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Managing Demand Management KPIs with Oracle EBS and ASCP

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Abstract

Demand management is critical for a business to manage customer expectations by keeping optimum inventory. This is a balancing act where continuous focus is needed, continuous learning is needed. Typically, this is the role of the material lead jointly with the sales lead where they keep track of the progress and escalate internally or customer if needed. As demand management drives the supply side, it is critical to manage all exceptions upfront. As a result, business leads need a bird's eye view across the supply chain, this is achieved by having KPIs in place, which will be monitored on a monthly or quarterly basis, depending upon the complexity of the supply chain, cost of material, and customer relationship.

Those KPIs/reports include – Demand waterfall reports, Material availability, forecast accuracy, and liability reports. These reports will empower businesses and customers to have business review meetings (monthly or quarterly) to understand each other's sides more effectively.

Oracle E-Business Suites (EBS) provides basic foundations for tracking data, Oracle EBS along with 'Advanced Supply Chain Planning' (ASCP) is the most powerful tool for supply chain management, performing simulations. The reporting layer could be achieved by Oracle Apex, which comes mostly free with Oracle database, and offers seamless integration with multiple Oracle applications with less coding.

This journal explains Oracle EBS and ASCP side changes, and reporting solutions to develop these KPIs for effective demand management.

Keywords:

Demand Management;
Key Performance Indicator(KPI);
Forecast Accuracy;
Forecast Response;
Demand Response;
Customer Liability;
Demand Management Reports;Oracle E-Business Suite (EBS);
Oracle Advanced Supply Chain Planning (ASCP);
Oracle Apex;
Power BI

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Introduction

Efficient demand management serves as the cornerstone for meeting and surpassing customer expectations. By upholding an optimal inventory, businesses can promptly cater to customer needs, ensuring products are accessible at the right time and place. This not only enhances customer satisfaction but also fosters brand loyalty. Navigating demand involves a careful balancing act, demanding a nuanced grasp of market dynamics, consumer behavior, and external factors shaping demand. Maintaining a continuous focus is imperative to swiftly adjust strategies in response to real-time shifts in market trends, economic conditions, or unforeseen disruptions such as supply chain challenges.

In the dynamic interplay of demand and supply, exceptions are unavoidable. Proactively identifying and addressing exceptions is crucial. Material and sales leads must promptly escalate issues, be they internal or customer-facing, to forestall potential disruptions. This necessitates a responsive and adaptable approach to effective problem-solving.

The implementation and tracking of Key Performance Indicators (KPIs) play a pivotal role in assessing the efficacy of demand management strategies. KPIs may encompass metrics like inventory

turnover, order fulfillment accuracy, and demand forecasting precision. Regular evaluation of these KPIs yields actionable insights, fostering continuous improvement. The frequency of KPI monitoring hinges on the intricacy of the supply chain. For intricate supply chains, more frequent evaluations—potentially every month—may be essential to capture nuanced shifts in demand patterns. Conversely, less complex supply chains might favor quarterly assessments. This adaptive approach ensures that the monitoring frequency aligns seamlessly with the nuances of the business environment.

Oracle EBS is a complete ERP solution that supports all business needs including demand management, and supply chain management. Oracle ASCP is a material planning tool, often called the brain of the supply chain, which considers demand and plans for supply orders. Combinations of these two ERP applications provide value adds to the business in terms of supply chain training, and financial reporting. Demand management KPIs are also developed by importing this data and developing corresponding analytics. To develop these KPIs, one can use Oracle Apex [1], Microsoft Power BI, or any custom reporting layer developed by using Java or Angular. Oracle Apex is typically offered free to Oracle database customers and offers less coding with seamless integration of Oracle.

Below is the system integration diagram, which shows Oracle EBS (transactional system) coupled with Oracle ASCP. Here demand and supply snapshotswill be passed to Oracle ASCP from Oracle EBS whereas suggestions and recommendations will be passed to Oracle EBS to implement those. The reporting layer houses various KPIs/ analytics and pulls data from Oracle EBS and Oracle ASCP.

