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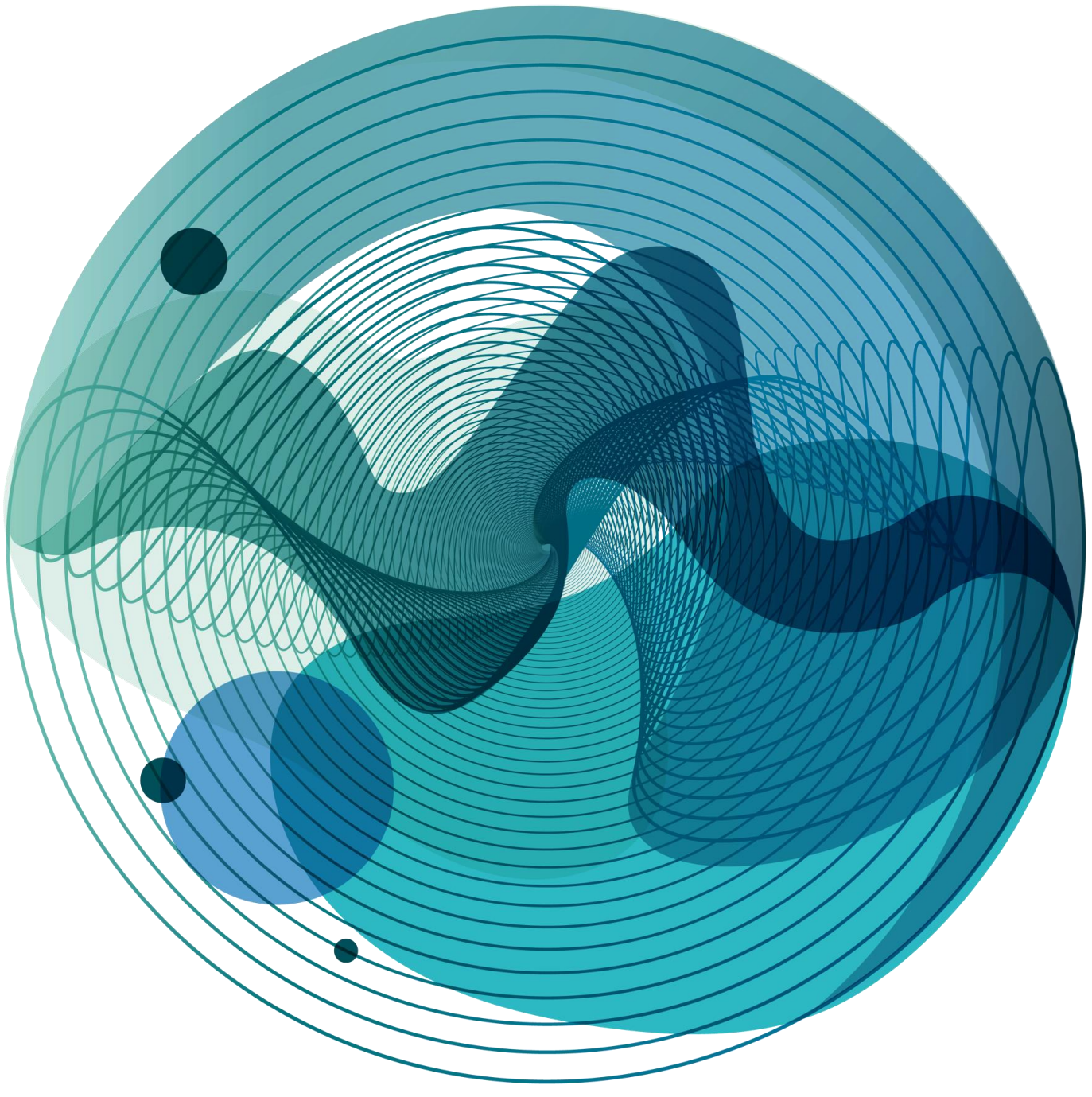


