



eyeon
YEARS AHEAD



**Forecasting
to the
next level**



Our world: a highly dynamic environment

With highly dynamic consumer behavior



Economic crises, raw material scarcity, upcoming markets, sharing concepts... And last but not least new technologies like IOT, artificial intelligence & digitization...

We are in a roller coaster, accept it and enjoy the ride!

Traditional consumer behavior



The online revolution is in full progress & direct consumer relations are increasingly important, resulting in more differentiated sales & distribution channels.

To be profitable companies react with focused marketing & promotion often combined with introducing new products at a higher pace.

Present-day consumer behavior

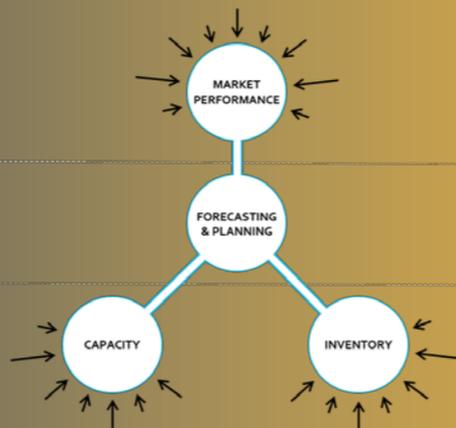


It should be clear: the driver of the modern total value chain is the end consumer!

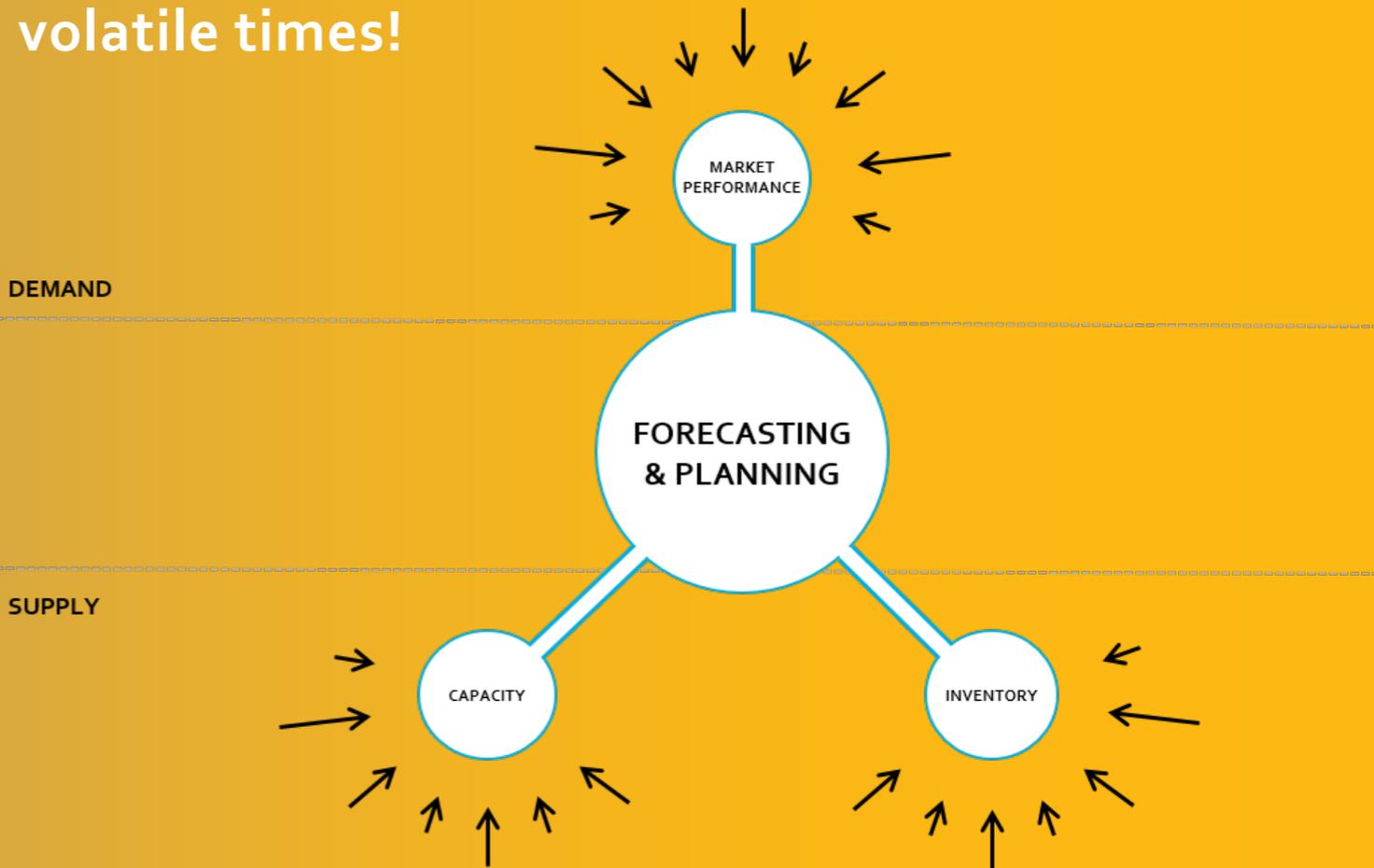
Pressure on forecasting & planning is increasing

In the past it was good enough to have buffers somewhere and volatility was limited enough to “breathe” with excess machine capacity or a surplus of inventory. In many situations that’s not possible anymore. Some key questions are:

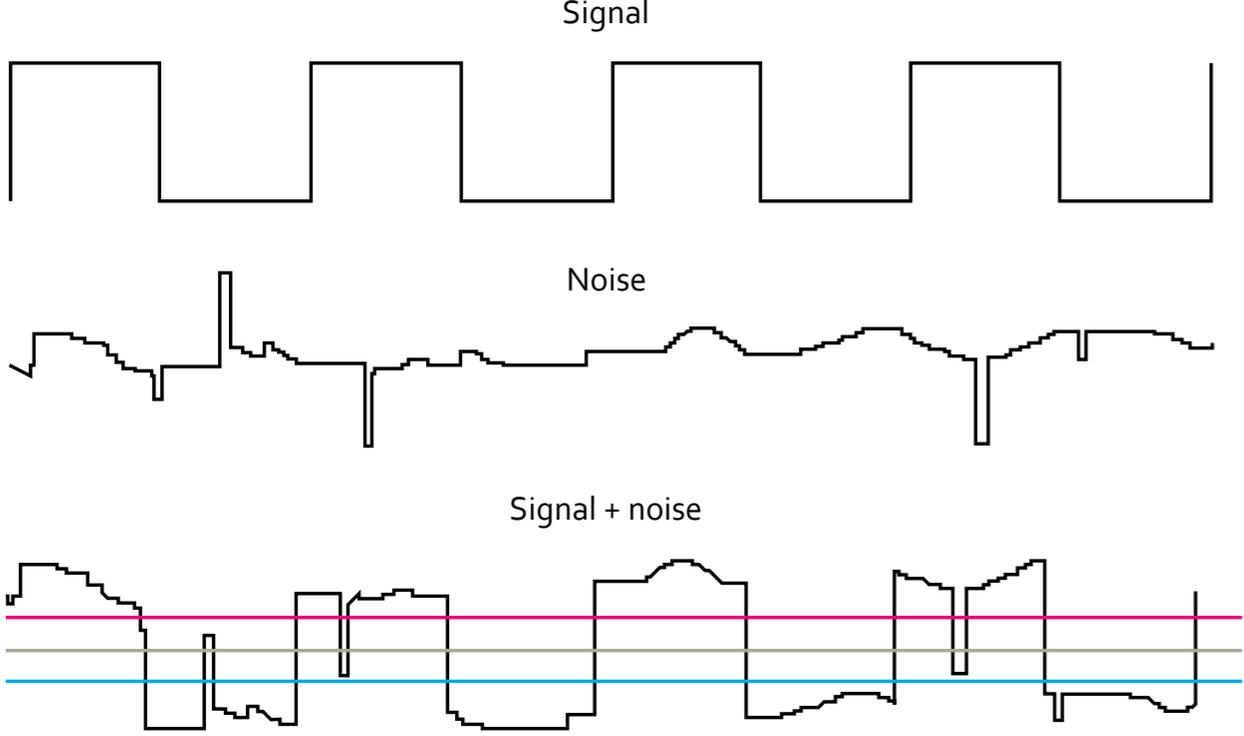
- How to make sure a promotion is profitable?
- What would be the best timing for my seasonal campaign?
- How can I react instantly when my new product performs much better than expected?
- Can I anticipate when the weather is much warmer than normal in this time of the year?
- How to avoid waste and not sell ‘no’?
- How can I avoid overtime in one week and have too many people around in the next?
- How much inventory should I keep to achieve my service target?



