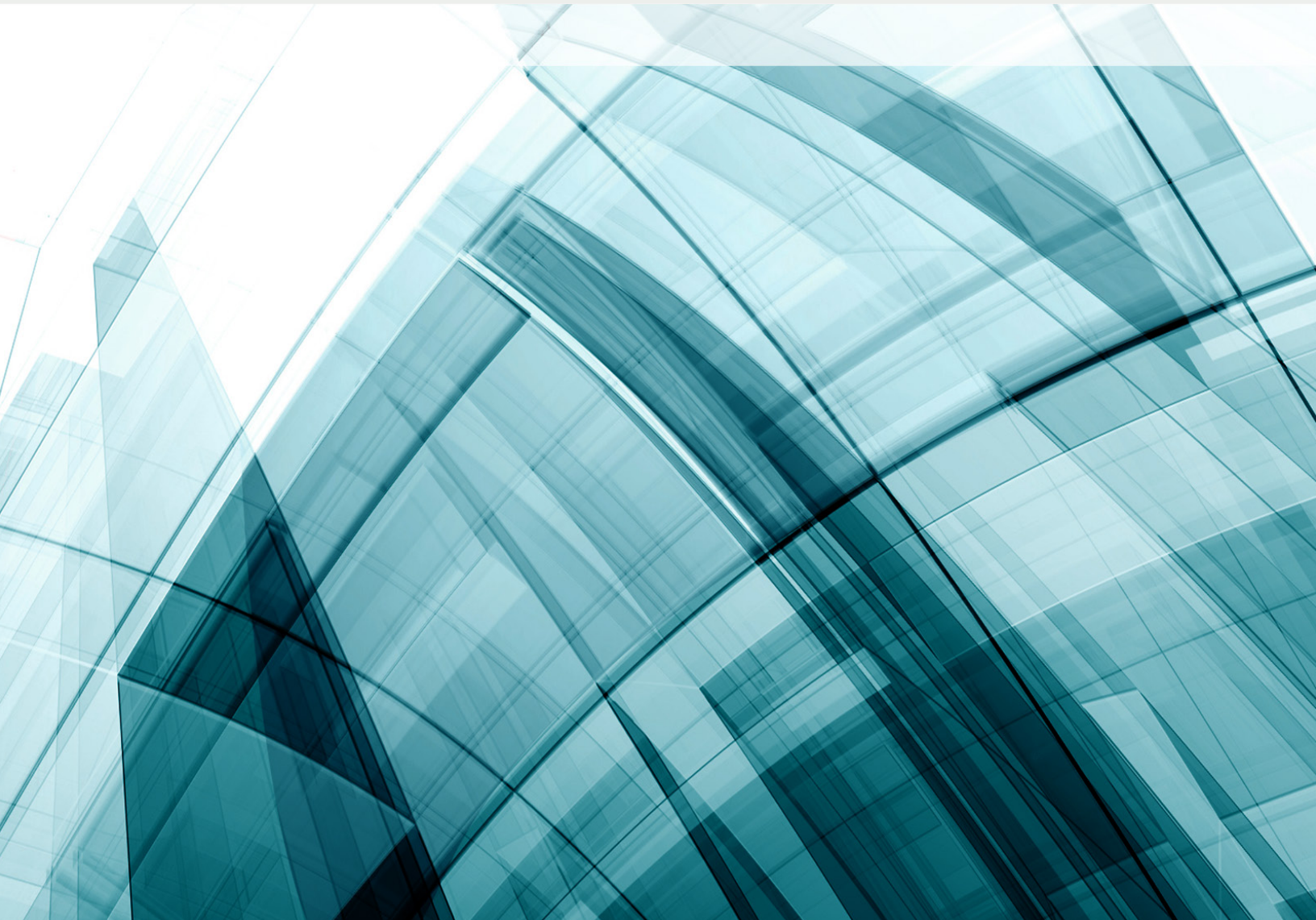




WHITE PAPER

2016 FORECASTING BENCHMARK STUDY: HIGHLIGHTS

COMPARE YOUR FORECASTING
PERFORMANCE TO INDUSTRY LEADERS



KEY TAKEAWAYS

Now in its seventh year, this remains the most comprehensive study of demand planning performance and the benefits realized by industry leaders from sensing demand. Demand Sensing augments traditional demand planning systems by using real-time data, algorithms and automation to create forecasts aligned with current market realities. This study encompasses \$250 billion in annual sales from 17 multinational consumer products companies, with 9 billion cases and 1.6 million item-warehouse combinations. See how your forecasting performance compares to leaders in this highlights version. You can request a copy of the full report [here](#).

EXECUTIVE SUMMARY

Rising supply chain complexity has been challenging for years, with growth through innovation strategies driving item proliferation instead of sales. The number of active items rose by 31% since 2010, outpacing sales growth by a factor of 5. More concerning is the rapid proliferation of total items which more than tripled, adding significant cost with little benefit. However, this year saw initial signs of hope. Active items dipped slightly and, for the first time, more companies reduced their portfolio size rather than expanding it. While too early to know if this is a trend, it is definitely a move in the right direction and might signal a shift from a focus on market share to a focus on profitability.

The real sales drivers are a company's "A" items. The top 10% of items generate 78% of sales, whereas the bottom 50% are responsible for less than 1% of shipments. Half of all items could be cut with little impact on sales. The long tail, which represents the slowest-moving items, comprising 20% of the total volume, contains 83% of all items. Of course, some slow-moving products are strategic but 83% is far too many.