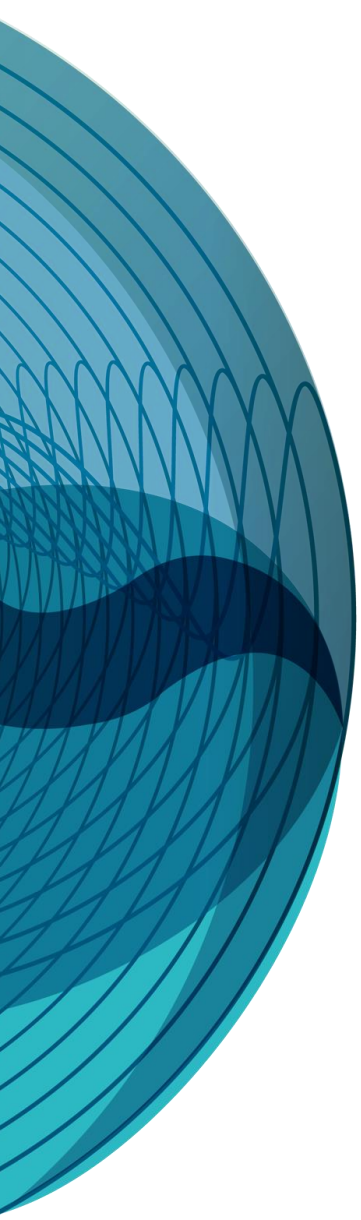
Bionic Demand Planning

Your journey to the future

Covid-19 and the war in Ukraine have underlined the importance of a responsive and resilient supply chain.

New technology and intelligent capabilities are becoming crucial to predicting and adapting global supply chains and networks.

In this complex landscape the next generation of demand planning – **Bionic Demand Planning – is emerging.**



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An introduction to Bionic Demand Planning

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Introduction

Bionic Demand Planning combines human and technological inputs to generate accurate demand forecasts and respond to increased volatility, uncertainty, complexity and ambiguity.

There are two angles from which to approach a Bionic set up:

1. An upskilled demand planner whose core competencies focus more on insights and interpretations based on data and analytics (refer to Chapter 2 for a detailed explanation) compared to the current standards of the demand planner role.

2. New tech trends and technologies that Bionic Demand Planning can leverage, such as Big Data (even unstructured data), Artificial Intelligence, such as Machine Learning and Natural Language Processing (NLP), Robotic Process Automation (RPA), real-time Analytics and Scenario Planning.

These technologies, embedded in intelligent decision-making systems, can support humans in the planning process and augment their intrinsic capabilities. Typical examples could, for example, merge the power of assumptions and business experience with Machine Learning to take the decision-making process to the next level.

Eventually utilisation of new technologies can release untapped capabilities, such as, for example, challenging a plan intelligently, running scenarios from High/Medium/Low cases of demand throughout the network nodes, and empowering demand planners to collaborate seamlessly with other teams and overcome any lack of visibility across the organisation.

Evolution of The Demand Planner Role

The evolution

At the heart of demand planning is talent and how companies manage and organise it. New sets of skills are needed by the demand planners of the future, including analytical, commercial and technological expertise, and a business mindset. The role is expected to become more and more event-driven, exception-based and data-dependent.

Where the role is performed is a fundamental consideration: local, centralised or virtual. Our current expectation is that in the future demand planning will be more centralised, to ensure during the transition both business continuity and knowledge retention locally and regionally. At Deloitte Synchronised Planning (team of experts on Supply Chain Planning) we see leakage of knowledge when moving from the bottom up, from local to global, as a critical problem and we believe in a high level of automation of day-to-day tasks coupled with local demand enrichment as new enablers for success.

In the current operating model, the majority of demand planning tasks (from Segmentation to Consensus) are local or regional. In the future we expect more process steps to be picked up from Centres of Excellence, such as Analytics, Continuous Improvement, Statistical Forecasting, Machine Learning, and Demand Sensing. Centralising the competences and building a connected and more capable “core” is often recognised as a key lever for a transition to a CoE. The same drivers have already successfully been applied to other areas where Centres of Excellence spread further: HR, Finance and IT.