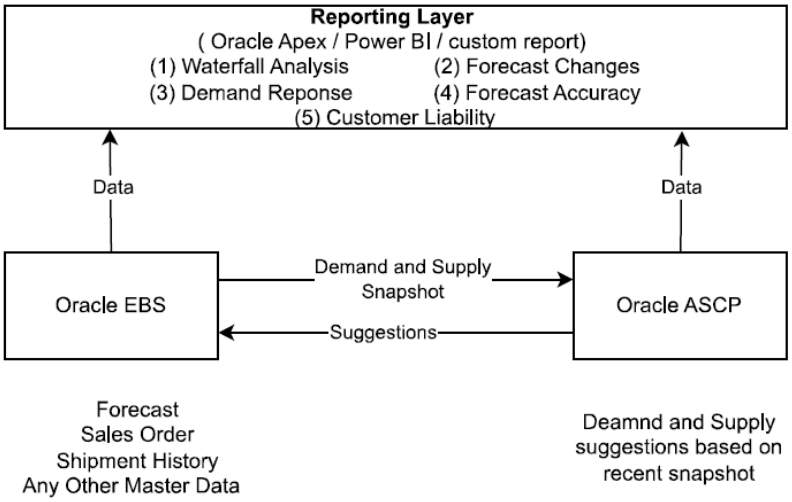

Figure 1: Integration of the reporting layer with Oracle EBS and ASCP

Waterfall Analysis:

Waterfall analysis explains demand changes over time. This analysis is useful to know changes that have caused fluctuations in supply chains and now created lags in moving material swiftly. These changes need to be discussed regularly with customers to bring awareness and also help to build cases for any material liability when sudden demand drops.

Below is an example showing waterfall data, where the “Forecast upload date” is a date when the customer forecast is received or derived from Demantra, and the “Forecasting month” shows forecast projection for a given month. This data could be plotted for a specific “organization”, having product family as “Engine and parts” for a customer called – ABC Corporations. On the same line, the line graph is also plotted in the “data changes” table. All these visuals help to show changes in demand.

Organization	LAX		Product Family	Engine and Parts		Customer	ABC Corp

Today's Date = 05 Jan 2024

Forecast Upload Month	Forecasting Month												
	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
Jan-23	87	98	80	91	124	145	147	142	150	151	197	180	194
Feb-23	85	119	100	83	122	173	174	121	132	181	186	163	172
Mar-23	87	92	82	97	150	176	162	137	162	171	186	165	188
Apr-23	91	113	86	85	117	153	179	124	111	163	162	165	197
May-23	86	100	86	97	127	157	179	179	102	154	177	174	185
Jun-23	99	102	94	93	105	200	166	173	181	192	167	193	176
Jul-23	83	111	91	90	131	153	148	178	102	174	165	165	200
Aug-23	95	113	89	96	102	200	190	165	191	167	162	165	192
Sep-23		109	94	86	142	171	191	180	172	173	166	168	196
Oct-23			96	81	145	173	198	120	102	179	194	195	169
Nov-23				98	115	187	132	128	188	151	187	160	185
Dec-23					129	142	187	143	161	184	160	179	195