Planning & forecasting get more important in volatile times!

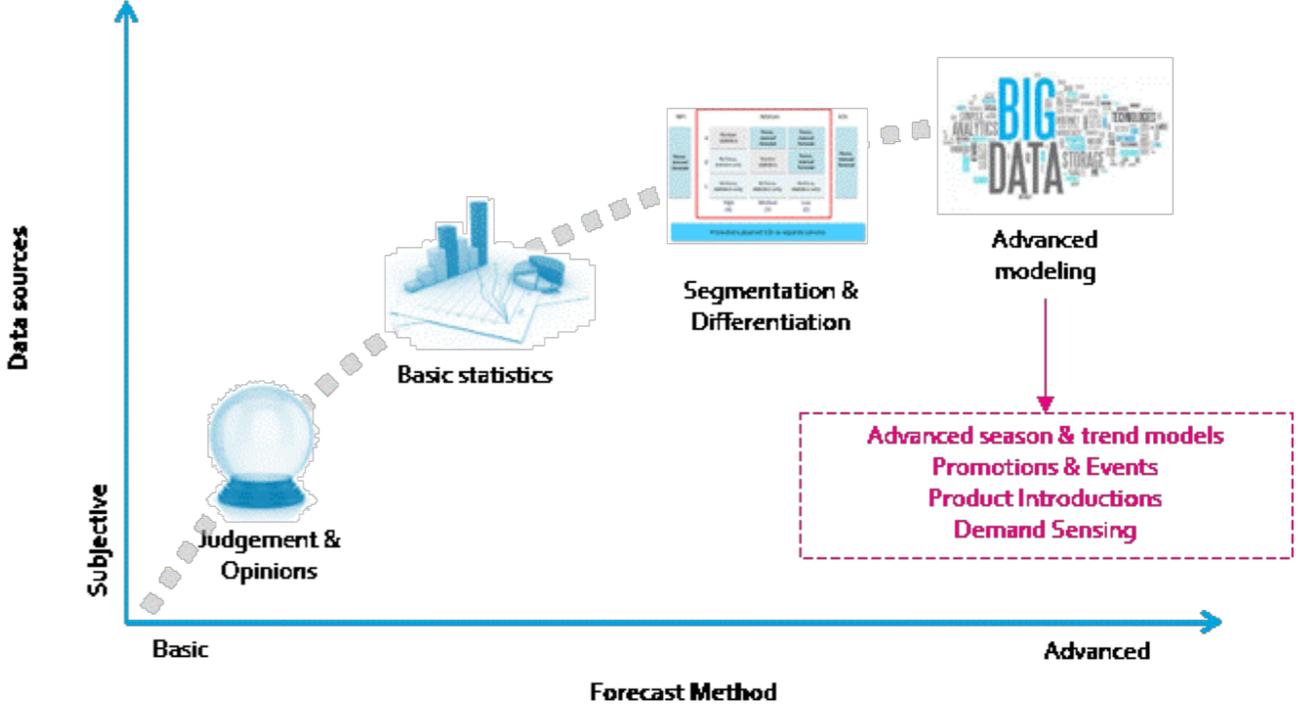


The noise and the signal; what is what?



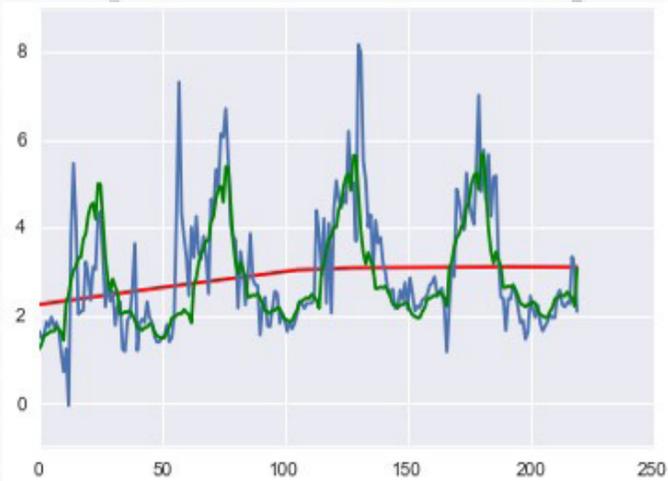
The higher the level of data you look at the more stability there seems to be...
 The more you look into the details, the more you run into the danger of drowning in it.

Forecasting and analytics methods develop rapidly



There shouldn't be a limitation anymore: data is there , systems and models are available.
 But take care: they all have to be customized to the purpose of decision making in your environment.

Understand what drives demand



Ask the average demand planner what influences his forecast and very likely he will come up with Season, trend, Promotions, new products or weather. In many cases there is correlation between the different drivers. Sometimes they have opposite effects but in many cases they strengthen each other like:

- A promotion at the start of the winter/summer to "load the kitchen shelf".
- A seasonal NPI like a strawberry desert with Spring feeling.
- A short term BBQ promo because of good weather supported by an adjusted TV/radio commercial.
- A lower seasonal effect by changed weather conditions (a rainy summer, a hot winter).
- Easter and spring holidays, which don't have the same timing every year and therefore influencing the conditions & success rate for seasonal NPI's or promotions.

Also the influence of competition behavior or price changes can cause step changes in consumer behavior which can't always be expected, so sensing the really consumer behavior becomes more and more important.

Reading framework



In the next pages we will highlight best practices on every of the 4 demand drivers:

1. The advanced baseline: Season & trend
2. Promotions & events
3. Product innovations: NPI's & EOL's
4. Weather

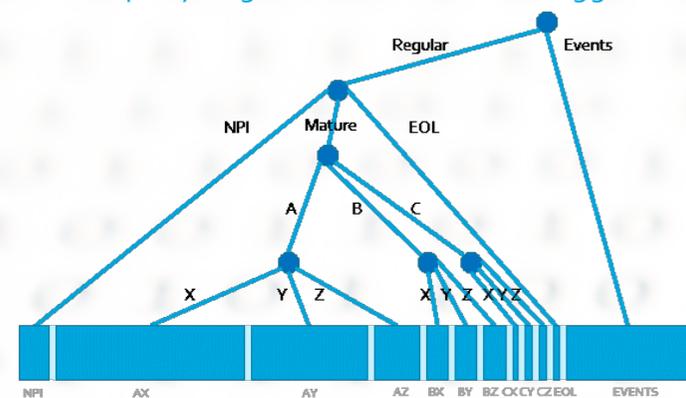
Furthermore we will discuss best practices to:

1. Focus
2. Sense
3. Decide

From big data to focused information...

Analyse & model on the level where it really adds value: The key questions when starting to make models is what you want to achieve. An investment decision for over 2 years requires another level of information than a discussion how much safety stock is needed in 2 months to achieve the requested service levels.

So detect seasonality and trend on the right level! The deeper you go into the detail the bigger the



Example of segmentation approach

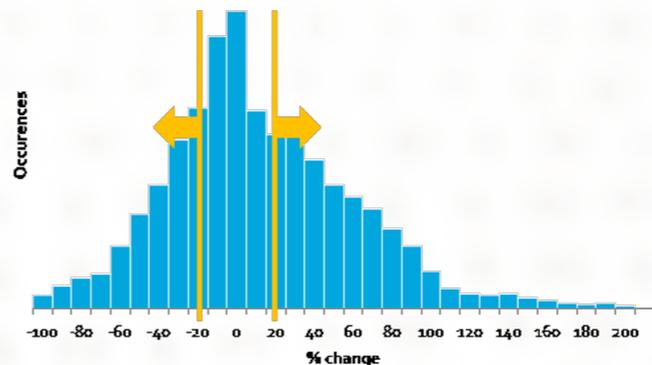
chance that small (noise) deviations are disturbing your analysis...

Best practice is to analyse what is needed to answer your business question in relation to the level of data that is available and giving you results that make sense.

SKU id	Category Sun	Category Sun	Country	Country
• SKU name	- Aftersun	- Aftersun	- Region 1	- Customer 1
• Hierarchy level 1	- Sunscreen	- Sunscreen	- Region 2	- Customer 2
• Hierarchy level 2	- Brand 1	- Factor 20	- Region 3	- Customer 3
• Shelf-life	→ Item 1	→ Item 1	- Customer 1	- Big Stores
• Package size	→ Item 2	→ Item 2	→ Store 1	→ Store 1
	→ Item 3	→ Item 3	→ Store 2	→ ...
	→ ...	→ ...	- ...	- City stores
	- Brand 2	- Factor 30		→ Store 2
	→ Item 51	→ Item 52		→ ...
	→ Item 52	→ Item 52		- Take aways
	→ Item 53	→ Item 53		- ...
	→ ...	- Factor 40		- Holiday pop up stores
		→ Item 51		- ...
		→ Item 52		- ...
		→ Item 53		- ...
		→ ...		- ...
		- Kids		- ...

