AURORA PREDICTIONS

Research Paper

Applications of AI-Enabled Analytics

For

Performance Improvement

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Robert J Zwerling, BE, MSc., P.E.

Abstract

$242B is lost annually by businesses from errors, wasted labor preparing spreadsheet reports, and under-optimized planning; despite $500B spent annually on state-of the art enterprise software.

Modern AI-Enabled analytics tools supplement ERP, CRM, EPM, Demand Planning, BI, and data visualization to find patterns in data, make predictions, and forecast more accurately.

While modern IT systems are designed for financial efficiency in a "steady-state", but are ill equipped to deal with dynamic complexities required to make detailed forecasts and predictions, especially when compounded in a changing environment of complex supply-chains and inflation.

The solution is modern AI-Enabled analytics tools built to deep-dive into data to find patterns and make predictions. These tools go beyond ERP, EPM, CRM, BI, and data visualization systems and tools that are transactional/informative but not insightful. AI can forecast more accurately, and analytics delivers insights that reveal unseen risks and unknown opportunities.

This report discusses the use of AI and advanced analytics for forecasting and predictions to reduce forecast error, determine the propensity of sales deals to close, and derive efficiencies that maximize billing in the face of constrained supply. These initiatives reduce costs and increase top line revenue 15%-30%+.

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1.0 Introduction

AI-Enabled analytics can deliver unbiased insights that mitigate our natural bias and yield better decision-making and more accurate planning.

Forecasting today is fraught with large errors. The average demand forecast error is 35%. Even with today's demand planning tools forecasting is an art reliant upon "good guesses" of experienced planners.

The solution is applying AI and analytics to forecasting and predictions across business to find insights, but analytics can be a heavy lift. The average AI project takes 6-50 people, and sadly, 2 of 3 analytics projects fail.

Aurora LightZ™ intuitive/zero-code platform enables analytics to scale by putting easier to use analytics in the hands of business users to solve local problems. This creates a fast-to-value capability that increases business performance.

AI and analytics deliver unbiased insights that can mitigate our natural biases and deliver better decision-making and planning. Analytics don't replace humans; it gives data driven intelligence that combines with our experience and knowledge of the future to increase our accuracy to predict.

This report explores a few applications and benefits of AI-Enabled analytics with Aurora LightZ™ in demand forecasting, sales propensity close scoring, and efficiencies for billing maximization with supply-chain complexities.

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2.0 The Problem

Transactional systems have brought productivity to business through process control, speed, standardization, and transparency. But for all these strengths, they generally lack the capacity and capability to apply AI and analytics that is needed to deep dive on data to find insights that reveal unknow risks and unseen opportunities.

The figure shows the first place to apply analytics is the demand forecast, as this affects all downstream activities.

The average demand forecast error ranges from 22% to 40% cascades to excess materials buffer stock, building of finished goods, and E&O inventory. Even with these excesses, $100B is lost at retailers due to stock-outs.

So, what are companies doing? Many are talking about Artificial Intelligence and advanced analytics, but outside the data science department, few are doing it, and even fewer are achieving meaningful results.

But, you say, my company is using data visualization tools that have dashboards that are pretty smart. Pretty dashboards, yes, smart, no.

Dashboards are informative but not insightful, as they aren't designed to incorporate advanced mathematics and AI algorithms to render insights from data. For insights, you'll need the "muscle" that comes from analytics tools, but muscle it is; i.e the data science skills, reservoir of high quality data (to train the models), and programming knowledge to render usable output from the tool.

Therefore, what's needed by business is an analytics platform that can be used by business analysts and managers to solve their business problems without need of data science/programming skills or IT support. This leads us to discuss some of the uses of Aurora LightZ™ that is just such a platform.

It's important to highlight that analytics tools don't replace ERP, EPM, BI, and data visualization tools but supplement them with the unbiased insights that can be gained from AI-Enabled analytics that the former transactional/planning/reporting tools are intrinsically challenged to deliver.