Figure 2 : Waterfall analysis

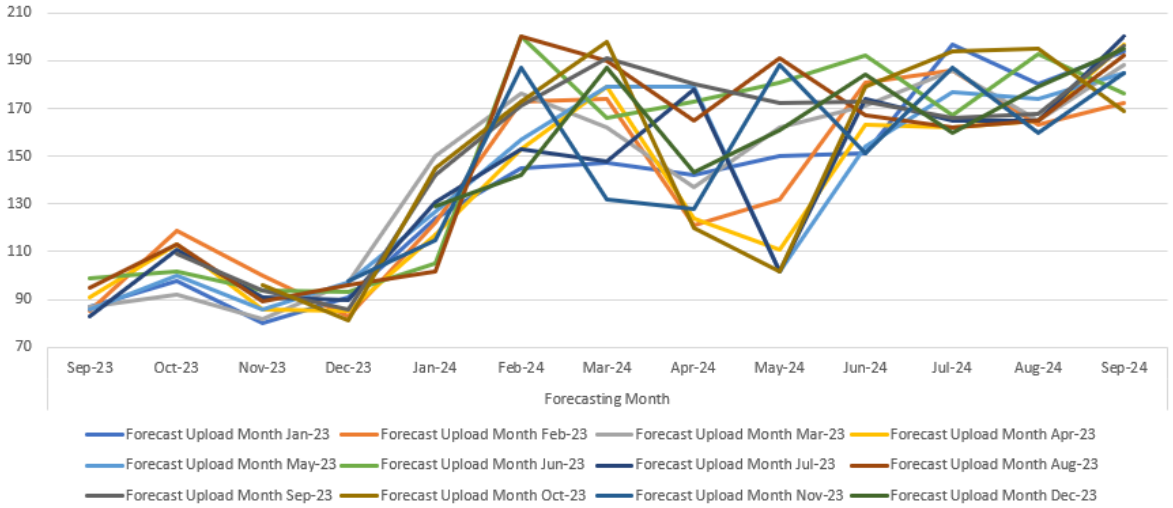

Figure 3: Forecast Trend

Forecast Upload Month	Forecasting Month												
	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
Jan-23													
Feb-23	-2%	21%	25%	-9%	-2%	19%	18%	-15%	-12%	20%	-6%	-9%	-11%
Mar-23	2%	-23%	-18%	17%	23%	2%	-7%	13%	23%	-6%	0%	1%	9%
Apr-23	5%	23%	5%	-12%	-22%	-13%	10%	-9%	-31%	-5%	-13%	0%	5%
May-23	-5%	-12%	0%	14%	9%	3%	0%	44%	-8%	-6%	9%	5%	-6%
Jun-23	15%	2%	9%	-4%	-17%	27%	-7%	-3%	77%	25%	-6%	11%	-5%
Jul-23	-16%	9%	-3%	-3%	25%	-24%	-11%	3%	-44%	-9%	-1%	-15%	14%
Aug-23	14%	2%	-2%	7%	-22%	31%	28%	-7%	87%	-4%	-2%	0%	-4%
Sep-23		-4%	6%	-10%	39%	-15%	1%	9%	-10%	4%	2%	2%	2%
Oct-23			2%	-6%	2%	1%	4%	-33%	-41%	3%	17%	16%	-14%
Nov-23				21%	-21%	8%	-33%	7%	84%	-16%	-4%	-18%	9%
Dec-23					12%	-24%	42%	12%	-14%	22%	-14%	12%	5%

Figure 4: Delta Changes over +/-5% changes

Oracle EBS does have a provision to create multiple forecast sets, a forecast set represents a set of items having forecast demand. Here we can create multiple forecast sets called 'Jan-23' till 'Dec-23' and add forecast. The following are various ways to load data,

- Manual upload: loading manual data for every item for 52 weeks or more will be a hectic job so Oracle offers provision to upload data via Excel, by defining a custom Web ADI integrator.
- Electronic Data Exchange (EDI): We can map EDI data to a given forecast set though new forecast set mapping needs to be changed for every month.
- Oracle Demantra: This will be a periodic cycle where Demantra generated forecast will be published regularly to Oracle EBS.

- SOP forecast: If a business has a sales and operation planning process defined, then we can interface the corresponding demand data to Oracle via the Demantra SOP application or manually upload or via Oracle Web ADI, as explained above.

All these old forecasts need to be archived or disconnected from Oracle ASCP planning, to avoid excessive or duplicate demand planning. If required, we can store the raw customer forecast separately from the final adjusted forecast for planning/reporting purposes. This will be the typical role for sales lead and material lead.

Forecast Response:

Forecast response represents confirmation of material by considering all available constraints – supplier and resource. This is the most optimistic date that you can communicate to customers, this will build confidence in the customer and also they can plan their work.

Oracle ASCP offers 'Enforce capacity constraints'/ECC – limits any kind of capacity (supplier and machine/labor) and 'enforce due date'/EDD - strictly follow customer due date. In order to know the forecast response, we need to follow ECC constraints where customer forecasts could be loaded as demand and then Oracle ASCP generates exceptions and suggestions to adjust the demand dates.

Additionally, Oracle ASCP does have a provision switch on or off specific constraints, explained in detail.