Example of hierarchies

Use manual enrichment where it adds value



Planners tend to make adjustments because it is their job!

Research by Goodwin (2010) shows that majority of manual changes is limited. Many planners spent too much time with small non value adding changes.

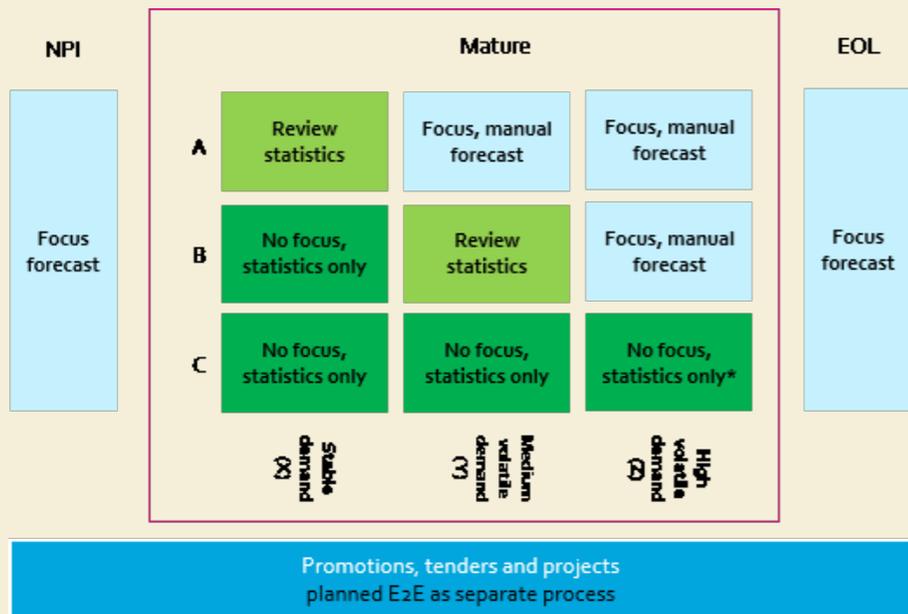


Combined with the natural habit to run around in the fire fight mode to save the data, you shouldn't have the illusion that a planner can still oversee everything in the current volatile environment.

So help them to get in control by focusing on relevant adjustments only.

Differentiated approach: Use statistics as base, focus enrichment only where it adds value!

Modelling & statistics have the advantage that they not only give insights, but also give you an objective starting point (playing games is far more difficult).



Marketing is a key ally in gathering and interpreting data...

New product in new market
Spotify instead of buying a CD

Listing in another channel
Candy sold in DIY, Action Supermarket selling fresh made meals

New bio alternative in supermarket
Insectburger

Relaunch new packaging, content
Other bottle size/better ingredient

Mix branded/private label
Within category marketing mix A & B BRAND can shift (sometimes disruptive)

- **New customer groups**
- **Portfolio NPI/EOL**
- **Macro economic factors**
- **Influence of pricing & competition**

Promotion planning and forecasting

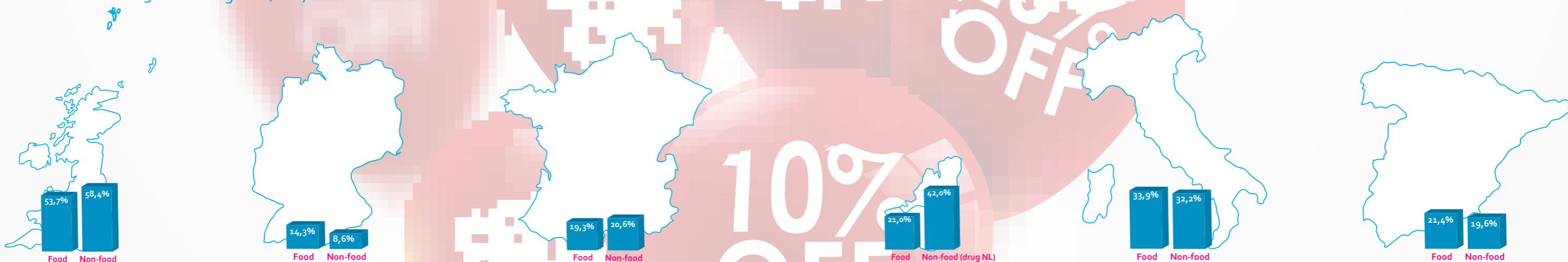
Promotion pressure in many European countries is still rising, with specific categories even having a promotional pressure over 50%.

Investigation by ECR Europe (2011) reveals that average out-of-stock levels in the retail and consumer goods industry in Europe are at 8.3%. According to GS1, the level of out-of-stocks for promotions is often 2 to 3 times higher (GS1, 2013).

Making promotions a success goes hand in hand with limiting the impact of on shelf misses. At many manufacturers and retailers this requires a lot of time & attention. Flexibility in capacity or inventories often can be the answer, but state-of-the-art promotion planning and forecasting is key.

No direct impact	Impact on manufacturer	Impact on retailer
<ul style="list-style-type: none"> 17% returns later 16% buys a different size 	<ul style="list-style-type: none"> 37% buys a different brand 9% doesn't buy anything 	<ul style="list-style-type: none"> 21% buys brand elsewhere 9% doesn't buy anything

Promotional pressure per country (IRI 2015)

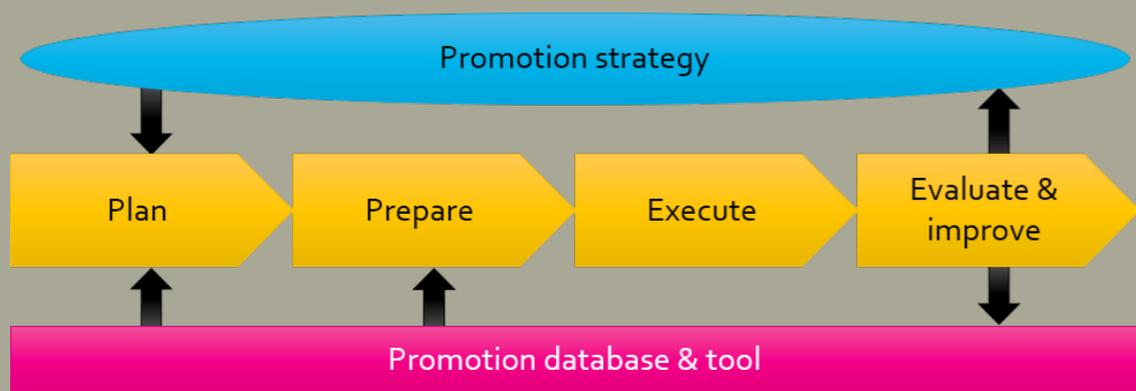


Get the basics right: Solid promotion planning process

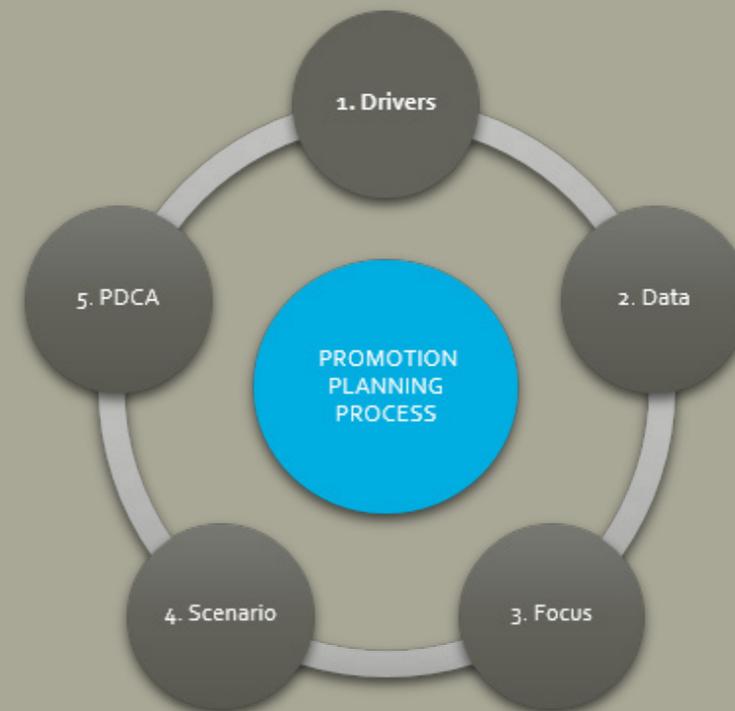
The main elements of an integral promotion planning process are:

- A long-term promotion strategy per category.
- A promotion knowledge database (and tool).
- clearly defined roles and responsibilities.
- An embedded process for evaluation of the process that drives continuous improvement.