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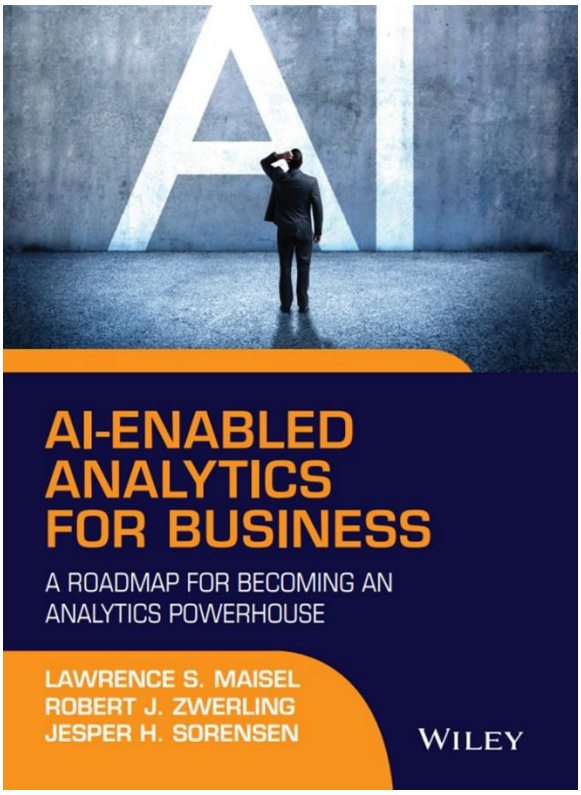
For example, a division of a Fortune 500 manufacturing company spent a year with Power BI and Excel to develop a formula that increased forecast accuracy. Another 3 years were then consumed by IT to incorporate the formula into SAP.

In the groundbreaking book, "AI-Enabled Analytics For Business", (Wiley), by Messrs. Maisel, Zwerling, and Sorensen, there is a discussion on the valued role analytics can play across finance, sales, operations, and supply chain in top line forecasting, as follows:



> *AI-enabled analytics can . . . enable finance to move past its traditional focus of cost control and into top-line growth. . .*
>
> *Budgeting is a stellar use for analytics as the typical budget is DOA. This is not to discount the budgeting process as a valuable exercise, but to state what we all know: budgets do not survive the first contact with reality. The key issue is the top line, as this is the area business cannot meticulously control as it can costs.*
>
> *Demand, sales, and revenue are all subject to the customer. But the good news is that customer prediction is in the realm of analytics, often with accuracy superior to biased human guesses that are made in the budgeting process.*
>
> *But you say, "My budgeting tool forecasts revenue." There is a significant difference between allocating a guess, which is typically done with budgeting tools vs. statistical forecasting that can mitigate bias, and the truly unbiased forecasting from AI enablement. And for the latter, you'll need AI-enabled tools.*
>
> *This is not to say AI tools replace budgeting tools; rather, they work in concert with the workflow capabilities of budgeting tools and the input of future events that humans know but that are not contained in the data. This is the best of all worlds that combine human and machine.*

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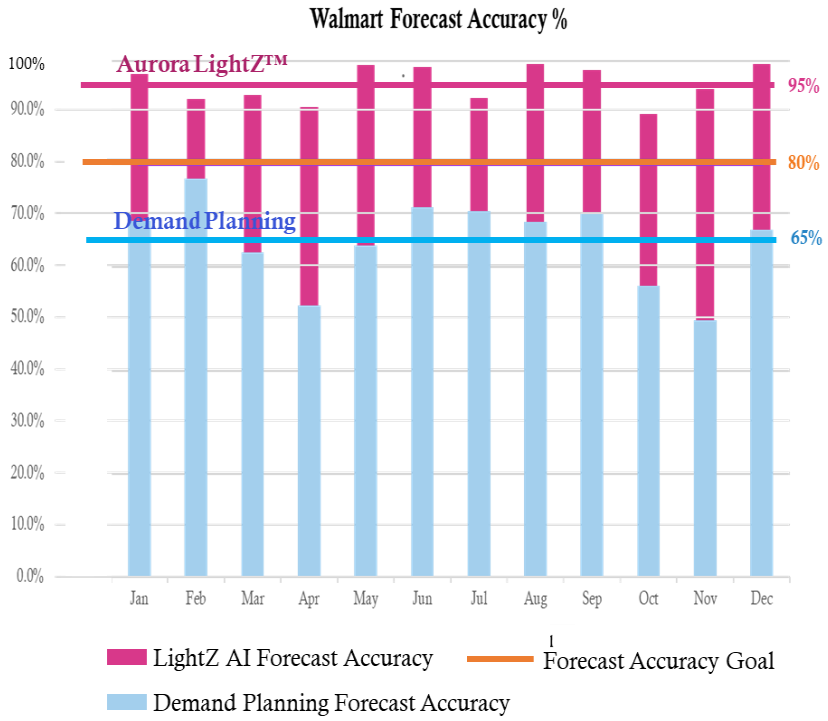
3.0 AI Demand Forecasting Use Case