- Resource constraints [3]: These constraints represent labor and machinery resource constraints. Example – Drill machine is available only from Mon - Fri for two shifts (06 am – 03 pm and 03 pm-midnight), having a total of 5 machines total whereas every product consumes 30 mins and needs one machine at a time. On the same line, we can model labor resources and capacity constraints.
- Supplier capacity constraints [3]: These constraints represent how much the supplier can produce the given item, this also allows load supplier holidays as well. While considering this capacity, Oracle offers to constraint the purchase part lead time as well

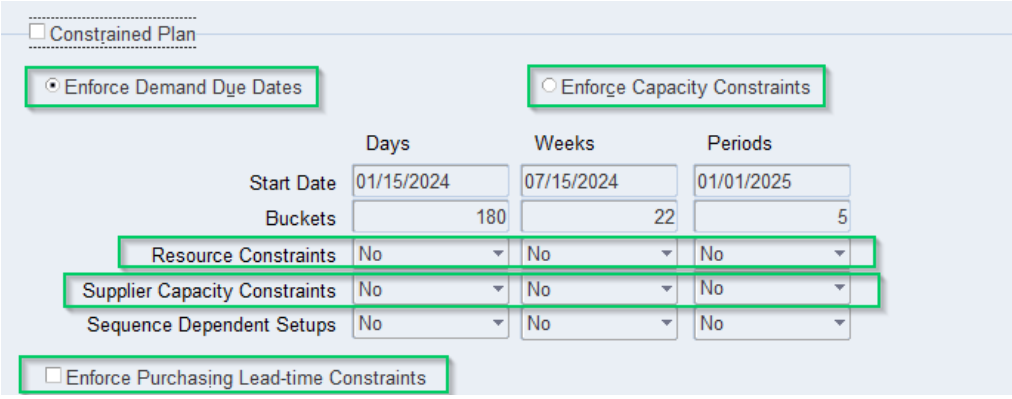

Figure 5: Oracle ASCP - Constrained Plan Options

To get optimum results, it is better to enable all constraints for short and mid-plan horizons. This ASCP plan needs to be run to generate a "suggested due date" for the demand lines and this data issue to generate a "forecast response."

Forecast Accuracy [2]:

Forecast accuracy is the degree to which sales leaders successfully predict sales (in both the long and short term). Accurate sales forecasts are essential for making key decisions about short-term spending and deals for key accounts. Accuracy is critical because its downstream effects are far-reaching and can have unintended consequences. Sales leaders must use data-driven insights to improve forecast accuracy. We can calculate forecast accuracy as 'shipment history' divided by 'forecast'.

'Shipment history' data for a given customer or product family has been pulled from Oracle EBS i.e. transactional system where the corresponding historical forecast is pulled from the 'Forecast set'. To level it down, it is advised to take the last 3 to 6 months of shipment history and forecast data.

Today's Date = 05 Jan 2024													
	Forecasting Month												
	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
Aug-23	92	96	84	88	141	192	142	144	142	151	178	190	188
Sep-23		114	87	90	142	172	143	197	167	200	164	166	184
Oct-23			86	99	138	153	200	150	199	156	179	191	189
Nov-23				80	117	145	141	154	179	154	168	200	170
Dec-23					146	151	198	117	175	171	172	164	192

Shipped	92	106	86	80
Forecast - Last	92	114	86	80
Forecast - Avg 3	91	107	86	90
Forecast - Max 3	98	114	87	99
Accuracy - Last	100%	93%	100%	100%
Accuracy - Avg 3	101%	99%	100%	89%
Accuracy - Max 3	94%	93%	99%	81%

Figure 6: Forecast accuracy with a lookback window of 3 months

There are various ways to calculate forecast accuracy, as explained above. Some businesses prefer to last 3 demand numbers and take the average or maximum of it, others do prefer to take the last number for calculation.
Forecast accuracy could be poor if a company is not able to ship material as per forecast demand. In this case, it is not the customer's fault but accounted for forecast accuracy. So need to add more intelligence to exclude stock-out situations.

Once you identify "forecast accuracy", then you can use it as a forecast bias factor to inflate the forecast or deflate the forecast. So forecast accuracy calculation will be closer to 100% for next time, which in turn reduces stock out and excess inventory situations.