Convert a clear promotion strategy into a (tactical) promotion year calendar to distribute the promotions between selected segments and channels. Select and plan milestones to fix these promotions. Prepare, execute and evaluate each promotion accordingly.



5 building blocks are key to support this effectively



They will be described one by one in the next pages

Promotion building block 1: Select the right drivers

Knowing the real drivers behind a promotion and the interdependencies of these drivers should result in companies being better positioned to select the optimal marketing mix and make a more accurate promotion forecast.

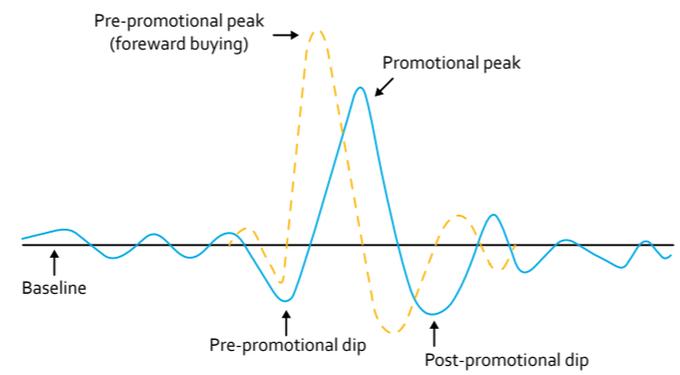
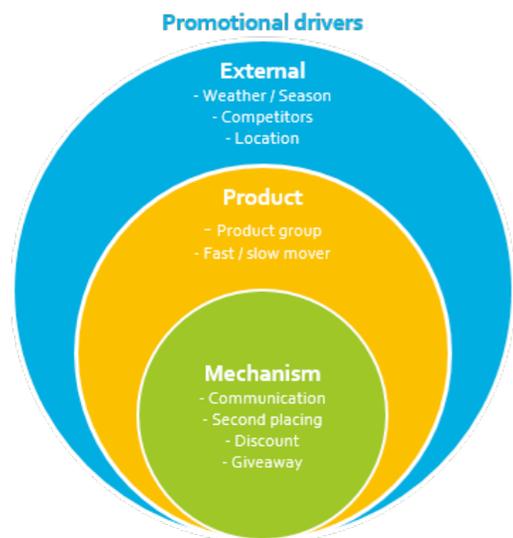
The promotional peak volume should be determined based on the parameters set for the promotional drivers of a promotion. In most cases, the promotional peak (P) can be expressed as a lift factor based on the baseline of a product. The lift factor is defined as the additional volume sold during the promotion period expressed as number of times the baseline.

$$y_t = \beta_c + \sum_{i=1}^4 \beta_i dSEASON_{i,t} + \beta_5 TEMP_t + \beta_6 SUNHDAY_t + \beta_7 dHOLIDAY_t + \beta_8 dEVENT_t + \beta_9 dTHEME_t$$

$$+ \beta_{10} \ln BS_t + \beta_{11} CPI_t + \beta_{12} CPI2_t + \beta_{13} PROMPRES_t + \sum_{i=1}^4 \beta_{13+i} nrPROMWEEK_{i,t}$$

$$+ \sum_{i=1}^3 \beta_{17+i} dBRAND_{i,t} + \beta_{21} dFOLDERFRONT + \beta_{22} dMULTIBUY + \beta_{23} dTV$$

$$+ \sum_{i=1}^6 \beta_{23+i} dRETAILER_{i,t} + \sum_{i=1}^9 \beta_{29+i} dCBRAND_{i,t} + \sum_{i=1}^9 \beta_{38+i} dSRCBRAND_{i,t}$$



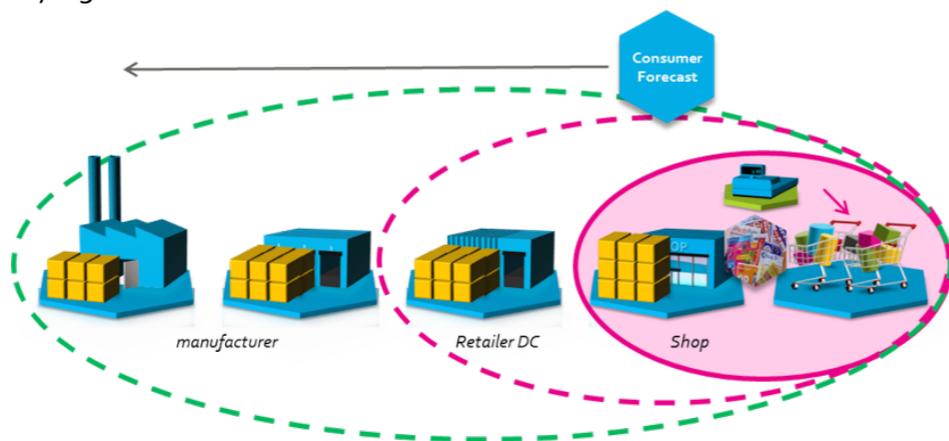
Most promotions also show a pre-promotional and post-promotional dip. These dips are caused to some extent by consumer behaviour and to some extent by trade/retailer behaviour. The type of promotion, the promotion driver parameters, the lift factor, and the retailer behaviour together determine how big the pre-promotional and post-promotional dip will be. Also these details of a promotion should be kept in the promotion database.

The lift factor assumes that a distinction between baseline sales and promotional sales can be made. However, there are products (groups) for which a clear distinction between baseline and promotional peaks cannot be made, for example, due to a promotion pressure of over 60%. In those cases the starting point should be an average periodic volume.

Promotion building block 2: Use the right data

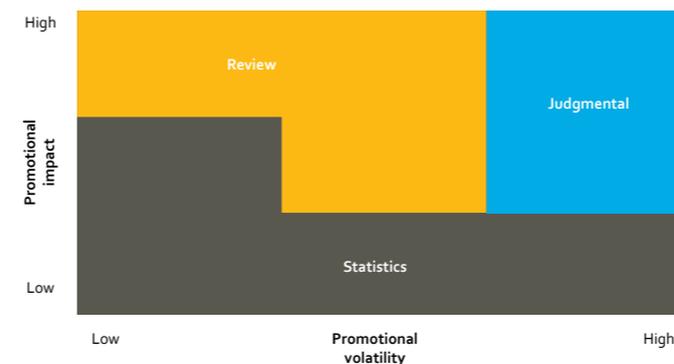
An example is the use of Point-of-Sales data of the retailer. This sell-out data to the consumer is free from pre-loading effects potentially caused by different partners in the supply chain. In case this type of data is available, it should be used for translating the promotional forecast further in the supply chain. This has the advantage of having one promotional forecast that is used by all partners involved which limits the chance on out-of-stock situations or forward buying.

If this type of data is not available to your organization, there are other sources that should be used in combination with your sell-out data. An example is market and consumer information from GFK or Nielsen.

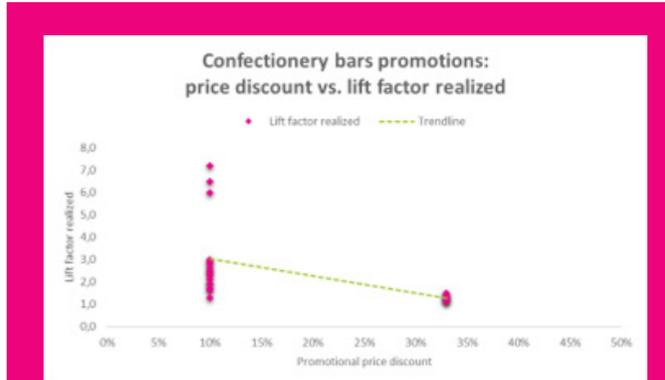


Promotion building block 3: Focus

The promotional volatility of historic promotions determines whether statistics can be used for determining promotion volumes of future promotion. If the variety in the realized lift factors of a historical promotions with similar promotional drivers is limited, then statistics can be applied. However, if the promotional impact is high, it is still advisable to review statistics.



Promotional impact is defined in term of the value, waste risk or availability needed of the products in the promotion needed.