Despite the huge investments in traditional demand planning systems and processes, performance has stalled, with key metrics such as forecast value-added and error essentially unchanged over the past 5 years. New introductions, seasonal products and items in the tail remain particularly challenging for traditional

systems to forecast. Continuous improvement programs to squeeze more from the status quo are failing to provide incremental value, let alone achieve the step-change in performance and productivity required to lead the competition.

With demand planning performance stuck, pursuing technology advances is particularly relevant and timely. In what might be the world's largest use case, the study finds that Demand Sensing more than doubles forecast value-added and cuts forecast error by an average of 37%. It also more than doubles productivity, allowing planners to support higher workloads while improving performance. The combined use of real-time data, algorithms and automation is key to these results. Real-time data mean that forecasts now reflect current market conditions; algorithms provide the same level of care to all items whether they are in the tail or are top sellers; automation enables scalability to process and publish daily forecasts for even the largest supply chains. The result is a significant improvement in planning performance across all parts of the business including top sellers, the tail, new introductions and seasonal products.

Each year, we publish this report to help companies in their pursuit of forecast excellence. To learn more and see further analysis on each section as well as new findings on productivity, request a full copy of the 2016 Forecasting Benchmark Study at:

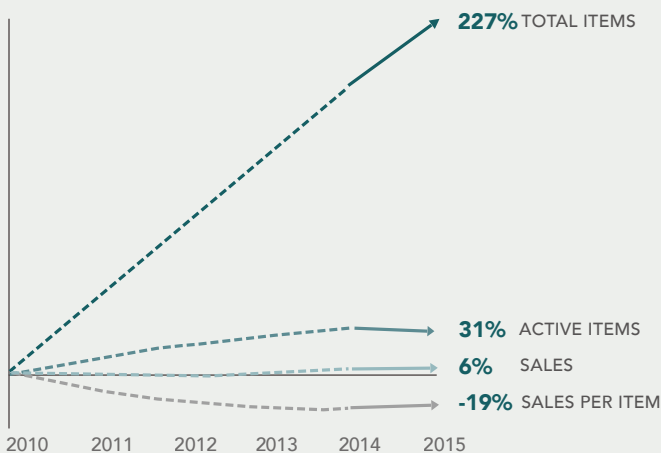
www.e2open.com/resources/2016-forecasting-benchmark-study.