The range of capabilities required in the demand planning community will broaden further, allowing for a split in role: regional business-oriented planners and central analytics planners.

In the graphic below the evolution of demand planning expected by Deloitte Synchronised Planning is depicted.

Starting at No Forecasting or Naïve Forecasting (1), we see a demand planning community that is short-sighted and has little maturity; moving towards Manual Forecasting (2), we encounter an increase in manual efforts to generate a plan, relying on Excel spreadsheets and modest analytical capabilities. Statistical Forecasting (3) is the most common next step, in which companies try to augment and align operating models and expertise; it is also the step that generates the most frustration and resistance to change. Aiming for Advanced Planning (4) is the next milestone: a capable organisation can deploy advanced algorithms, robust processes across regions, tight integration with financials and a new mindset to challenge plans’ assumptions and scenarios. Finally, Bionic Demand Planning (5) represents what we consider the end state based on today’s view, where Machine Learning and Artificial Intelligence are embedded in sustainable processes, analytics and dashboards are at the core of the planning activities, job satisfaction is high and talent retention increases. Future developments such as blockchain, quantum and metaverse might lead to an additional step, going beyond Bionic.

The evolution

Arno Kohlsdorfer, Project Manager, SIG Combibloc

"To be able to successfully progress from Step 2 to 3, it is key to have examples where the algorithms beat and outperform manual forecasting. **An upskilled staff member who understands, interprets and operates the statistical models is fundamental**. The overall solution must be a fit for non-statisticians and a Demand Planner Champion for Train the Trainer will boost success and allow you to move towards the Bionic goals"

1	2	3	4	5
No Forecasting or Naïve Forecasting	**Manual Forecasting**	**Statistical Forecasting**	**Advanced Planning**	**Bionic Demand Planning**
1. Entirely reactive 2. The past is the indication for the future 3. Low capabilities 4. Low maturity 5. Medium Free Time 6. No target measuring 7. No vision	1. Forecast upload 2. Excel hell 3. No analytics 4. Medium capabilities 5. Medium maturity 6. Little free time 7. Few KPIs and little target measuring 8. Unharmonised objectives across planning areas	1. Basic algorithms 2. Capabilities and maturities vary by region 3. Little free time 4. Achieving targets is the mission 5. Basic processes in place 6. Chase the data 7. High frustration 8. Poor employee retention 9. Continuous performance improvement	1. Advanced algorithms 2. Challenge the plan 3. Plan by scenarios 4. Plan by segmentation 5. Plan by past performance 6. Prioritisation processes 7. Financial planning 8. Sustainable processes	1. Machine Learning 2. Differentiated planning 3. Root cause analysis 4. Analytics planning 5. High maturity and capabilities 6. High job satisfaction 7. Process playbooks 8. Inherent automated performance improvement

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ML and AI for Demand Planning

The concept

The term Artificial Intelligence (AI) refers to the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

From the above definition, it is paramount to recognise and not underestimate the key and central role of Big Data in the new intelligent enterprise applications. Based on our experience, it could be very complex for companies to find the right data and make it available. In large digital transformations as well as Advanced Planning Software (APS) implementation the data aspect is often considered as the gatekeeper for success. Therefore, there needs to be a strong focus on the pre-processing steps for the data, given their pivotal role, to make them usable in the processes required.

Currently three sub-categories of AI are ready to be deployed to support demand planning:

1. **Machine Learning (ML)**
2. **Natural Language Processing (NLP)**
3. **Deep Learning (DP)**

1. ML can be used to automate processes and improve forecasting quality.
2. NLP can be utilised to enable a machine to understand human language and streamline the need for special technical skills for language-specific code developments.
3. Deep Learning (DL) is another technology with high potential in the demand planning field, though it is still in a preliminary stage of adoption. DL models are seen as the next big game changer in forecast generation as the models have the capability to integrate Big Data continuously and automatically update themselves.