Top-line forecasting is low-hanging-fruit for the application of Artificial Intelligence. Aurora LightZ AI-Enabled software attacks forecast error through its novel AI that needs no data science/programming skills or IT support nor model training, as the EmeraldZ AI ***thinks*** through data vs being trained by it.



In this benchmark, the maroon bars are a LightZ™ forecast made 1-year in advance by month at the customer level. LightZ forecast accuracy exceeded the preset accuracy target of 80%, with accuracy ranging from 90% to 99% and an average 95% accuracy across the year. LightZ forecasting was done out of the box in a few simple steps through the 1-Touch AI forecast.

Next, a state-of-the-art demand planning system made the 1 year forecast in the blue bars, with accuracy ranging from 48% to 78% and an average accuracy of 65% across the year.

Top-line forecasting is broadly applied across demand, revenue, sales, RMA, and cash flow. These are exceptionally good uses for AI because benchmarks show AI will produce more accurate forecasts more often than ERP, EPM, Demand Planning, data visualization, BI, and spreadsheet tools. The reason for higher accuracy is found in the dynamic nature of AI.

We can simplify forecasting to four dependent variables of Data, Dimension, Formula, and Time Series. Data (e.g. sales) is that to be forecasted. Dimension (e.g. customer) is the segmentation to forecast at. Formula (e.g. linear regression) is the method to forecast the Data at the Dimension. And Time Series (e.g.14 months Data) is the amount of historical time of the Data to be used in the Formula to forecast the Data at the selected Dimension.

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A user selects the Data and Dimension, this is the easy part. But what of the selection of the Formula and Time Series, as every Dimension for the selected Data may require a different Formula and Time Series. This is the hard part that transactional/planning/reporting systems/tools either require you to select the Formula and/or Time Series, or the system/tool will fix the selection to one Time Series with multiple formulas or varied Time Series with one Formula.

Because Formula or Time Series is fixed or a user must choose one or both, only when the right selection is made does forecast accuracy improve. Now, a data scientist/statistician can spend considerable time selecting the Formula and Time Series for each Dimension, but what if you're not a data scientist? And this is where AI comes in to make unbiased decisions that more often produce more accurate results.

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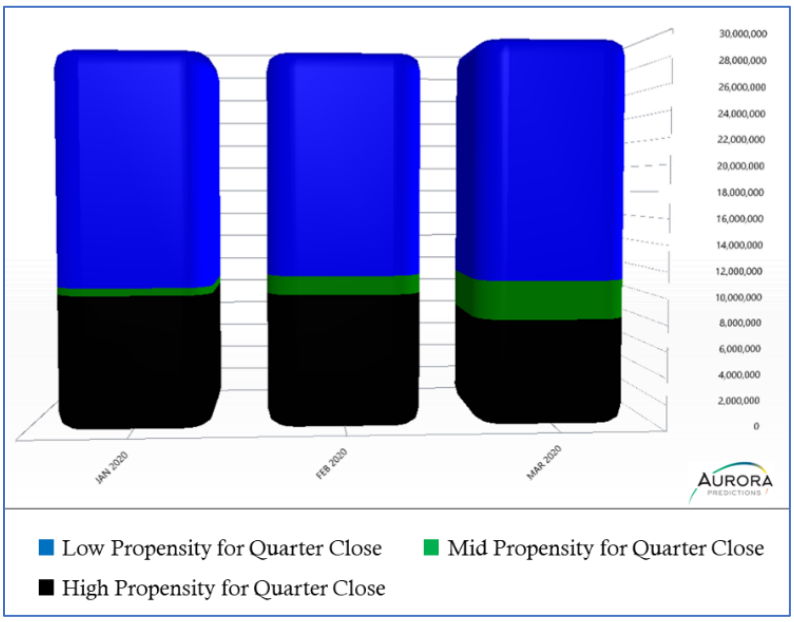
4.0 Sales Propensity Score & Billing Maximization Use Case

