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Triple-A demand planning in the
consumer product industry

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Management Summary

To mitigate the threat that demand uncertainty poses on firm and supply chain performance, this whitepaper delivers a framework for triple-A demand planning in the CP industry. The triple-A demand planning framework enables the identification of demand planning improvements and shows how to implement them.

The fact that increasing demand uncertainty poses a threat to demand planning performance is well-established in the literature and well-recognized in practice. Driven by market dynamics and internal decision-making, demand uncertainty in the form of volume, product mix and timing uncertainties impedes accurate forecasting of future demand. Moreover, in the current CP environments, most organizations fail to effectively integrate the available data and therefore have trouble identifying causes of forecasting errors. These two factors further increase the harmful effect of demand uncertainty on performance.

Lee (2004) introduced agility, adaptability and alignment as core capabilities for dealing with demand uncertainty in supply chains. Applying the three capabilities to demand planning processes should increase the ability to, respectively, handle, prevent and share demand uncertainty. Hence, the framework for triple-A demand planning in the CP industry embeds agility and adaptability in the four generic steps of a demand planning process and adds a coordinating layer focused on alignment.

Divided over the three A's, five keys to success can be identified:

Agility

- Key success factor 1: Gather data from multiple sources
- Key success factor 2: Get data aligned in the value chain
- Key success factor 3: Monitor and react to forecast-versus-actuals deviations

Adaptability

- Key success factor 4: Identify market developments and anticipate

Alignment

- Key success factor 5: Establish and secure the coordinating layer

How demand uncertainty wrecks company performance

Demand uncertainty indicates the lack of predictability of downstream demand for a product or service

(*Baghalian, Rezapour & Farahani, 2013*).

Markets are changing at an exponential pace due to phenomena such as globalization and the rise of an omni-channel world. As a result, demand is becoming increasingly uncertain.

"In fact, demand uncertainty is one of the most critical challenges of present-day supply chains" (Syntetos et al., 2016).

A quarter-century ago, Fisher et al. (1994) already noticed the effect of environmental and market changes on demand uncertainty. The development of global complexity causes an increasing difficulty throughout the supply chain of predicting how products will sell (Fisher et al., 1994; Srinivasan & Swink, 2015). Therefore, Fisher et al. (1994) called for "a growing need to face demand uncertainty."

Nevertheless, demand forecasting and planning processes in the consumer product industry (CP) have not yet responded to this call. Even though it has been proven that an exclusive focus on past sales results in neither effective nor reliable predictions (Syntetos et al., 2016), demand forecasts are still based predominantly on historical data. Demand planning, the higher-level process of making managerial decisions to allow for effective use of demand forecasts, also has not really changed in order to deal with increasing demand uncertainty. Even with the use of quantitative (e.g. time-series, regression), qualitative (e.g. expert judgements) or mixed methods, the current demand planning processes in the CP industry are heavily centered around historical sales data-based demand forecasts.

Besides leading to increasingly erroneous demand planning performance (McCarthy et al., 2006), demand uncertainty is undermining entire businesses and their environments. The fact that current demand planning processes depend

heavily on (increasingly inaccurate) forecasts, has detrimental consequences for both individual firm (Adebanjo & Mann, 2000; Nenni et al., 2013) and collective supply chain performance (Hubner, Kuhn & Sternbeck, 2013; Nenni et al., 2013). Due to failure of current demand planning processes to absorb discrepancies in expected and actual demand, forecasts that predict demand to be higher than in reality are leading to unmanageable excessive inventory costs and a bullwhip effect throughout the supply chain. Contrarily, forecasts that underestimate demand are resulting in rush orders, lost sales and sub-optimal customer service and satisfaction.

Therefore, this whitepaper is centered around the million-dollar question: How should demand planning processes in the CP industry be designed to deal with increasing demand uncertainty?

The answer can be found by applying a well-known supply chain concept specifically to demand planning: [Triple-A demand planning](#) (Van Bree, 2019).

The triple-A demand planning framework offers a substantiated solution for improving demand planning processes in the CP industry. It allows planning professionals to analyze how the current process matches with the ideal picture and hence, how it can be improved.