Interpretation of statistics: don't make basic mistakes in modelling & interpretation

The chart shows an example where the realized lift factors of past promotions of confectionery products are pictured in relation to price discounts. Based on this plot, you could conclude that there is a linear relation: the more discount you give during a promotion, the lower your lift factor will be (which sounds strange in case of an impulse product). Reality however is that the high lifts at the left are influenced by a special event and the low lifts for the 2+1 at the right are caused by a more expensive healthy candy bar with a different market dynamic and customer base.

So model with the right drivers and assumptions!

Promotion building block 4: Make use of scenarios

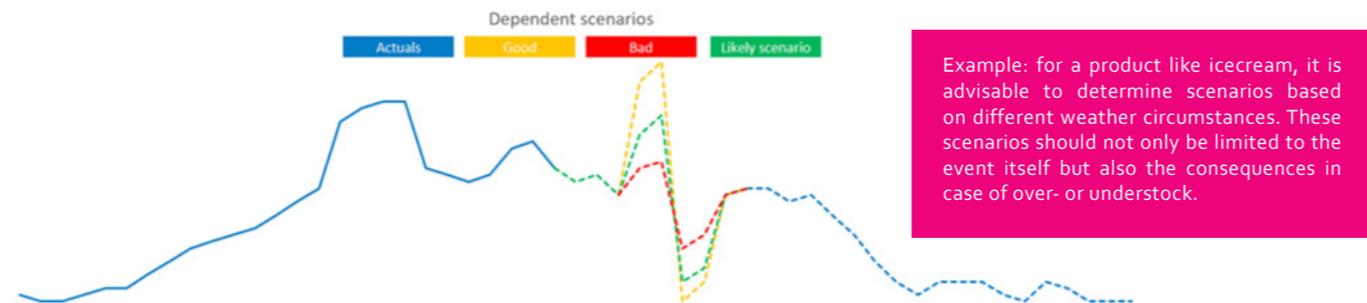
In case deviations from the plan occur during the execution phase, you have limited time to respond to these and take corrective action. For that reason it is recommended to define several scenarios.

In case not all required information is available to set parameters for promotion drivers or promotion drivers are highly uncertain, scenarios could offer a solution for companies to most optimally have prepared their supply chain. Having extra packaging material available or

reserve capacity during a promotional period are examples of preparing your supply chain for different scenarios.

Scenarios can easily be created with the help of models. Models will make sure that the different promotion forecasts are generated:

- Objectively ('removing the emotion')
- Very fast
- Can be compared
- Give insights into different drivers



Promotion building block 5: Monitor and evaluate

Once the promotional drivers, the promotional forecast and potential scenarios have been determined and the execution phase has started, it is key to monitor if the promotion is evolving according to plan. Monitoring a promotion can be done on the basis of analysis on available sales point-of-sale information or data from market research agencies.

If deviations occur, corrective action should be taken. In case you have defined various scenarios in the preparation stage, the corrective action may involve switching to one of the defined scenarios.

After the promotion has been held a sound evaluation of the promotion should take place in order to learn from the past. Promotion evaluations can be split into two parts:

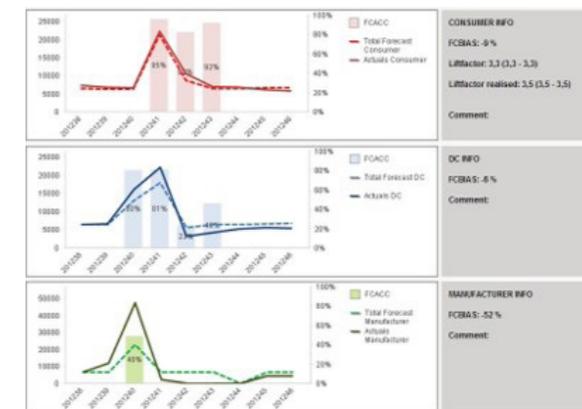
- A commercial and financial evaluation
- Process and planning evaluation

Commercial and financial evaluation

Best-in-class companies determine the real incremental promotion volume (the net effect) by decomposing the promotion peak. All supply chain related costs are derived which results in a mini-P&L as part of the promotion evaluation.

Planning evaluation

- Determine the forward buying or pre-promotional and post-promotional dip effects and correct the baseline.
- Continuously evaluate your promotion and your promotion planning process to ensure continuous improvements.
- Store the relevant evaluations in a promotion knowledge database.



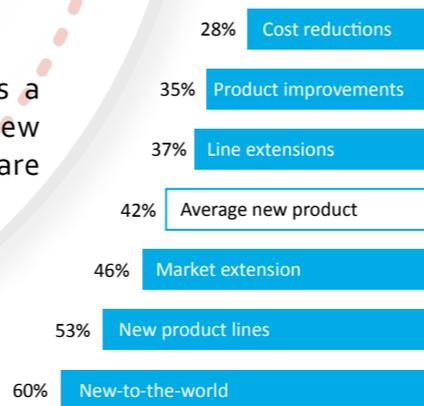
Introducing successful new products remains a challenge

The number of NPIs has risen dramatically over the years. More than 12000 consumer products were being introduced by FMCG companies in Western Europe between 2011 and 2013. However, this increasing number of NPIs does not say anything about the success rates of NPIs as out of these 12000 NPIs that were being introduced, only 7 products met the requirements of being truly successful breakthrough innovations (Nielsen, 2013).

One of the reasons behind this massive number of NPIs is the fact that there were only low or no growth rates across different markets in Western Europe and in order to return to growth again, companies tried to break this trend by introducing new products in a faster pace.

The increasing number of NPIs puts a lot of pressure on the ability of companies to align their processes towards the launch of new products. On top of that, the fact that involvement of nearly all business functions is required in order to come to a successful introduction of a new product, makes it even more difficult.

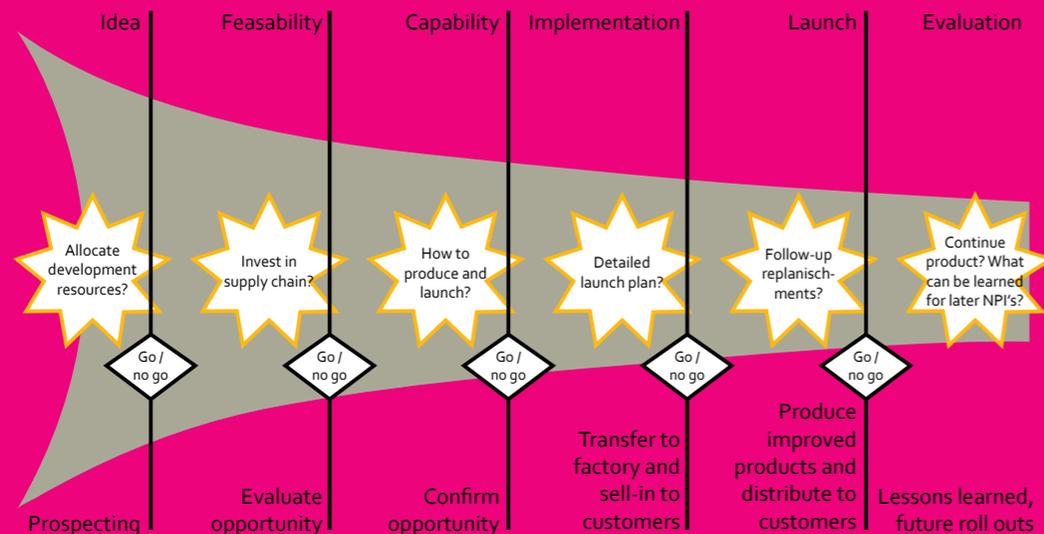
Especially the more innovative products have to deal with many uncertainties both from the internal organization as from a market perspective. As a result, error rates in new product forecasting are high (Simon, 2009).



Categories of new products defined according to their degree of newness to the company and customers in the target market (Mullings, 2010).

Start with an effective new product planning process

To be successful it is not enough to be first to market. The main reason for failing NPIs is often a disconnect that could have been addressed through a more effective NPI planning process (Cooper, 2013).



Example of a proven NPI planning process: the stage-gate™ method.

Characteristics of a formally/strictly embedded NPI process and team:

1. The planning process for the launch of a NPI should be an integral part of the new product development (NPD) process.
2. The planning process for the launch of the NPI should begin early in the NPD process.
3. The team responsible for the launch of a NPI should be integrally resourced.
4. The team should collectively review all data available in order to form the assumptions underlying the launch plan and initial launch forecast
5. The phasing out of products is an integral element of the NPI process.