COMPLEXITY

ITEM PROLIFERATION

Each year, the study examines the state of supply chain complexity by tracking item proliferation since 2010. Growth through innovation strategies continue to drive complexity instead of sales. Active items grew 31% compared to only 6% for sales. As a result, sales per item dropped 19%. Despite these unfavorable trends in network complexity, 2015 saw initial signs of a positive change. For the first time, more companies reduced the number of items in their portfolios instead of expanding them. Consequently, the number of active items dropped 1% point; sales gained 2% points; and sales per item rose 2% points.

ITEM PROLIFERATION AND SALES GROWTH

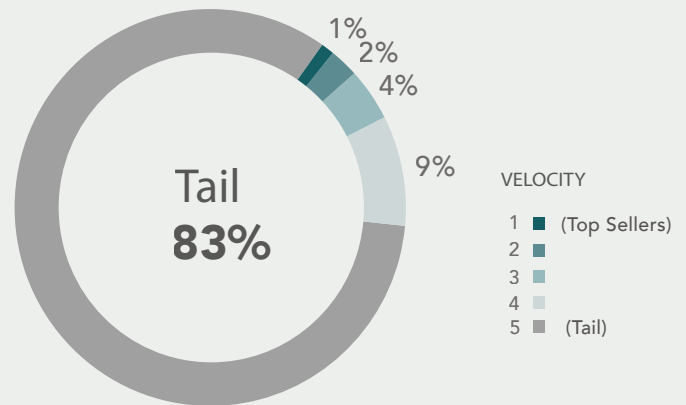


More troubling is the rapid proliferation in total items offered for sale since 2010. The number of total items has more than tripled; many of which have since been discontinued. For each 100 items introduced, 86 were discontinued. Each introduction and discontinuation is associated with various supply costs including setup changes to manufacturing, inventory of raw materials, packaging and finished goods, as well as write-downs for obsolescence. The scale and pace of this turnover raises concerns about the hidden costs of growth through innovation strategies.

THE LONG TAIL

Tails represent a major financial commitment for make-to-stock manufacturers and comes with many hidden costs. Just how long is the tail in consumer goods? The answer is 83% of all items. To measure performance of the tail, the dataset was divided into five velocity quintiles, each comprising 20% of sales. It turns out that the tail closely follows the 80/20 rule, with the slowest-moving 83% of items making up 20% of the volume. In contrast, the fastest-moving quintile which represents a company's "A" and "super-A" items accounts for only 1% of products.

ITEM DISTRIBUTION BY VELOCITY

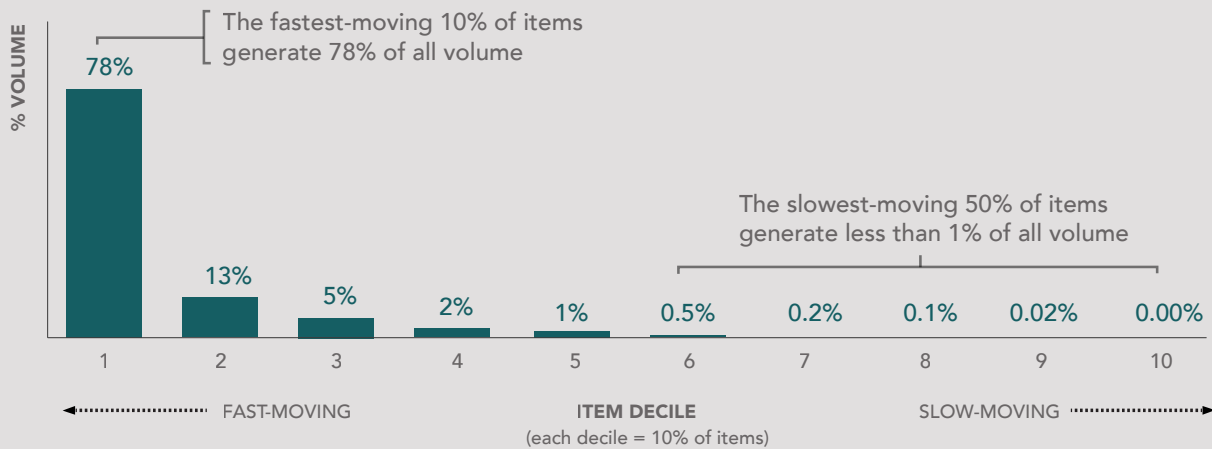


Growth through innovation strategies continue to drive complexity instead of sales, creating a challenging planning environment.