The Triple-A demand planning approach

2.1 The triple-A supply chain

The “Triple-A” concept was originally introduced in a supply chain context by Hau Lee (2004), a highly valued supply chain practitioner and professor at Stanford University. Although introduced fifteen years ago, the triple-A theory is still an influential supply chain management framework. Showing the present-day relevance of Lee’s (2004) work, Feizabadi et al. (2019) recently advocated that: *“Triple-A supply chain capabilities remain key to sustainable competitive advantage”* and that *“Agility, adaptability and alignment remain vital to supply chain management in current business environments.”*

The triple-A supply chain framework proposes that only supply chains embracing agility, adaptability and alignment as core capabilities are able to gain and sustain competitive advantage. Here, agility implies being able to respond quickly to short-term changes in demand or supply. Alternatively, adaptability concerns continuous market and end-customer monitoring and according adjustment of supply chain and process design. The third A represents the alignment of all supply chain parties’ interests.

Altogether, interactions between the three A’s boost both supply chain and organizational performance (Whitten et al., 2012). The mechanism underlying this beneficial effect is as follows: By establishing agility, adaptability and alignment, the triple-A supply chain enables processes to be “developed and renewed in response to changes in customer demand and changes in the structure of markets and economies” (Whitten et al., 2012). Along similar lines, the objective of demand planning is to efficiently and effectively respond to customer demand (Moon et al., 2000). Moreover, demand planning is the basis for all other supply chain processes (Hubner et al., 2013). Therefore, ensuring agility, adaptability and alignment specifically in the demand planning process helps to achieve demand planning objectives and lays a solid foundation for an entire triple-A supply chain.

2.2 The Triple-A look at demand planning

Agility

An agile demand planning process is one that allows for efficient reconfiguration in a changing environment, by enabling quick response to abrupt demand changes. In essence, effective agility requires proactive responsiveness, meaning that agile demand planning processes can cope with change.

On the one hand, agility can be realized by minimizing (business-)internal and (business-)external information delays. Externally, information flows can be promoted by demand sensing (Byrne, 2012). Demand sensing implies exploring real-time demand signals and has been proven to contribute to agility (Nenni et al., 2013). Moreover, supply chain alignment facilitates smooth information flows up- and down the chain. Internally, information delays can be minimized by internal alignment, implying cross-functional coordination of the demand planning process.

On the other hand, demand shaping activities add agility to demand planning. Demand shaping refers to using marketing strategies (e.g. additional promotions, shifting commercial visibility between products) to exert influence on customer demand. This requires recurring forecast-actuals analysis and profound scenario planning and evaluation.

Adaptability

Whereas agility is concerned with sudden, short-term dynamics, adapting to structural changes in markets is essential for dealing with increasing demand uncertainty as well. This is where the notion of adaptability, or “Adaptation of the Fittest” (Lee, 2004), comes in. An adaptable demand planning process embraces complex environments and is willing to adapt its processes to structural changes originating from, for example, technological developments and subsequent increasingly short product life cycles.

Future patterns can be identified through evaluation of end-consumers’ needs. This implies market monitoring and demand sensing with a long-term focus. To clarify: On the one hand, demand sensing to achieve agility has a short-term focus and aims at responding to current, real-time uplifts or downturns in demand. On the other hand, demand sensing with a long-term perspective aims to identify future patterns, and hence potential structural changes, of customer demand. Demand sensing (long-term) enables anticipation of uncertainty by adapting the demand planning process to incorporate uncertainty prevention strategies based on changing consumer needs.

Besides identifying future patterns, adaptable demand planning processes also require internal alignment. As correctly stressed by a manufacturer: *“Demand planning in isolation is worth nothing. So not only demand planning should move with structural changes, the entire business should be aligned along with it.”*

Alignment

Alignment in demand planning should harmonize the interests of all actors involved in the demand planning process, by free information and knowledge exchange and clear definition of roles and responsibilities. Here, we make a distinction between internal and external alignment.

Internally, alignment is crucial to overcome functional silos. Demand planning requires inputs from different business functions, such as marketing, purchasing and manufacturing. Without internal alignment, these business functions are often solely focused on their own expertise and thereby impede demand planning performance. Internal alignment is supported by five major cultural elements: trust, openness, mutuality (meaning mutual benefit and risk sharing), structured communication, and high information transparency and quality (Barratt, 2004). Therefore, ensuring presence of these elements in the demand planning process stimulates internal information and knowledge sharing and clear definition of internal roles and responsibilities.