The do's in planning and forecasting NPI's:

1. Business Case: Product positioning & Stage-gate.
2. Initial launch: Determine & plan initial quantities & Use specific Forecasting.
3. Launch monitoring: Supply chain collaboration & Scenarios.
4. Evaluation: Evaluation & Performance measuring.

NPI building block 1: Start with the right data

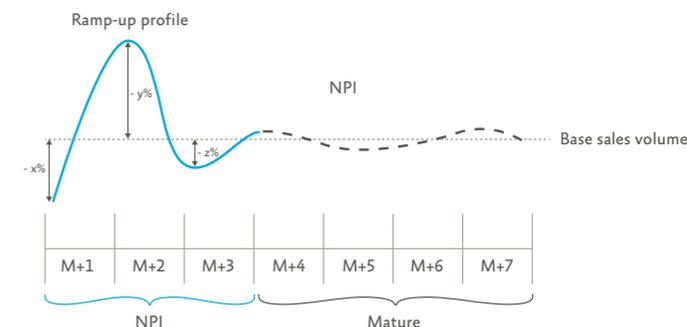
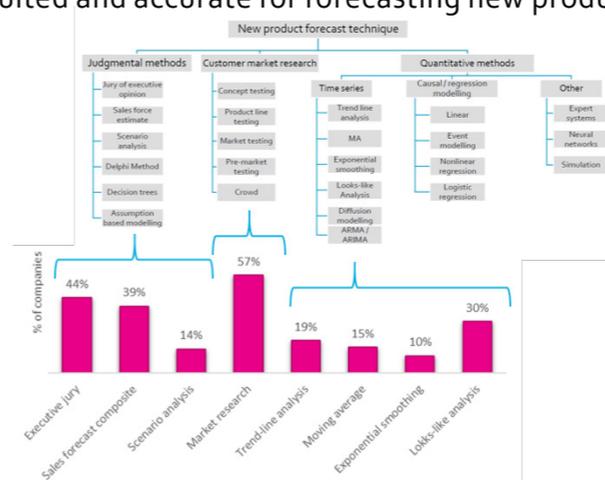


New product introductions start with the identification of a trend in the marketplace and then prospecting for an opportunity to realize that trend. As soon this trend goes from the idea phase to the feasibility phase, a business

case should be built in order to determine the feasibility of the idea. Here, the idea and the opportunity is evaluated by doing data analysis and market research.

NPI building block 2: determine the launch quantity!

Companies can use 3 different methods to forecast new products. Often, judgmental methods and customer market research are used to forecast the base sales volume of the more innovative new product introductions. For incremental new products, there are often predecessor-successor relations defined for which existing data of the predecessor can be used to determine the ramp-up profile and base sales of the new product. In those cases, quantitative methods are more suited and accurate for forecasting new products.



Initial launch quantities might be plannable, but what about follow-up replenishment?

As the data collection for new products is still sparse and erratic in the first stage of the product life cycle, forecasting can be hard. Besides that, shifting demand for similar products and existing inventory of predecessors in the supply chain, may all contribute to the fact that historical sales patterns in the early stages of the product life cycle are still unreliable and make it difficult to deliver reliable forecasts.

NPI building block 3: Launch monitoring by collaboration & scenarios thinking

Internal



To facilitate a successful launch, collaboration with both internal and external parties is key in order to collect all relevant data that is needed to make this launch plan as accurate as possible. A solution could be to start gathering data further downstream the supply chain. An important mechanism to improve the accuracy of the

Customer



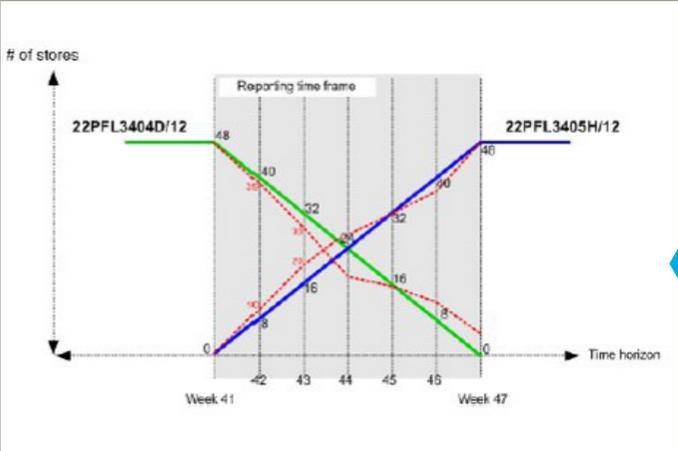
forecast is increased demand visibility of sales to consumers (sales-through) by using point-of-sales data. Only a limited number of days after the selling period has started is it possible to adapt the first forecast of the total sales by combining different facts from earlier products and by extracting the basic laws and fixed

Consumer



relations from previous product introductions. It shows the sales patterns of previously introduced products, by matching the actual orders of the newly introduced product against the patterns a reliable estimation of futures sales can be made using the first weeks of actual sales.

Predecessor/successor



Maintaining predecessor/successor relations is key when products have a clear relations. Timing and a changing number of outlets/ stores in which the NPI is sold are important criteria for the abruptness of the change.

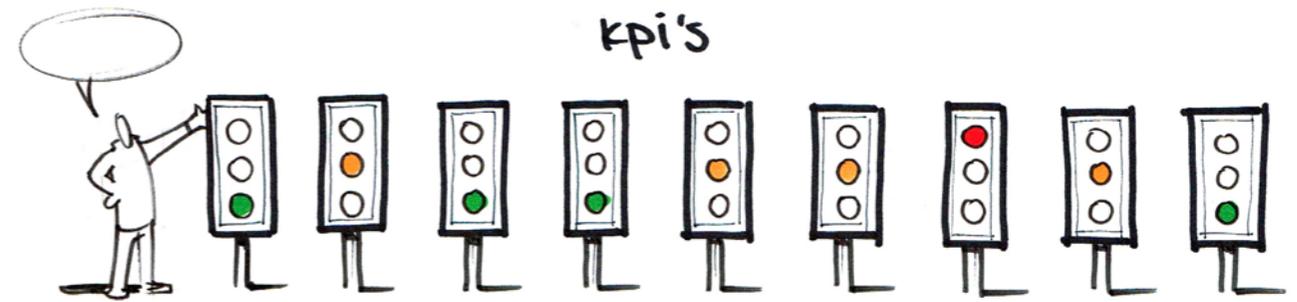
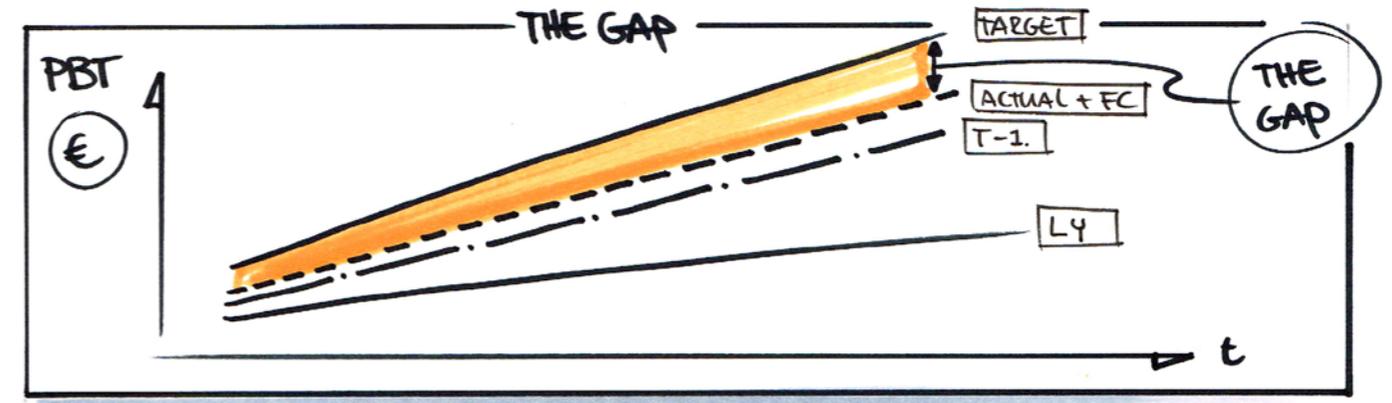
NPI building block 4: Evaluate

The success of an innovation process is not only measured by the additional sales it generates. The process itself towards the new products launch is just as important. There are two main reasons that make evaluation of new product launches important:

1. To determine whether the introduction was successful against predefined targets.
2. To finetune the sales pattern of the introduction in order to be useful as load profile for future comparable introductions.

For the first reason it is important to have a clear predefined set of KPIs to both measure the success of the introduction in terms of market goals (profitability, penetration, etc.) and the success of the launch process itself.