A different view of the data shows that the top 10% of items generate 78% of all sales; whereas the bottom 50% contribute only 1%. This means that essentially half of all items could be cut with little impact on sales. These glacially-moving items add complexity with little value and clearly illustrate that not all revenue is good revenue.

Essentially half of all items could be cut with little impact on sales.

ITEM DISTRIBUTION BY VOLUME

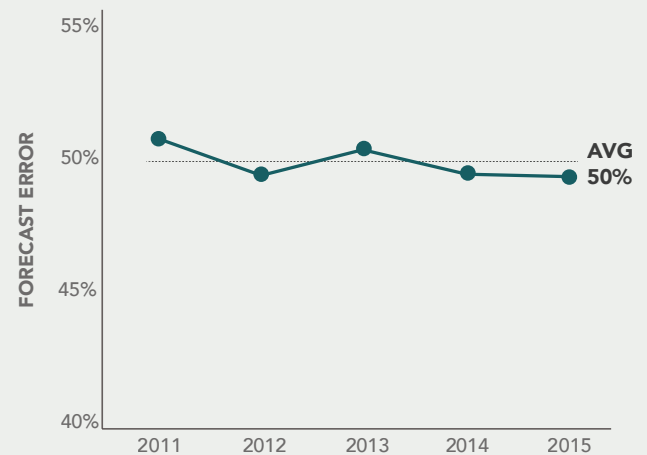


DEMAND PLANNING

FORECAST ERROR

Despite the slight drop in complexity, forecast error is unchanged from last year and remains flat at 50% +/- 1-2% throughout the study. It is clear that traditional forecasting systems and processes have reached their limits and are unable to provide the step-change in performance that management seeks from modern supply chains.

DEMAND PLANNING FORECAST ERROR BY YEAR

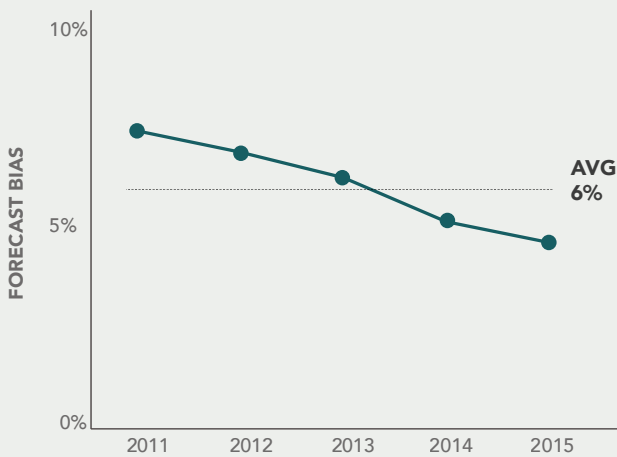


Forecast error is stuck at 50%; traditional forecasting systems and processes have reached their limits.

BIAS

Whereas error provides a measure of how well a company forecasts, bias indicates how well departments work together to create a consensus forecast. Bias continued its downward trend reaching its lowest level in 5 years, suggesting improvements within S&OP. However, consistently positive bias since the beginning of the study reflects the overly-optimistic outlook of the consumer goods industry and an inherent incentive conflict in the S&OP process.