4.1 SALES PROPENSITY ANALYTICS

$1B electronics manufacturer said "I know 50% of my deals in the sales pipeline will not close. I just don't know which 50%." Further, when Sales Reps focus on closing an account that's not "ready" to close, large discounts are often offered that degrade revenue quality and leads to profit shortfalls downstream.



It's hard to assign the right resources to the right deal when you're not sure what deals will close and when. In the chart, LightZ sales propensity AI-Enabled analytics shines an unbiased light on the propensity of each deal to close in the sales pipeline.

Deep dive into data reveals patterns of deals that have the characteristics to close and don't close, so sales resources can be best deployed to chase deals that produce better revenue quality; i.e. informing managers to let low propensity deals "mature" without much discounts rather than offer large discounts to close a deal too soon.

Once again, AI can see what the human eye can't detect in the data, as well as automate unbiased decision-making about deal propensity measurement (away from the bias and pressure salesmen and sales managers are under to deliver sales).

Another important gain from analytics is measuring the efficiency and effectiveness of Sales Reps. While all sales teams measure each Rep's sales volume in absolute dollars and percent relative to quote, often overlooked is a Rep's efficiency, meaning dollars per deal generated, and effectiveness, meaning the percent of deals closed to the number of deals attempted. Reps can increase sales dollar volume by being more efficient and/or more effective, and if all Reps improved one and/or the other measurement the sales team's dollar volume production will increase too.

Product portfolio analysis can also be introduced to identify areas for improvement, as well as salesman deal characteristics to deal comparison. The former can direct Reps to faster sales and upselling, whilst the latter matches a Rep's selling profile to customer and prospective sale (e.g. a Rep may be good at selling deals under, say $100k, but a $1m deal needs a different selling skill set).

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4.2 MAXMIZE BILLING IN SUPPLY CONSTRAINTS

When demand outstrips capacity to build and supply-chains are uncertain, analytics can discern priorities to maximize billings. For example, the manufacturer organization thinks to build the highest revenue/profit products, but this in isolation can be incorrect. This is especially important when billings can't be recognized until the entire order ships. The solution is to change thinking from individual products to the "efficiency" of a sales order to generate billings.

As seen in the figure, when the efficiency of the order to generate revenue by Sales Price (order dollars per product) is laid out by quintile, with the top quintile having 10X more revenue per deal than the bottom quintile and consumes 85% less product.

AURORA PREDICTIONS	Top Q Commit	Upper Q Commit	Mid Q Commit	Low Q Commit	Bottom Q Commit
Demand – July 21					
Quantity	86	309	329	770	1,150
Sales Price	106,836	68,314	56,630	30,556	10,636
Total Price	4,922,512	12,451,744	10,629,666	12,440,685	7,977,206

1494 Products $40.4m

1150 Products $7.9m

Generate **$32.5m (4X)** More Billings with Only 30% More Products

Segmentation of sale deals often start with a layering in a "sales-tree" of four categories as follows:

1. Sales Priority
2. Commit
3. Best Case
4. Pipeline

Sales Priority are strategic deals, Commit has 50% close odds, Best Case has 25% close odds, and Pipeline has 10% close odds. The percentages are established by manual measurement of past performance and not by any analytics calculation, and deals are placed in each category by the Sales Rep. As such, the process is biased and based on hope and experience.