The second reason, evaluation of the load profile of a NPI brings additional insights that can be useful to take into account by using the sales pattern of the NPI as load profile for determining the forecast of future NPIs.

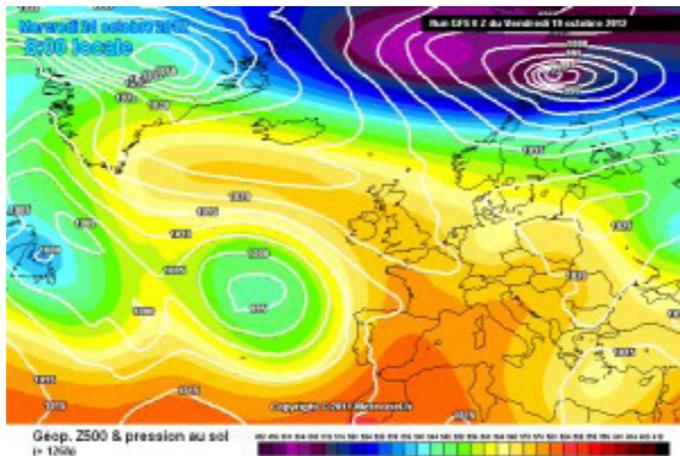


Weather forecasting

Weather is the effect within the season, that what is really happening compared to “average”. Often the weather forecast becomes less reliable looking further ahead, but not always... Sometimes the generic forecast on high and low pressure systems are better forecastable on a 3 week horizon...

The impact of weather on consumer behavior is an important effect in many categories. Three different influences can be identified:

1. Buying times or occurrences: Consumers stay home in case of extreme weather
2. The mood of consumers: Bad weather leads to unhappy consumers
3. Product (group) specific sales patterns such as BBQ and ice-cream.

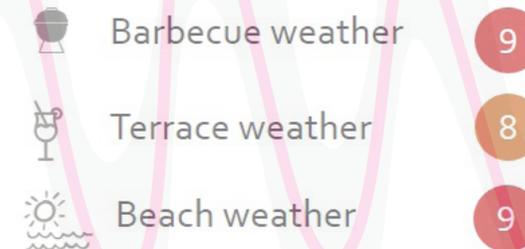


The weather forecast for the next 2 weeks is often reasonable on a trend level, day to day specifics remain difficult.

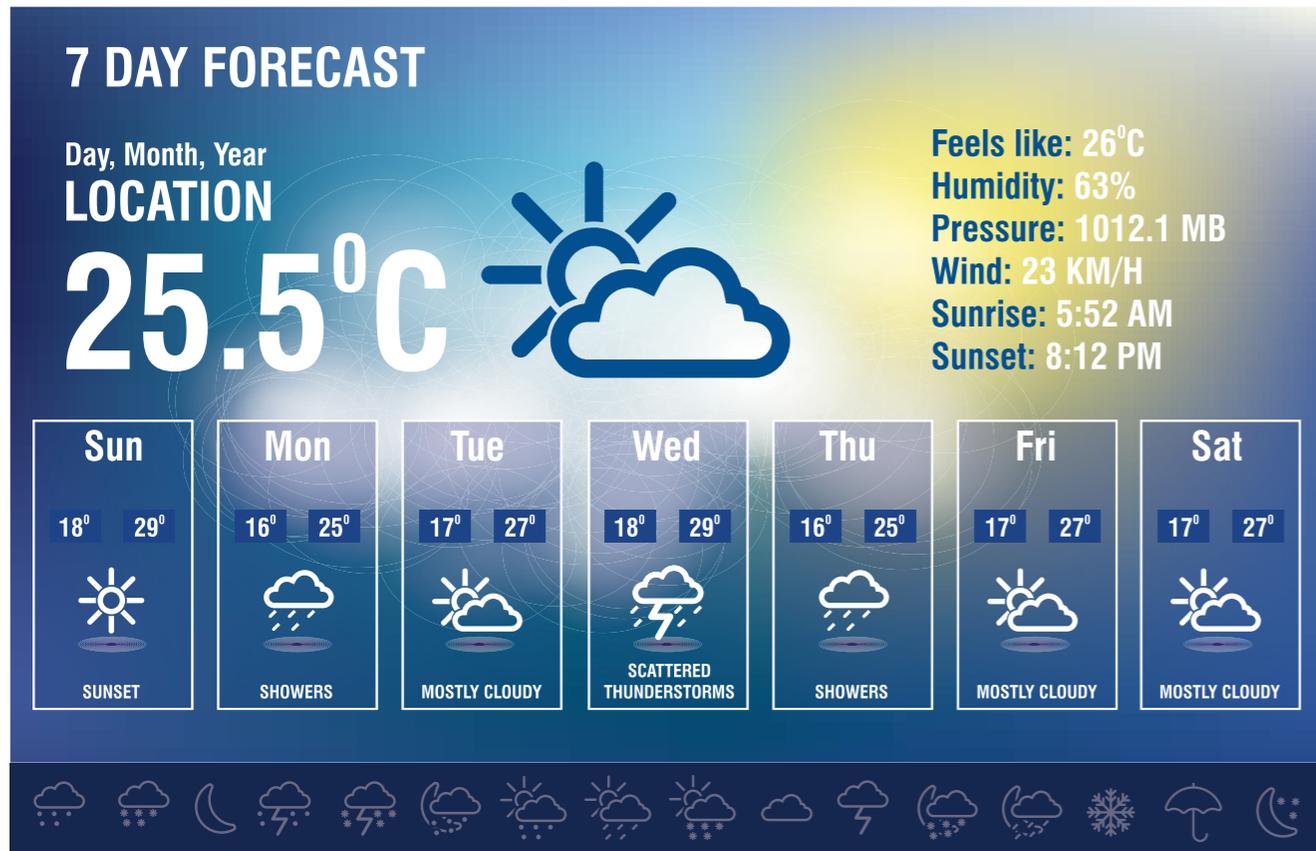
Up to now weather info is mainly used in Fresh Business, mostly as a separate input direct into supply planning ... Relations are often not linear, so step change approach is key. Partly because of this still a lot of 'Gut Feeling' sometimes even at scheduler level. Step by step long term weather models are available and getting better, giving more companies the possibility to act on weather predictions -> From reactive to scenario planning. Sometimes the weather forecast as such is a better model driver than the real weather.

Future decision making can be improved by taking into account the real weather influence of the past. Deweatherisation past sales records is key to be able to analyse in a structured way.

“To BBQ or not to BBQ” is driving a bigger part of the supermarkets portfolio than you would expect. Not only meat, charcoal, beer and salads are effected but also tissues, chocolate and sauces etc. Many companies act up on this in a relatively “simple” way. Either everything is normal or there is a BBQ alarm. This 0/1 thinking is not optimal in many environments. Thinking in thresholds, alerts and scenarios opens up a world of improvement potential.



Planning based on weather forecasts



Quantifying the impact of weather on daily online sales of a shoe selling company

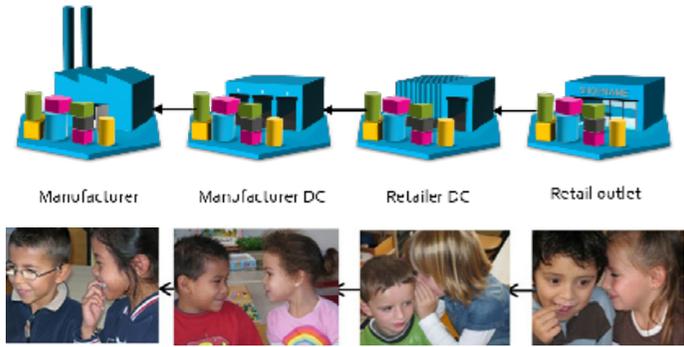


Quantifying the impact of weather on sales of a meat company



Weather

Information sharing in the value chain: Change the storytelling game



Story telling is a communication game that everyone has done when he or she was young. You read a line or a small story and tell it to your friend. Your friend tells it through and this is repeated a few times. The last in the group will tell the story out loud, guaranteed that the total

message is corrupted beyond recognition. Then you read out the original text, and everyone will be amazed by what remained from the original. Many supply chains are like this...

To deal with reality: Sense & respond!



