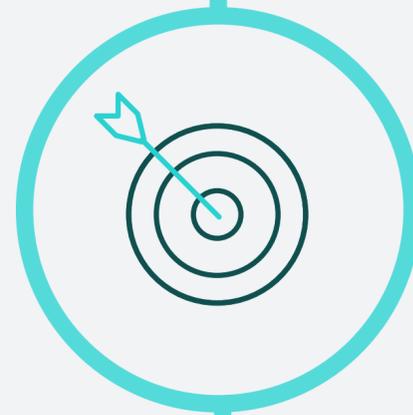
Using SAS in this way has meant an improvement in performance for key portions of their portfolio of products, and it has freed up time for demand planners to focus on higher-impact opportunities.

WHY AI?

LET'S GET REAL ABOUT FORECASTING

As demand for forecasting grows, knowing what is possible and what is not helps narrow the field in selecting a partner and software to support this critical business function. Three of the most important considerations in that process include: accuracy, bias and algorithms.

KEY FORECASTING CONSIDERATIONS



1. ACCURACY

HOW GOOD IS GOOD ENOUGH?

Be wary of any claims of consistently achieving highly accurate forecasts. This is because the level of accuracy that may be achieved is ultimately determined by the behavior you are trying to forecast. For example, if you were to predict the outcome of a fair coin toss, over a long series of tosses you will only make the right choice 50% of the time. The level of randomness limits accuracy—and it is the same principle for demand forecasting.

Excessive, unneeded, and accuracy-harming adjustment of the computer generated forecasts is an oft-cited problem. And it happens to be one that machine learning approaches are helping to resolve, by providing guidance to the forecaster in making forecast adjustments.

THE REALITY



2. BIAS

HOW CAN YOU REDUCE THE HUMAN IMPACT?

Just because data is the key ingredient of a forecast, doesn't mean all forecasts are solely based on data. When initial forecasts are unacceptable to management there will be pressure to adjust them, contaminating the process with the biases and personal agendas of the stakeholders. There are ways to overcome the challenge of human bias, such as Forecast Value Added (FVA) analysis which, as we outline later, can identify different biases and help streamline the forecasting process.



3. ALGORITHMS

ARE THEY ALL OR PART OF THE STORY?

Yes, algorithms are important, but there are other critical capabilities that also will affect accuracy and efficiency. You'll want to produce a large number of forecasts quickly, while also taking into account other impacts such as seasonal events and any short-term promotions. To better reflect the complexities and nuances of the scenarios you are forecasting, make sure you have the ability to manually override forecasts based on a set of key attributes, not just hierarchical variables. Additionally, being able to segment your time-series data according to the types of data, e.g. seasonal, trending, or new products, will allow you to fine-tune selected models for better quality forecasts.

THE
REALITY



FORECAST WITH RIGOR

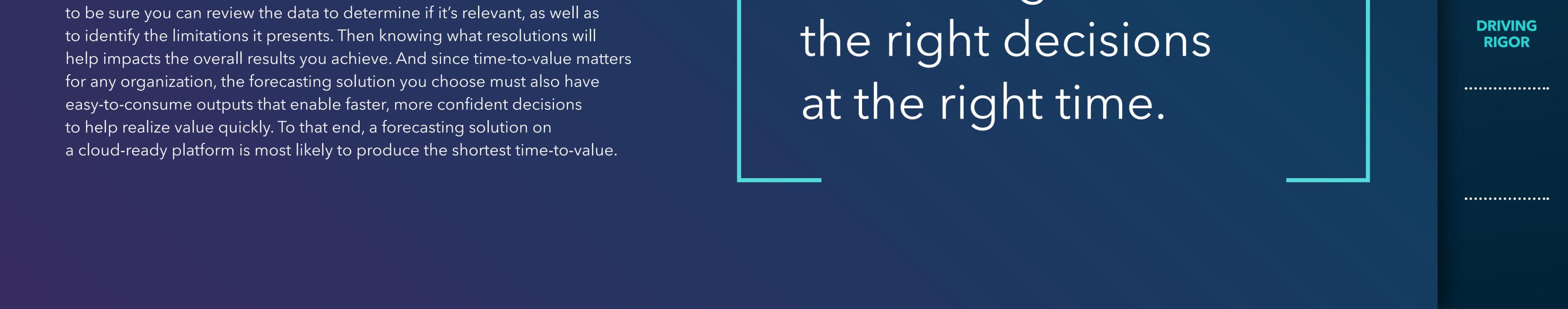
It's vital to remember that a good forecast requires good quality data and robust, well governed processes. The level of rigor needed to optimize the value of forecasts calls for a single end-to-end forecasting capability that includes good data prep and data management techniques, as well as statistical modelling and management review.