Yet, Lee’s (2004) concept of alignment is not entirely realized in demand planning by internal alignment only. For full alignment, internal alignment should be complemented with external alignment to overcome organizational silos as well. Here too, one must ensure trust, openness, mutuality, structured communication and high information transparency and quality

2.3 Triple-A to move from forecasting to true demand planning

Figure 1 shows the generic positioning of triple-A capabilities when moving from forecasting to demand planning. Although often used interchangeably, the concept of demand forecasting differs from the concept of demand planning. Whereas demand forecasts can be seen as a prediction of what future demand will be, demand planning is the higher-level process of making managerial decisions to allow for effective use of demand forecasts. In other words, demand forecasts drive demand planning and so constitute an input into the demand planning process.

Alignment is established as an antecedent of agility and adaptability. Cross-functionally and cross-organizationally aligned demand planning processes are needed to prevent information from being distorted and to speed up the identification of and response to market signals (agility). In addition, alignment is also needed to be able to reconfigure demand planning processes to changes in market, organization or supply chain dynamics (adaptability). It can thus be concluded that the demand planning function must take responsibility for continuous alignment to enable an effective triple-A demand planning process. As respondents in the CP industry stressed that a one-hour cross-functional meeting does not suffice, the notion of continuous refers to the fact that alignment activities should not be once-in-a-while occurrences, but instead should be recurrent in the entire demand planning cycle.

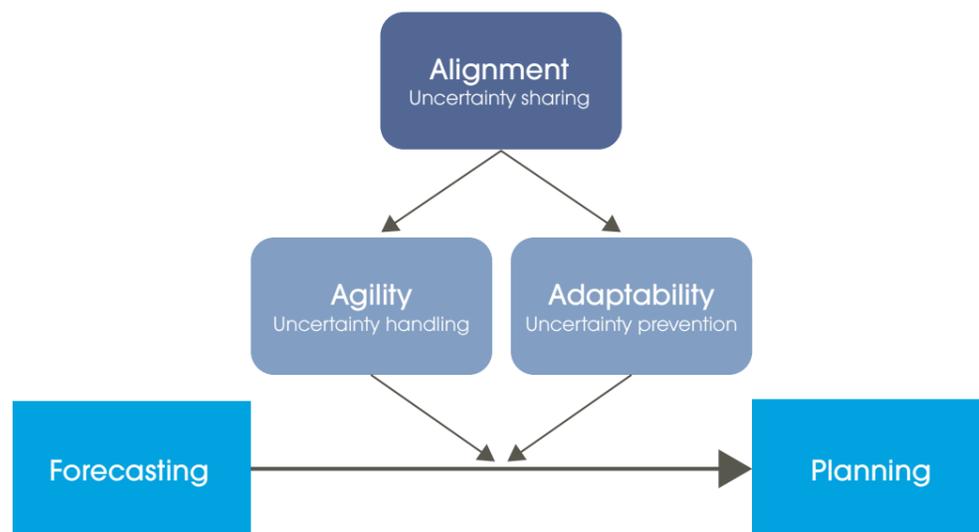


Figure 1: Triple-A capabilities in demand planning

How triple-A demand planning tackles demand uncertainty

3.1 The impact of demand uncertainty on demand planning in the CP industry

Currently, most of the demand planning processes implemented in the CP industry impede the ability of reaching desired customer service and product availability levels. Yet, how demand uncertainty influences demand planning strongly depends on what CP sector you are in. However, demand uncertainty is always driven by (sector-specific) market dynamics. As pointed out by a manufacturer: *“especially in the CP industry, the number of factors influencing market dynamics is enormous. Product portfolio changes, your own promotions, promotions from your competitors, price fluctuations, product reviews and sometimes even weather expectations all have an effect on market dynamics.”*

Demand planning in the CP industry is also affected by internally created demand uncertainty. Dealing with (strategic) decisions made in the interest of other departments causes irregularities in the demand planning process. Therefore, regular best practices cannot always be executed and the predictability of demand decreases.