This is why operations and sales organizations often work in stovepipes that are incentivized differently; i.e. sales is responsible for a sale dollar volume quota, whilst operations for building and shipping product in unit volume. This often creates a chasm of thinking that mitigates the overall maximization of billings and profits of the whole of the business.

AI-Enabled analytics can be overlayed on the sales-tree. Combining quintiles of deal efficiency to generate billings with sales deal propensity to close (discussed above) within each sales category can then elevate the intelligence of the sales-tree to predictively integrate the dollars of sales with unit volume of production to enlighten decisions for both operations and sales.

In the revised sales-tree below (that uses the Commit category as an expanded example) manufacturing and sales can cooperatively balance sales' priorities with capacity planning to clearly make decisions that are strategic whilst maximizing revenue and revenue quality with respect to unit production volume.

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1. Sales Priority
2. Commit
    a. Top Quintile Sales Efficiency
        i. Top Close Propensity
        ii. Mid Close Propensity
        iii. Low Close Propensity
    b. Mid High Quantile
    c. Mid Quintile
    d. Low Quintile
    e. Bottom Quintile
3. Best Case
4. Pipeline

This application of AI-Enabled applications has an added benefit of materially reducing the time and friction that typically comes at the end of each quarter as the business presses to bolster its revenue. Landing-The-Quarter (LTQ) is often fraught with sales pressing manufacturing to ship more products. However, because each organization can now see the effect of decisions of which customers or prospective customers gets priority, the LTQ process is made faster and easier.

For example, the sales organization says to build or reserve products for a major strategic account that's currently in the Commit category with the analytics assessment of Mid Quintile of billing efficiency and Low Close Propensity. Manufacturing responds to ask if the deal is being moved to the Sales Priority category, to which the sales organization says, yes. OK, is manufacturing's response, along with the question of, Which deal do you want to move out of Sales Priority?

LTQ is now streamlined as both organizations understand that the analytics enabled sales-tree creates a prioritization maximizing billing against part and product availabilities and manufacturing capacities, such that rearranging one deal requires a corresponding movement of another deal.

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Conclusion

AI-Enabled analytics tools across operations, sales, and finance for forecasting and predictions are superior to legacy systems be they ERP, CRM, EPM, Demand Planning, BI, data visualization, or spreadsheets. However, all analytics tools are not the same, and new generation tools where "intelligence" is imbedded can substantially reduce the time, effort, and cost to deliver AI, as well as put AI in the hands of the business analysts and business managers to solve their local problems with a fast-to-value and high ROI.

In the use cases herein, Aurora LightZ™ displayed demand forecasting with substantially reduced forecast error 1 year in advance as compared to a state-of-the-art demand planning system. Sales closing predictions and sales deal efficiencies were used separately and together for assigning the right resources that maximize revenue and revenue quality.

Note worthy too, is that the models to achieve increase forecast accuracy and predictions were done without need for data science/statistic skills and zero coding.

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About the Author

Robert J Zwerling, P.E. – *Managing Director, Aurora Predictions and Finance Analytics Institute*

Mr. Zwerling is a high-tech serial entrepreneur with 25 years experience of founding and growing software companies across telecommunication, manufacturing, distribution, high data availability, predictive analytics, and artificial intelligence. He is an accomplished business leader, speaker, and author on predictive analytics, inventor of the innovative One-Touch AI forecast with no need for model training, and creator of the Systematic Thinking™ methodology for the application of AI and analytics to solve business problems.

Mr. Zwerling is at the vanguard of digital transformation, with 1000+ analytics projects, his experience has made him a thought leader in analytics and novel strategist in the deployment of AI. He has been a keynote speaker and delivered highly rated lectures/courses across North America, Middle East, and Europe. He has co-authored articles and research papers, and the definitive books ***"Implementing an Analytics Culture for Data Driven Decisions"***, and ***"AI-Enabled Analytics for Business"*** (Wiley).