The 4 take aways

ML is a branch of Artificial Intelligence (AI). It gives a system the ability to learn automatically and improve its recommendations using data alone, with no additional programming needed

The more it runs the better

These machines are not just programmed to do a single, repetitive task; they can do more by adapting to different situations

Automatic and without supervision

Machine learning is based on the idea that we can build models that process data automatically and learn on their own, without constant supervision

External Data

Machine learning algorithms add value when coupled with external factors and information captured as data. External Factor Data are commonly weather, sales prices, events, promotions, seasonality indexes, patient numbers, competitor constraints, disease outbreaks, tenders, regulatory aspects

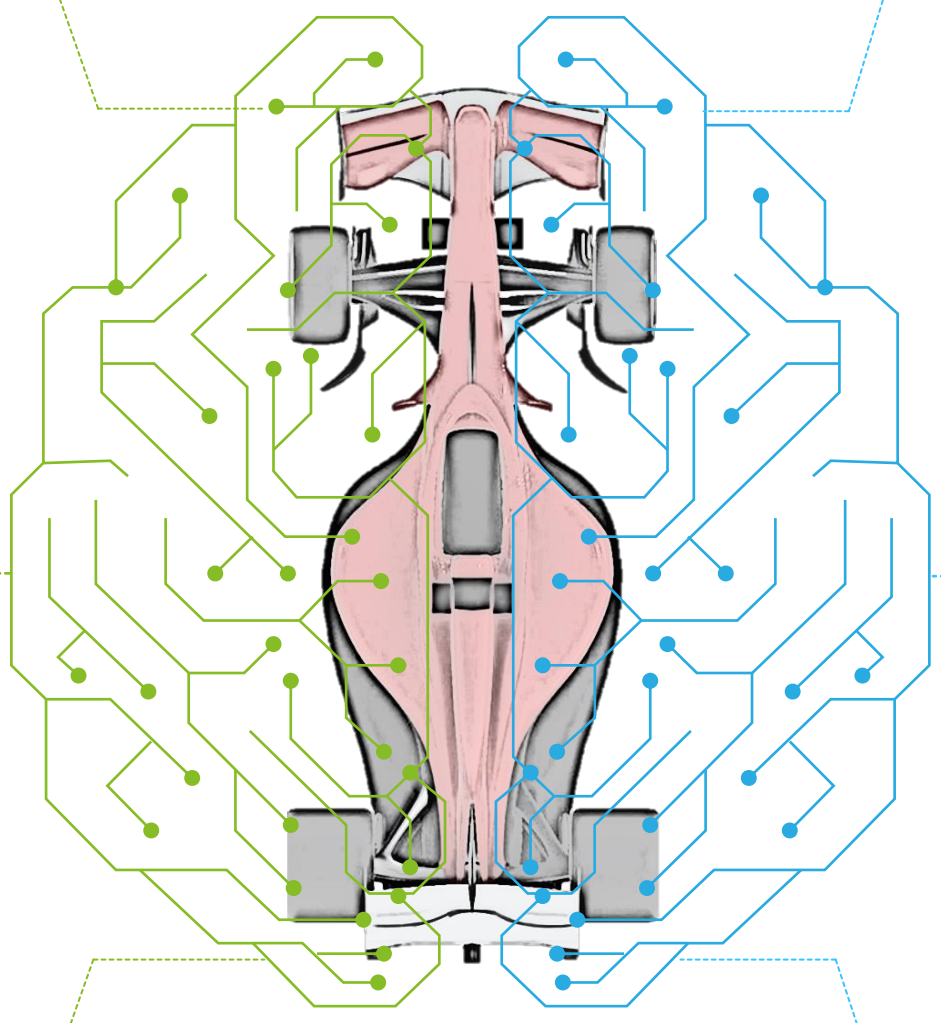
Trainings

Machine learning algorithms are more accurate after a training period. The greater the number of runs, the better the forecasts

Democratise Machine Learning with Formula 1

The F1 car is your technology with the available statistical forecasting models and ML algorithms

The F1 drivers are your capable, trained and upskilled **Demand Planning Champions**



The F1 engineering is the collection of data impacting your business

A faster F1 Lap Time is a more trained algorithm. The more it runs the more accurate