It's not just the technology that matters, it's the ability to continually improve the quality of data and the process of forecasting that is important. You want to be sure you can review the data to determine if it's relevant, as well as to identify the limitations it presents. Then knowing what resolutions will help impacts the overall results you achieve. And since time-to-value matters for any organization, the forecasting solution you choose must also have easy-to-consume outputs that enable faster, more confident decisions to help realize value quickly. To that end, a forecasting solution on a cloud-ready platform is most likely to produce the shortest time-to-value.



Incorporate learning
and automation into
forecasting to enable
the right decisions
at the right time.

DRIVING
RIGOR



One of the most impactful ways to transform demand forecasting is by incorporating both learning and automation capabilities into it. Taking that step is an important way to leverage the capabilities of AI to improve quality and speed in ways that build trust for your forecasting function. It will help your organization make the right decisions at the right time and meet the accelerating challenges of an ever more complex world.

Part of building that trust can be achieved through the FVA approach mentioned above, which can identify activities and people in the forecasting process that either fail to improve the accuracy of the forecast, or make it worse. In doing that, it streamlines the process of producing more accurate forecasts. It does so as efficiently as possible—by consuming the least amount of company resources.

Figure 1 illustrates simple (left side) and more complex (right side) forecasting processes. The forecast can be adjusted at each step of the process. FVA should be measured at each step, to identify which steps are making the forecast more accurate, and which are just making it worse.