Figure 2 schematically portrays how demand uncertainty impacts demand planning in the CP industry. *“Because so many aspects are involved, we do not know how things will sell.”* In line with this quote, demand uncertainty impacts demand planning processes by lowering forecast accuracy. More specifically, both a retailer and a manufacturer argue that a lower forecast accuracy harms demand planning performance if the causes of errors in forecasts cannot be identified. In other words, a lower forecast accuracy caused by demand uncertainty is especially harming demand planning because *“no one knows what caused the error if a forecast is wrong.”* The data available to enable the identification of forecast errors is often not used effectively due to a lack of data integration. Seven of the eight CP company respondents mentioned that they were dealing with a lack of data integration because the data is either *“extremely scattered throughout the organization”* or *“because of planning system constraints.”*

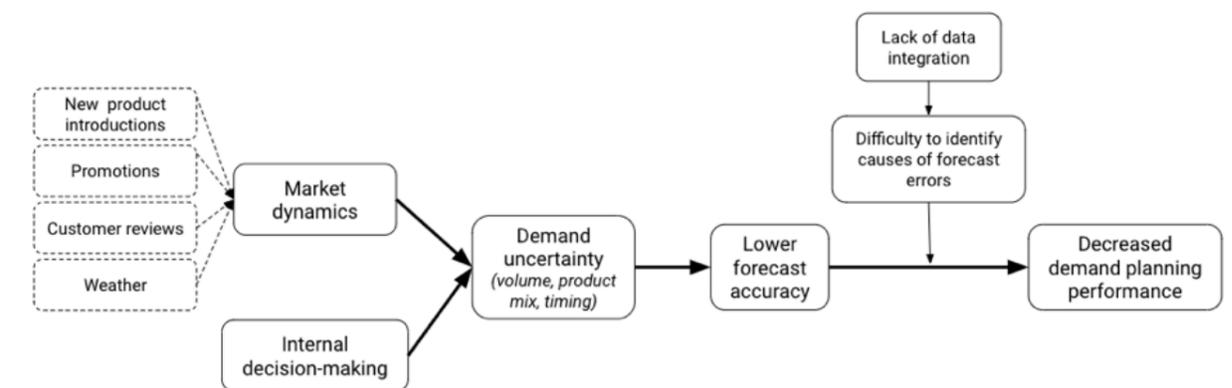


Figure 2: Impact of demand uncertainty on demand planning in the consumer products industry

3.2 The effect of Triple-A demand planning

Triple-A demand planning can limit or even eliminate the harmful effect of demand uncertainty on demand planning in the CP industry (figure 3). Adaptability, agility and alignment foster, respectively, uncertainty prevention, handling and sharing abilities (Lee, 2004; Tang & Tomlin, 2008).

We have seen that demand uncertainty in the CP industry is driven by market dynamics and internal decision-making. These drivers cannot be fully prevented, as market dynamics is an external factor, and internal decision-making is inherent to organizations. However, since adaptable processes are defined to embrace complex environments and adapt accordingly, adaptability can prevent demand uncertainty from lowering forecast accuracy by embracing demand uncertainty and adapting the demand planning process to deal with it. Identifying future demand patterns and potential structural changes using data-driven approaches will help to transfer demand uncertainty to (predictable) demand volatility.

Secondly, agility is linked to uncertainty handling. Agile demand planning processes allow for quick response and hence reduce the negative impacts of demand uncertainty. Therefore, agility handles the impacts of demand uncertainty and hence eliminates the effect of a lower forecast accuracy on demand planning performance.

Lastly, besides being a requirement for embedding agility and adaptability (as shown in theory and in practice), alignment also overcomes functional and organizational silos and integrates data from all around an organization and supply chain. Apart from its uncertainty sharing potential (Lee, 2004), alignment thus especially helps to deal with demand uncertainty in the CP industry by eliminating a lack of data integration, and thereby making it easier to identify the causes of forecast errors.