DEMAND PLANNING BIAS BY YEAR

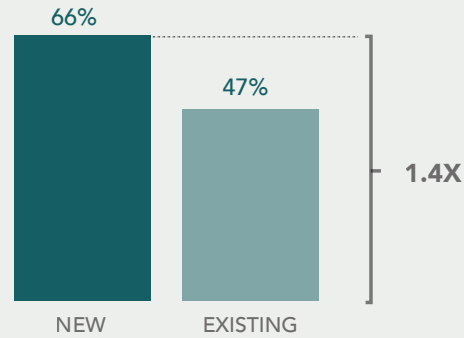


INNOVATION

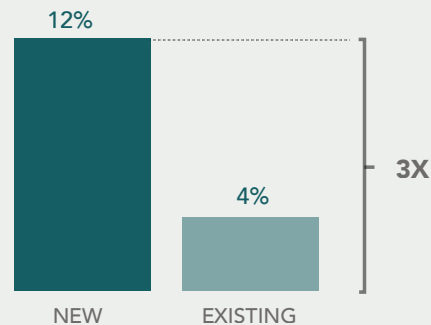
Innovation is a strategic activity to grow sales, protect existing markets and retain consumer relevance in a fast-changing world. New items have always been challenging to predict. Traditional time-series statistical methods require at least 2 years of prior sales to create a basic seasonal model. Clearly no one can wait 2 years to forecast new items, so planning relies heavily on human input. This introduces significant bias, which is 3 times higher for new products than for established items. High hurdle rates to justify R&D investment likely contributes to positive bias by artificially raising expectations for new introductions.

Overall, forecast error is 40% higher for new products. With safety stock proportional to error, this creates a significant inventory premium that is often overlooked when evaluating the total cost of innovation.

FORECAST ERROR FOR NEW AND EXISTING ITEMS



BIAS FOR NEW AND EXISTING ITEMS



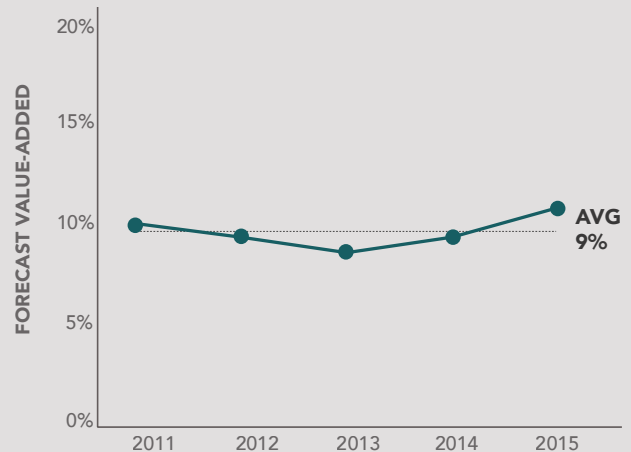
High error and bias in new items impact return on innovation and make it challenging to cost-effectively support introductions.

FORECAST VALUE-ADDED

Forecast value-added, which measures the impact of demand planning investments, has remained essentially stable at an average of 9% +/- 1-2% over the 5-year period, revealing the limits of traditional planning systems and processes. The incremental gains are far from the step-change that management seeks from investments in planning systems.

Forecast value-added remains essentially unchanged year-over-year, revealing the limits of traditional systems and processes.

FORECAST VALUE-ADDED BY YEAR



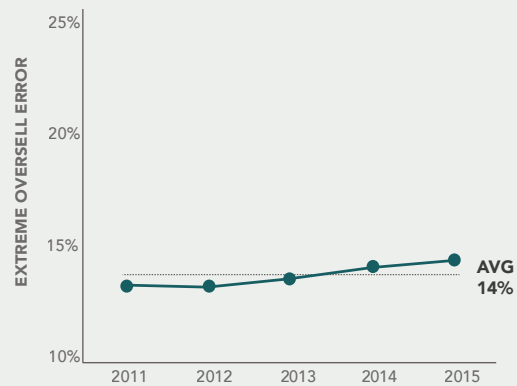
EXTREME ERROR

Supply chains are designed to operate in an uncertain environment, with the flexibility to tolerate normal daily error with little impact. Cases of extreme error — when forecasts exceed shipments by two times or more (extreme undersell) or shipments exceed forecasts by two times or more (extreme oversell) — are the most disruptive and costly to supply chains.