Mr. Zwerling is founder and managing director of Aurora Predictions with its LightZ™ intuitive/no-code platform with no need for data science/programming skills that automatically delivers AI insights across sales, finance, operations, and supply chain. He is co-founder and managing director, of the Finance Analytics Institute that teaches "how to" implement analytics through its Benchmark Analytics Survey, that measures the position of an individual/business on the Roadmap to an analytics culture; and the Analytics Academy, that brings vision, voice, and clarity to the value of analytics and defines the Roadmap to implement a culture of data driven decisions.

Mr. Zwerling's career spans leadership and executive positions at Fortune 500 companies in power generation and high-tech. As founder and CEO of multiple software companies, he managed global growth and exits to a major public company DXC Technology Company (NYSE:DXC), a foreign public company, and a private party. He has a Bachelor of Engineering (magna cum laude) in mechanical engineering from Stony Brook University, and a Master of Science in mechanical engineering (major in thermodynamics and fluid mechanics) from CSU Los Angeles. He is a member of the Tau Beta Pi engineering honor society, and a licensed professional engineer (mechanical engineering) in the state of California.

About Aurora Predictions

Is the leader in AI-Enabled analytics for business planning and performance improvement with the LightZ™ intuitive/zero-code platform that empowers the business user to easily do analytics without being a data scientist. It's fast-to-value insights enable unbiased decision-making with high confidence across supply chain, sales, finance, and operations. Just click to load data and LightZ™ AI automatically builds a model complete with a broad reporting and visualization library with predictions, correlations, and AI forecasting to learn on a detailed level what happened, where it happened, why it happened, what will happen, and how to make the future happen.

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Contact

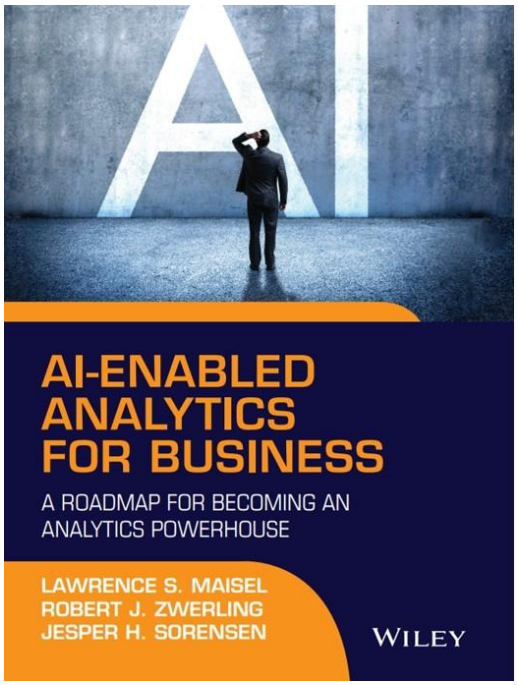
Robert J Zwerling, BE, MSc., P.E.

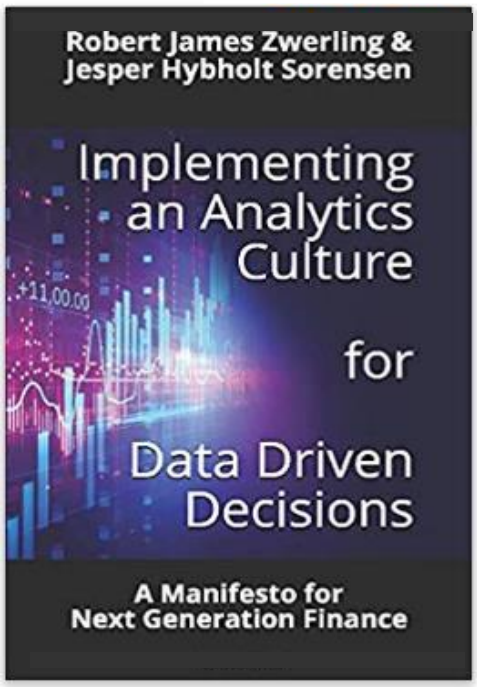
E: rzwerling@aurorapredictions.com

L: www.linkedin.com/in/robert-j-zwerling-p-e-53118683/

O: 949-622-5457

Available on Amazon





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