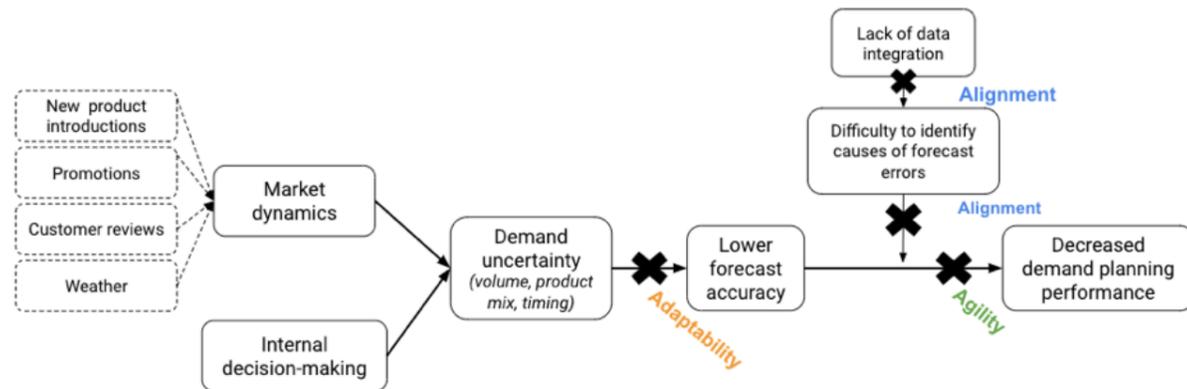


Figure 3: Impact of demand uncertainty on demand planning – Triple-A solution

Research methodology

This whitepaper is based on the results of a theory-supported inductive research carried out by Eni van Bree (2019), on behalf of EyeOn. Her research followed the science-for-design cycle (figure 4), where academic literature (science) was used to design a theoretical framework that, in turn, was verified in practice by means of a multiple case study.

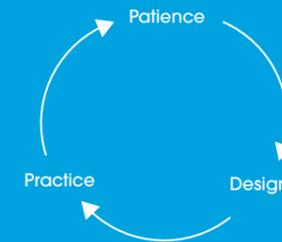


Figure 4: Science-for-design cycle. Adopted from: "Guest Editorial: Five steps towards exploring the future of operations management", by J. Holström & A.G.L. Romme, Operations Management Research, 2012, 5(1), 37-42.

Data was collected at eight companies in the CP industry via semi-structured interviews. To support an exhaustive understanding of demand uncertainty and allow for industry-wide verification of triple-A demand planning framework, the sample included demand planning employees from diverse sectors and types of companies in the CP industry. Amongst others, companies that are active in the FMCG, consumer electronics, fashion and nutrition sector were included. Moreover, the sample included retailers, wholesalers and manufacturers.

The collected data was processed by means of a robust coding protocol and analyzed on three levels: within-case, cross-case and expert analysis (Heikkilä, 2002; Merriam, 2009). The within-case analysis was done by means of independently analyzing the coded interview transcripts and allowed for the checking of contextual factors that might have affected the results of the individual case. In the next step, cross-case analysis enabled the identification of relationships and connections across cases. To this purpose, interview data was structured in a data table for transparency and clear demarcation. Lastly, the interview results were presented and discussed with both an academic expert and experienced practitioner for expert analysis.

Triple-A framework and five keys to success

Figure 5 shows a framework for the ideal triple-A demand planning process. Importantly, competitive advantage is only gained and sustained if all three A's are implemented: a combination of only two out of three does not suffice (Lee, 2004). Agility and adaptability are embedded in the four generic demand planning steps, whilst alignment is incorporated by means of a coordinating layer. Divided over the three A's, five keys to success can be identified.

4.1 Agility

Key success factor 1: Gather data from multiple sources

First of all, successful agile demand planning processes explore real-time demand signals. In the CP industry, this boils down to local customer data collection and the incorporation of non-sales data before forecasts are made. The earlier customer demand signs and information is included in the demand planning process, the earlier demand uncertainty can be handled or turned into predictable volatility. CP companies realize the need to look beyond first-tier partners and to include demand sensing the beginning of the demand planning cycle. However, demand planners indicate that it is hard to earlier include non-sales data as this requires better collaboration with sales and marketing (internal alignment). Also, incorporating non-sales data at the data gathering step requires a forecasting system or employees with technical capabilities that can handle data sources other than historical sales data. Therefore, both internal alignment and analytical capability development are required before non-sales data can really be included earlier in the demand planning process.

Key success factor 2: Get data aligned in the value chain

Secondly, In the CP industry, successful data gathering goes beyond looking at first-tier partners. As an example, a manufacturer experienced a high peak in demand from its customers (retailers) last summer. Therefore, the firm scaled up production. However, in reality the end-consumers were not buying the product and it turned out that the retailers were just stuffing their warehouse. Three months later, the product had to be sold in supermarkets with a heavy discount. Only then the manufacturer found out that its product was not as successful as they thought. To conclude: *“If we would have looked beyond the retailer, by for example including point-of-sales data, the problem would have been identified a lot earlier and we could have responded by scaling down production again.”* To successfully respond to demand signals, one must thus get demand information aligned in the entire value chain and so minimize external information delays.