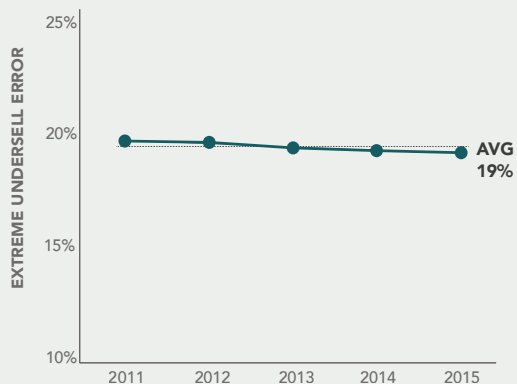
One-third of all forecasted volume was affected by extreme error. Extreme oversell and undersell error consistently ranged between 13-14% and 19-20%, respectively. The degree of extreme undersell error was higher than extreme oversell error, in line with the observed positive bias for the industry.

Extreme error is consistently one-third of all forecasted volume, creating costly disruptions.

EXTREME OVERSELL ERROR BY YEAR



EXTREME UNDERSSELL ERROR BY YEAR



DEMAND SENSING

As a prescriptive analytics solution, Demand Sensing employs fundamentally different techniques than traditional demand planning and is defined by the following characteristics:

- **Use of multiple, real-time signals** to create daily forecasts reflecting current market realities (instead of relying on historical sales which are by definition disconnected from present conditions).
- **Use of pattern recognition technology** to process masses of big data and extract meaningful information (beyond traditional time-series analysis methods).
- **Fully automated system with self-tuning algorithms** that learn from data without human interaction and publish daily forecasts daily for every item in every stocking location without need for a planner's review.

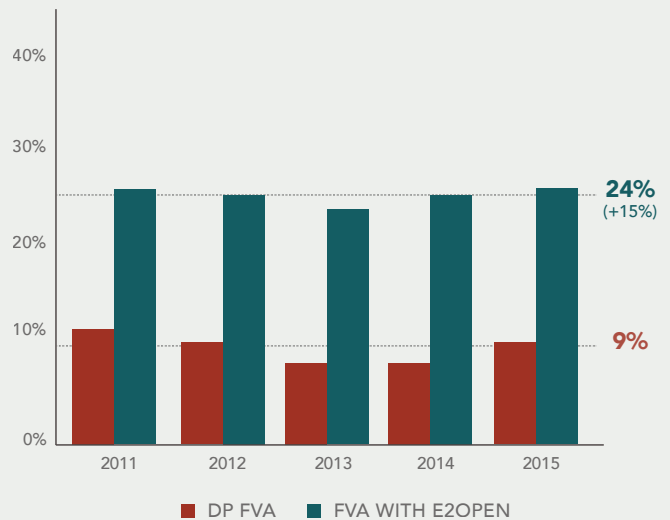
FORECAST VALUE-ADDED

Demand Sensing almost triples forecast value-added achieved by traditional systems, raising it from 9% to 24% for all items. Performance gains for top sellers, items in the tail, new introductions and seasonal items range from 12-16%-points.

In particular, forecast value-added for items in the tail was more than 3 times higher with Demand Sensing. There are never too many items for an algorithm to process, so the same care and attention is always given to slow-moving items in the tail as to the top sellers.

The difference in value-added between Demand Sensing and demand planning is relatively consistent by year. While continuous improvement programs to maximize the value of existing investments are laudable, these findings illustrate that management is better served directing its resources towards augmenting with new technology rather than trying to "squeeze" incremental gains from current systems and processes.