Customer Liability

Customer liability is a process of holding the customer accountable for the material that got ordered or built because of demand negligence, this includes forecasting sudden drops and jumps that a business has used to drive material. This report should be published on a monthly or quarterly basis to customers and avoid last-minute surprises. Typically customer liability is applicable when material is getting ordered for a specific order, this is nothing but a Make-to-order (MTO). But if it is a Make-to-stock (MTS) business model, then liability should not be a major concern.

To calculate liability, Oracle EBS applications needed to be modified in the following way,

- Add events/ triggers to sales orders and forecasts to note quantity, date, and item changes. Also, record the reason code while changing the demand, reason code likes – Customer side changes, sales miscalculations, etc. These reason codes will help later to build Pareto analysis [4]. It could be achieved by developing a PL SQL procedure to identify such changes and then call it via Form personalization to make a 'Descriptive field' /DFF [5].
- This will be a bit annoying when customers or users keep changing the dates. As an alternative, a web ADI template for Excel upload could be used to update date/quantity along with the reason code.
- Define an allocation rule where it will allocate material to different reasons code-based percentages.

Pririty	Company	Customer	Product Family	Reason Code	Excess Material %	Early Material %	Early Window
1	LAX	ABC Inc		Demand Date Change	80%	75%	30 days
1	LAX		Engine and Parts	Demand Item Change	15%	20%	30 days
1	LAX			Others	5%	5%	31 days
2	DEN			Demand Date Change	95%	95%	32 days
2	DEN			Others	5%	5%	33 days

Figure 7: allocation rule

The above information could be stored in the Quality Collection plan or lookup with the DFF field where all the above information will be stored and revised by the user if needed.

- As a good business practice, you can define a category called "product family" which will be assigned to an item. If material is custom and specific to a customer, then a corresponding customer-

specific category code will be assigned to an item but if it is common for multiple customers, then a generic category code will be assigned.

- As per the above material allocation guide, one can define Oracle concurrent programs, and below is high-level logic,

    - Oracle ASCP identifies excess material after netting/pegging. Also, Oracle ASCP generates rescheduled days for each supply order.
    - Collect the various reason codes along with the customer, and product families for all open/closeddemands, including sales orders and forecasts for a specific period, say - 3 months.
    - If material is excess but specific to a customer, then liability = (current on-hand x item cost) + (carrying cost per month x age in months x item cost)
    - If material is excess but common for all customers, then liability = [(current on-hand x item cost) + (carrying cost per month x age in months x item cost)] x allocation % from allocation rule
    - If material is early beyond early window, then liability = (carrying cost per month x age in months x item cost) x allocation % from allocation rule
    - This data will be published periodically to customers and achieved if needed for future reference purposes.

Conclusion

In conclusion, the exploration of waterfall analysis for forecast demand, forecast accuracy, and customer liability within the context of inaccurate forecasting and forecast responses has revealed valuable insights into enhancing organizational processes. The focus on customizing the Oracle application to cater to these specific needs further underscores the commitment to precision and efficiency in addressing challenges related to demand forecasting.

Through the course of this journal, we delved into the intricacies of forecasting and the far-reaching implications of inaccuracies in predicting demand. The waterfall analysis emerged as a powerful tool, offering a systematic approach to dissecting various components such as forecast demand, forecast accuracy, and customer liability. By breaking down these elements, organizations gain a comprehensive understanding of the factors contributing to forecasting discrepancies and can strategically address them.

The discussion on customizing the Oracle application marks a pivotal point in the journal. Recognizing the need for tailored solutions, the exploration of Oracle's capabilities in accommodating specific requirements for forecast analysis demonstrates a proactive approach to adapting technology to organizational needs. This customization empowers businesses to align their technological infrastructure with the nuances of their forecasting challenges, fostering a more agile and responsive environment.

In essence, this journal serves as a roadmap for organizations seeking to navigate the complex landscape of demand forecasting with a focus on accuracy, accountability, and customer satisfaction. The integration of waterfall analysis and Oracle application customization not only addresses current challenges but also positions businesses to proactively tackle future uncertainties, fostering a culture of continuous improvement and adaptability in the realm of demand forecasting.

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