What info is available? Sense what is relevant and available in the value chain

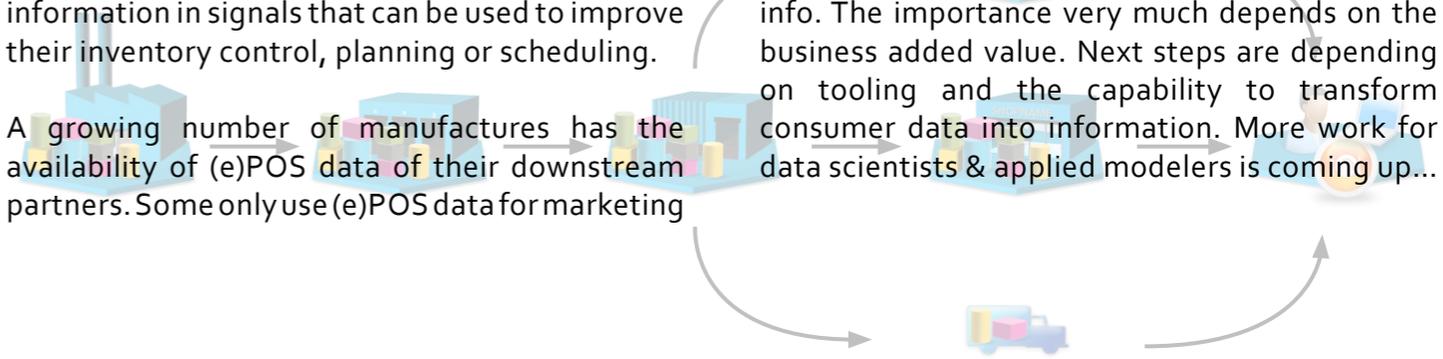
Which signals really can be used in forecasting and planning? How important is it to "sense and respond" to changes in near real-time? the answer to the questions above is very much depending on volatility in demand and supply:

Some multinational companies are doing pilots with Demand Sensing or have already invested in tooling on top of their ERP or APS. The first step in many cases is to use more actual order info within their own company to convert transactional order information in signals that can be used to improve their inventory control, planning or scheduling.

A growing number of manufactures has the availability of (e)POS data of their downstream partners. Some only use (e)POS data for marketing

analyses, but depending on the availability (largely varying per country /retailer group) it is more and more used in (demand) planning.

Only looking at aggregate POS data from the marketing department is often not good enough anymore. The need for detailed and frequent POS data depends on volatility (e.g. promotion pressure, new products or weather conditions). Companies with high volatility increase the frequency with which they look at their relevant info. The importance very much depends on the business added value. Next steps are depending on tooling and the capability to transform consumer data into information. More work for data scientists & applied modelers is coming up...



Online signals : sense consumer behavior

The consumer of today is different than 10 years ago. He or she is Interconnected, Instrumented, & intelligent and therefore better able to get the information he or she wants. Engaged consumers are able to develop themselves in being influencers, not only for their direct friends and relatives but for everybody searching for review opinions and experiences. Therefore consumers themselves can have a direct impact on brand preferences and directly influence buying decisions of peers.

When we look at how we can harvest information on the internet it is important to differentiate in 2 categories:

Digital Behavior : What people are doing online (surfing patterns) Digital interactions on company websites and mobile sites

Social Data: Any social information that people share about your product(s)

Up to now especially Marketing is discovering how to harvest information out of this sea of data . Supply chain should connect . At this point many companies see most added value seen for New Product Introductions.

The impact strongly depends on product and category, but at those companies where it is used, the first steps are made to integrate processes and set up tooling. The promise is clear: marketing & supply chain can help each other with insights to bridge the gap and decide based on better insights!

Sense: when something becomes a success or a failure

Collecting info on social media doesn't only have value for marketing. The supply chain should be connected and relevant info should be made an integral part of your S&OP/IBM process

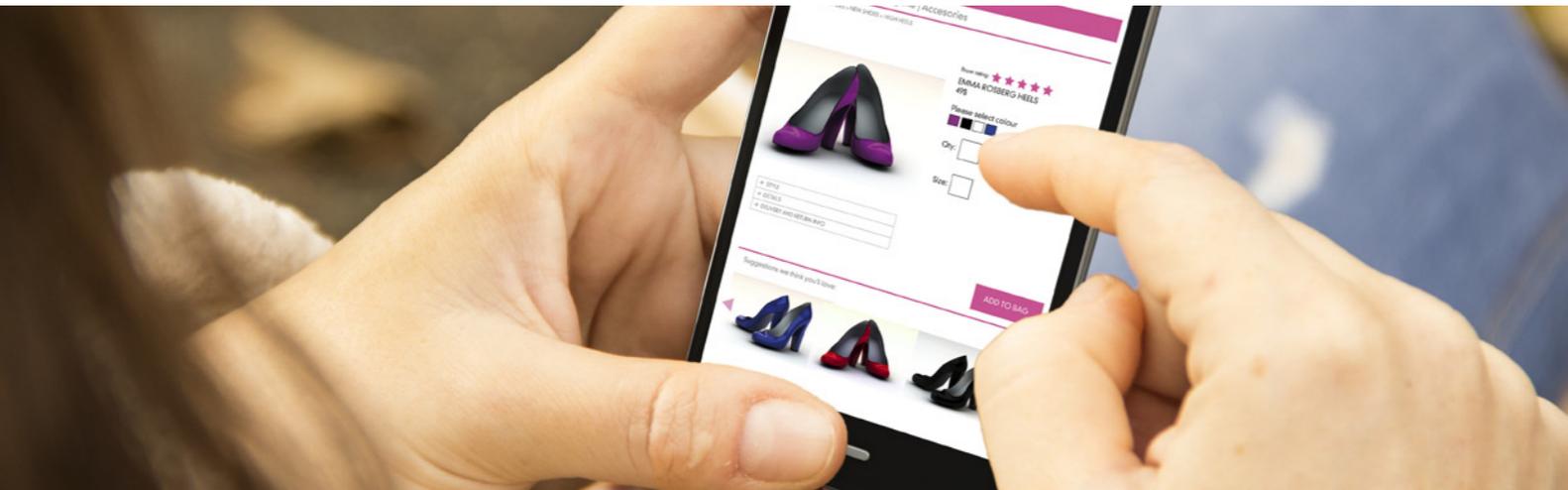


Sense & Predict before the consumer himself knows

An American online retailer has dominated the news by stating that they can predict a customer buying a product even before they have considered it themselves. In August 2012 they filed a patent for a shipping system designed to cut delivery times by predicting what buyers are going to buy before they buy it — and shipping products in their general direction, or even right to their door, before the sales even register. This

is all to reduce delivery times even further. The patent was granted on December 24th 2013.

The speculative shipping of packages is determined by analysing various data sources like historical buying patterns, preferences collected via surveys/questionnaires, demographic data, browsing habits, wish-lists and so on.



Sense & shape the future!



A fashion retailer is putting the consumer in the middle. Helping her with services via all different channels available, the pay off for the retailer is a true connection with the consumer giving the ability to shape the demand directly. Not by a sales push, but via service messages which are focused on the preferences and needs of the individual customer.

Understand demand to take the right actions

Characteristics	Causes	Impact	Intended effect	Action
Event or step change? 	Cross-sell or cannibalization?	Can negatively influence forecast	Ignore history	Mark as outlier
	Weather effect?			
	Competitor action?	Forecast needs to be adjusted to new situation	Forecast picking up new situation	Model step change
	Changes in distribution? 			
	Changes in facings?			

Starting point of every value chain is consumer behaviour. Starting with individual consumer traces however is not always possible. Sometimes, it makes no sense /not usable for value chain steering on individual level. Combining different sources or sensing the trend on an event

conditions can also be the key to success.

- What events do you want to look out for?
- What decisions can you make?
- Look at history or at forecast
- Decision tree > if no decision, then also no exception



The world is dynamic: use scenarios & decide... to achieve your business targets!



- In the end a model is never 100% right, make scenario's to enable the right decisions.
- Sense & steer based on 'reality'.



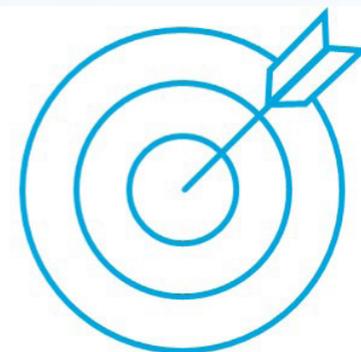
1

Get issues on the radar screen early



2

Decide on corrective actions



3

Achieve strategic business targets



YESTERDAY

TODAY

TOMORROW

Colophon & references

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More information on www.eyeon.nl.

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Pictures via Shutterstock, Jan-Jaap Rietjens

- Front picture by Natalya Volchenkova / Shutterstock.com
- Social media picture scyther5 / Shutterstock.com

Design by Martine Harmeling, André Vriens

Layout by Martine Harmeling



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