DEMAND SENSING FORECAST VALUE-ADDED ADVANTAGE (ALL ITEMS)

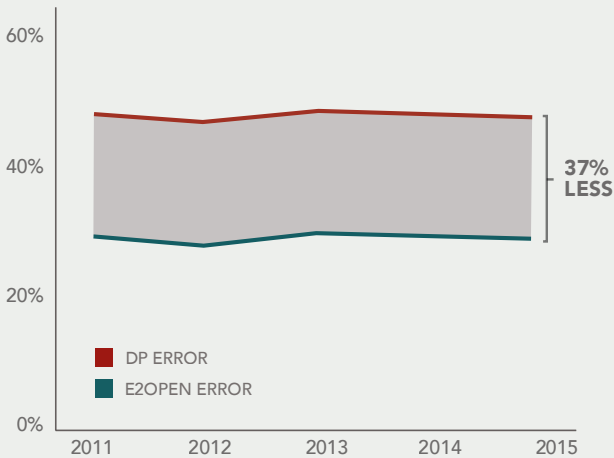


Demand Sensing almost triples forecast-value added, increasing it from 9% to 24% for all items.

FORECAST ERROR

The use of real-time signals in demand prediction is a game changer because it creates forecasts in sync with current market conditions instead of relying on prior shipments and well-meaning but biased input from Sales and Marketing. As a result, forecast error across the entire dataset is cut by 37% compared to traditional demand planning.

DEMAND SENSING ERROR ADVANTAGE BY YEAR
(ALL ITEMS)



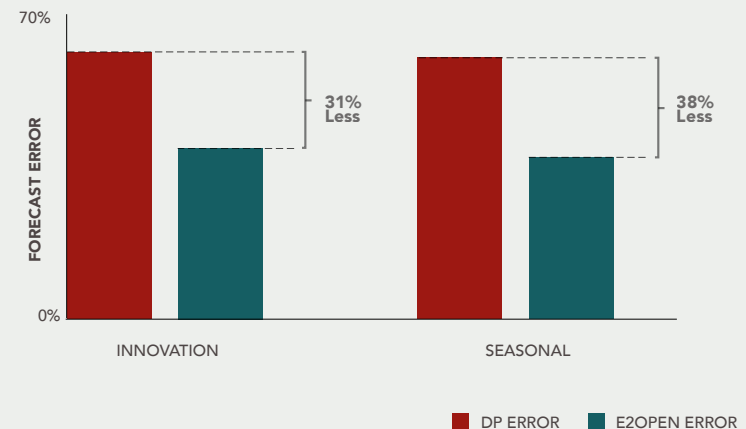
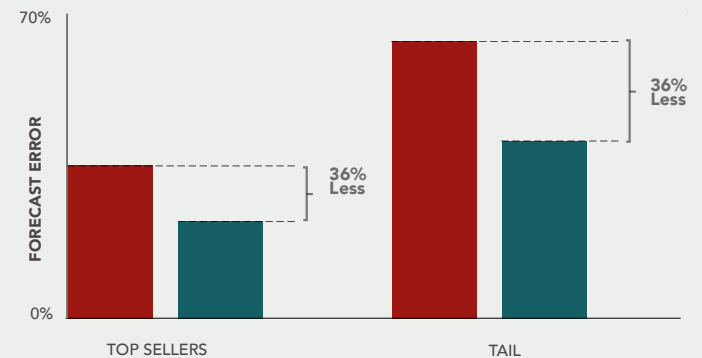
Real-time data is key to accurately predicting demand.

Similar to forecast value-added, Demand Sensing improves accuracy across all parts of the business. It does so by extracting meaningful information from the masses of real-time supply chain data – information that is not available from prior sales and is free from human bias.

Demand Sensing improves accuracy across all parts of the business.

As a result, forecast error for seasonal items and product introductions was reduced by 38% and 31%, respectively. Error for top sellers and the tail was cut by 36%.