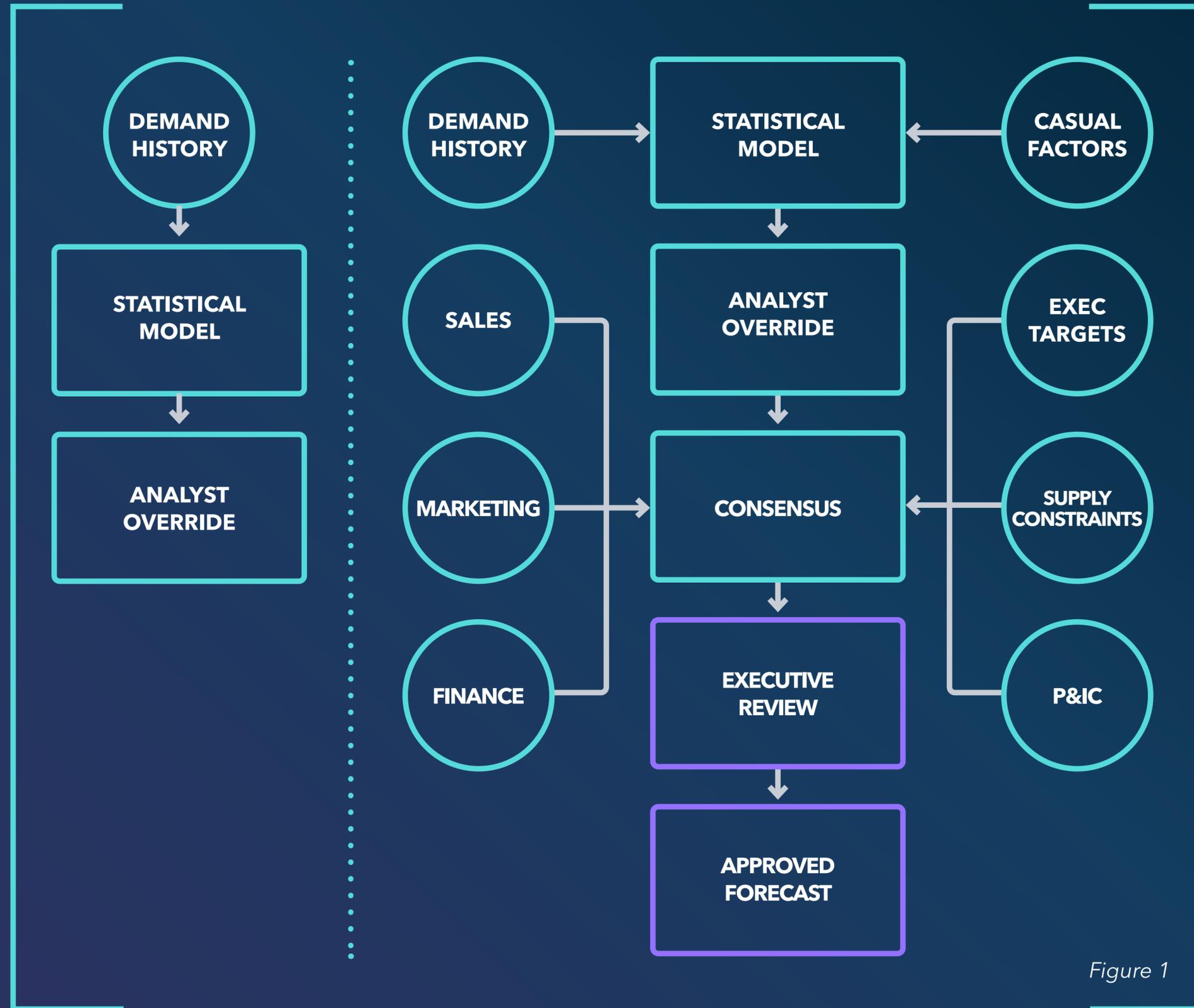


Figure 1

MAKING LIFE EASIER FOR ANALYTICS TEAMS

As we've seen, the impact of forecasting can be significant. Great forecasts can feed efficiencies and greater understanding of other areas of your organization; poor forecasts can increase expenses and decrease revenues, diminish customer experience and hamstring operations.

Amid so much volatility and with so much at stake, the impact of making life easier for analytics teams cannot be overstated. It's a significant way to derive greater value from your forecasting process.

MAKING FORECASTING EASIER

With one end-to-end solution you can acquire, clean, and prepare data for modeling, data segmentation, automatic modeling or use open source algorithms, data visualization and time series exploration, and reporting. Open source compatibility affords data scientists and other analysts the freedom to code in a range of languages, without sacrificing process standardization, model degradation prevention, and built-in data governance.

MAKING FORECASTING FASTER

Being free to automatically produce large-scale time series analyses and hierarchical forecasts will help your teams get more done. By reducing the requirement for manual intervention there is less chance of introducing bias. When forecast analysts don't have to manually build and monitor forecasting models for every time series, production is faster and skilled personnel can focus on more strategic, high-value forecasts or projects that aren't suitable for automation.

The amount of time analysts spend reviewing forecasts can be reduced by applying machine learning to identify which statistical forecasts should be manually overridden. Doing that also can provide a suggested increase/decrease direction and a range of adjustment. Another benefit of machine learning is to improve the accuracy of those adjustments.

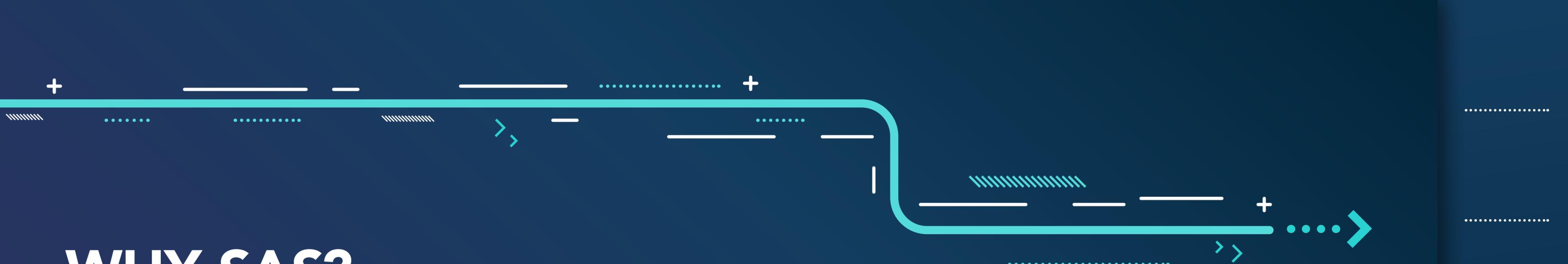
MAKING LEARNING EASIER

With the inclusion of Neural Networks (NN), data scientists and analysts can generate features and train NNs, create a forecasting methodology that combines signals from different model types, and address problems with both time series characteristics and a nonlinear relationship between dependent and independent variables.

MAKING CHANGE EASIER

Forecasting solutions that are available via a cloud-ready platform will allow for rapid implementation, which will accelerate time-to-value significantly. In addition, specialized forecasting solutions that are developed for industries such as energy and retail can ease the path to better forecasts.

EASIER FORECASTING



WHY SAS?

Data scientists and analysts across industries benefit from SAS's unified interface that covers the entire analytics life cycle from data wrangling through modeling and discovery to deployment of their models.

They can improve their forecasts by using ensemble models to gain the perspectives of a wide range of available model classes and utilize the information in different time frequencies through temporal reconciliation. In addition, compatibility with open source software allows them to work in Python and R.

Executives leading data and analytics functions are able to harness large-scale automatic forecasting with SAS for even the largest enterprise forecasting challenges. They are also able to manage the forecasting process based on the unique structure of their organization using flexible hierarchies and drive better planning decisions through scenario analysis and possibilities for incorporating new developments (such as promotions) into their forecasts. And open source compatibility enables their teams to manage all their models with high data and governance using a single platform for all data and analytics assets, including open source.

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WHY
SAS?