Key success factor 3: Monitor and react to forecast-versus-actuals deviations

Once forecasts have been run, successful agile demand planning focuses on preventing and handling differences in expected and actual demand. In the CP industry, a forecast-actuals analysis and scenario planning are useful methods to increase agility. CP company respondents stress that especially in the CP industry, *“we should focus more on minimizing data latency: Getting the actuals right, selling what we predict”* instead of solely attempting to achieve a 100% correct forecast. Agile demand planning processes thus also require continuous forecast-versus-actuals analysis after the forecast has been generated. In this analysis, current sales (actuals) should be compared to the initial forecast to identify differences. Then, scenario planning implies devising possible plans for a number of potential scenarios. It adds to agility as it allows the demand planning process to match actuals with the forecast in case of (substantial) differences: *“The more you think about upfront, the quicker you can act.”*

Ask yourself questions like: *“What can we expect? How can we respond? Have we encountered possible future situations before and how did we respond to them in the past?”. This will initiate a learning process that will help you to close the gap between your forecast and actual sales.”* Importantly, the various scenarios must include related expected turnover and costs *“if you can easily translate a plan from, for example production units, to expected turnover and costs, decisions can be made quickly without first requiring time-intensive calculations and discussions.”* Hence, adding expected turnover and costs related to scenarios results in quicker decision-making and increases the ability to respond within short notice.

4.2 Adaptability

Key success factor 4: Identify market developments and anticipate

To be able to succeed in adapting demand planning processes to structural changes, markets should be monitored with a long-term perspective as well. Successful market monitoring consists of three steps. First, it is key to include aggregate data in the data gathering process and be able to approach this data from multiple angles. Secondly, changes in the environment result in changes in the analytical process forecasting process too. Therefore, the second step of market monitoring entails analytical forecasting capabilities developed, both in form of employee training and in analytical techniques used. Thirdly, successful adaptable demand planning processes use the sales enrichment stage to spot trends in the consumer market. Together with sales and marketing, one should go through a monthly process of identifying future trends, what they imply for the organization, and how the demand planning process should respond to them. Hereto, a medium-term view allows of early awareness of trends that develop gradually and therefore do not jump out either in short- nor in long-term evaluations. In general, medium-term focus is considered to be three times as long as the adopted short-term horizon.

4.3 Alignment

Key success factor 5: Establish and secure the coordinating layer

“Demand planning in isolation is worth nothing. So not only demand planning should react quickly and move with structural changes, the entire business should be aligned along with it.”

As shown in the quote above, for demand planning processes to be successful, businesses and supply chains should be aligned. Both in the literature and in practice, alignment is also seen as an antecedent to, or requirement for agility and adaptability. A cross-functional demand planning process is needed to prevent information from being distorted internally and to speed up the identification of and response to market signals (agility). In addition, alignment is also needed to be able to reconfigure demand planning processes to changes in market, organization

or supply chain dynamics (adaptability). It can thus be concluded that the demand planning function must take up the ‘orchestrator’ role to effectively deal with demand uncertainty. Therefore, a coordinating layer focused on continuous internal alignment is added to the four main building blocks of demand planning in the framework (figure 5). Here, it should be stressed that a one-hour cross-functional meeting does not suffice. Internal alignment activities should not be once-in-a-while occurrences, but be recurrent in the entire demand planning cycle.

On a more detailed level:

- Openness is needed to create a win-win situation by overcoming functional and organizational silos. Nowadays, businesses are highly interconnected, and the demand planning process is heavily dependent on all other functions. Therefore, employees of different functions and organizations might have to overcome the idea that *“we know better than they do.”*
- KPIs of departments and organizations must be linked to establish mutuality and support, instead of work against, each other. More specifically, KPIs should be targeted around the same measuring units (e.g. all target production cost or all target sales volume). As seen in one of the case companies (Van Bree, 2019): *“Two years ago, our sales department had to deliver a turnover plan in euros. The viability of this plan was not checked by others and often the set target was unrealistic.”* Therefore, the sales department was constantly adding additional volumes to the demand forecast in an attempt to still reach the turnover target. This led to low demand forecast accuracy and high overstocking. The company then decided to change the KPI of sales from turnover in euros to turnover in volume and started rewarding realistic targets instead of high numbers. After linking the KPIs of sales and demand planning: *“The departments are now much more aligned and instead of working against actually support each other.”*
- Structured communication procedures must be set in place to allow for clear responsibility definition. In five of the CP company interviews (Van Bree, 2019), the respondents reported that the cross-functional meetings were not always useful as they lacked structure: *“We get a lot of data in the meeting. However, much of this data is not complete. It [the cross-functional meeting] is very vague and still confuses me. Marketing might have more insights, or might not, but we sure do not have them.”* Therefore, it should be established by structured communication procedures what information is brought to a demand planner and what information the demand planner should look for herself.
- Shared data should be as transparent and as high-quality as possible. Only then, goals can be aligned with good arguments and decisions can be made based on the data.
- Once high-quality and transparent information is

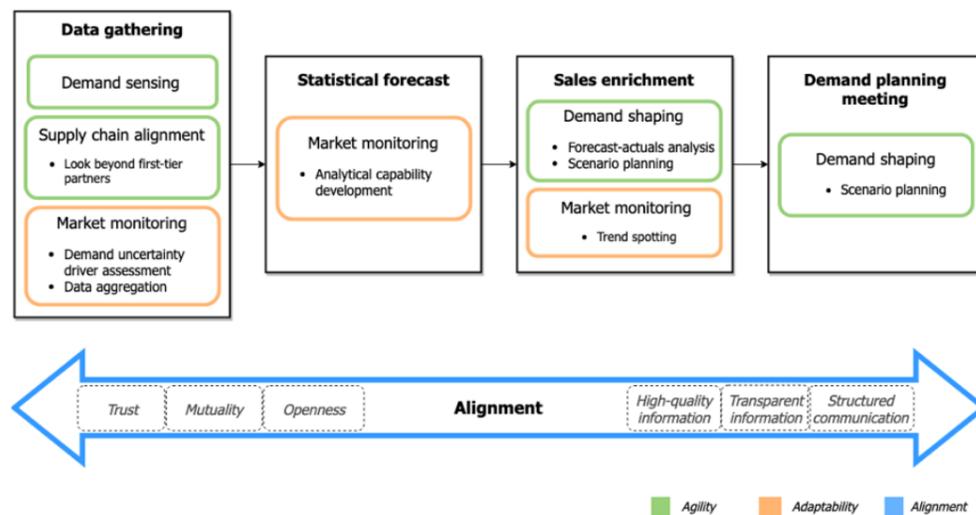


Figure 5: Framework for triple-A demand planning in the CP industry

safeguarded, top management trust and support is needed to fully attain a business- and supply chain wide culture of data-driven decision-making. As explained by one of the case study respondents (Van Bree, 2019): *“The faster top management shows employees that they trust them to make the right mistakes and learn from them, the faster the entire business will work towards the same goals. If you try it the other way around [bottom-up], it will not work; you need top management support.”*

Conclusion

The fact that increasing demand uncertainty poses a threat to demand planning performance is well-established in the literature. Driven by market dynamics and internal decision-making, demand uncertainty impedes accurate forecasting of future demand. Research by Van Bree (2019) has empirically verified the harmful impact of demand uncertainty on demand planning in the CP industry. It was found that in current CP environments, most organizations fail to effectively deal with demand uncertainty in demand planning processes. This is a serious problem, as it has been repeatedly pointed out that decreased planning performance both individual firm and collective supply chain performance.

Therefore, this whitepaper introduces a framework for triple-A demand planning. The framework embeds agility and adaptability in the four generic steps of a demand planning process and adds a coordinating layer focused on alignment. In the end, adaptability transfers demand uncertainty to (more predictable and manageable) demand volatility in the CP industry, agility mitigates the effect of a lower forecast accuracy on demand planning, and alignment contributes to handling demand uncertainty by eliminating the lack of data integration.

To transform your demand planning towards triple-A, 5 keys to success are brought forward:

1. Gather data from multiple sources (agility)
2. Get data aligned in the value chain (agility)
3. Monitor and react to forecast-versus-actuals deviations (agility)
4. Identify market developments and anticipate (adaptability)
5. Establish and secure the coordinating layer (alignment)

So let's turn threatening uncertainties into valuable opportunities for improvement!

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