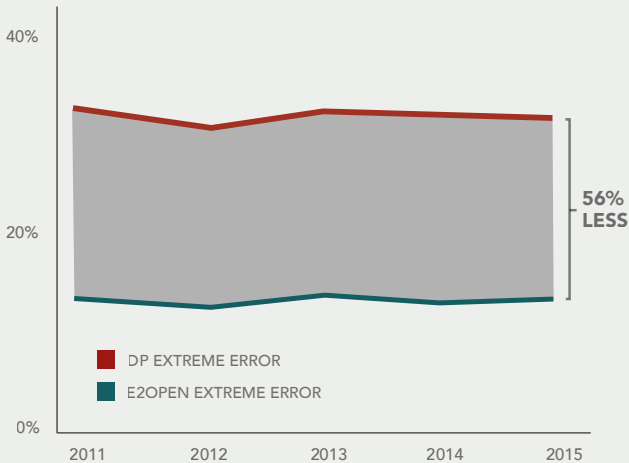
DEMAND SENSING BENEFIT FOR DIFFERENT PARTS OF THE BUSINESS – FORECAST ERROR REDUCTION



EXTREME ERROR

Demand Sensing is very effective at cutting instances of extreme error, consistently reducing it by more than 50% for the past five years. By leveraging real-time data, forecasts published by Demand Sensing better reflect current market conditions and are less prone to significant deviations.

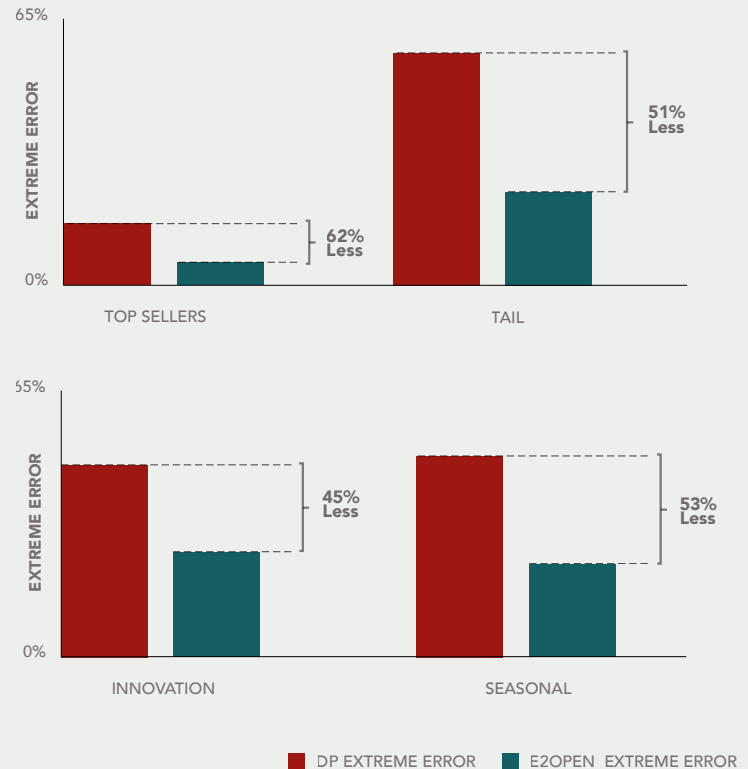
DEMAND SENSING EXTREME ERROR ADVANTAGE BY YEAR (ALL ITEMS)



Demand Sensing consistently cuts the most costly and disruptive error by more than half.

This benefit extends to all parts of the business, including new product introductions, seasonal sales, and both slow- and fast-moving items. The highest relative improvement is with top sellers, with a 62% reduction in extreme error; the highest absolute gain is with items in the tail, with a 29% point reduction.

DEMAND SENSING BENEFIT FOR DIFFERENT PARTS OF THE BUSINESS – EXTREME ERROR



For more analysis, request the full 2016 Forecasting Benchmark Study at: E2open.com/resources/2016-forecasting-benchmark-study

ABOUT E2OPEN

Founded in 2000, E2open provides the largest and most comprehensive Supply Chain Operating Network, including a broad suite of collaborative supply chain solutions. Leading global enterprises rely on E2open to provide greater end-to-end visibility, more accurate data and insights, and real-time business process orchestration across complex, multi-tier trading partner networks. For more information, visit e2open.com.

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