The F1 Racing Track is your organisation set up, process and governance

The F1 Team is your Demand Planning Community with the other teams playing a role in Demand Forecasting

Planning Software Capabilities for Bionic

Our technology watch

To exploit the full potential of Bionic Demand Planning, **supply chain leaders need to choose the best-of-breed system**, and Deloitte has extensive experience and a large set of capabilities to support decision-making:

Advanced algorithms – *Prepare the foundation*	A broad and diverse portfolio of algorithms, both traditional statistical and more advanced. Algorithms should include the traditional smoothing as well as Multi Linear Regressions, ARIMA, SARIMA and Gradient Boosting.
Flexible architecture – *Ensure the foundations*	A fast-integrating system capable of receiving different data from different sources (internal and external)
Ease of use – *Foster the adoption*	It should be convenient for the planner; therefore, it should be intuitive with a fluent user experience.
End to End visibility – *Be future-proof*	Planners should know what is happening across the organisation with efficient, real-time data, with flexibility to perform root cause analysis.
Scenario Planning – *Simulate and replan*	Creating multiple scenarios allows planners to test their assumptions, compare different plans and present them to other teams.
Dashboards and analytics– *Plan differently*	Immediate comprehension of what is happening and to show main KPIs of the current situation or what-if scenarios to planners and peers.
Alerts system – *Manage the change*	An interactive and proactive system that warns the planner to solve any possible issues in advance without making queries.

Marc Verpaele, IBP Director, Organon – Here for her health

"The fundamentals of Demand Planning enablement have not changed in a few decades. Companies fail typically not because of the technology, but because of a lack of understanding of what the technology can and cannot do.
Success can only be achieved by companies that understand the limitations of the tools and their own organisation."

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Implementation Options To Go Bionic

Our options

Based on Deloitte experience, there are 3 ways that companies can pursue Bionic Demand Planning:

1 Build Bionic internally

Option 1 implies fully preparing the organisation internally for the Bionic journey, addressing processes, new capabilities and skillsets as well as new or advanced technology

2 Outsource Bionic

Option 2 relies on the support of external partners whose core expertise lies in data services in order to outsource the process steps that are not at the core of the organisation's business

3 Hybrid Bionic

Option 3 suggests a hybrid approach, Build-Operate-Transfer (BOT), where, in the implementation and initial stages of the journey, external providers provide the Bionic service. Only when the company is set up and the environment is considered ready does the transfer take place.

Monika Meier, Remigio Candela, Process Experts, M-Industries

We have decided to outsource (Option 2) the process step of Statistical Forecasting creation while leveraging our internal planning system. All the available forecasting models were not easy to handle for a user and a certain level of trust in the calculations and the statistical generation was required.

The advantage gained is having all the information in one tool, allowing some changes, simulations and visualisation of the effects also in dashboards or alerts.
The disadvantage is still related to the forecasting quality of the intermittent and seasonal products where more than 12 months of historical data are needed or specific short seasons (Christmas, Easter, Mother's Day) for impact planning.

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Drivers and factors To choose your Implementation Strategy

The drivers

The key drivers that might lead a company to explore the Bionic opportunity are:

1. Low forecast accuracy
2. Uncontrolled bias
3. Working capital is too high
4. Poor forecast completeness
5. Poor forecast value-add
6. Overall digital strategy demands change
7. Regulatory aspects

However, there are several factors to consider when deciding upon the best strategy or option to adopt

1. Industry and market
2. Size of the company
3. Data policy and security required
4. Planning software technical readiness
5. Company guiding principles
6. Maturity of the demand planning community
7. Budget and headcount
8. Regulatory aspects

Additional insights

(1) The type of industry and market are the starting point of the transformation journey. Large industries with growing and fast-moving markets characterised by large portfolios of products represent ideal candidates for Bionic. Industries that are constrained by supply or whose markets and demand are very predictable and stable have less reason to embark on the journey.

(2) The size of the company determines the affordable investment level and the speed of return on the investment. Most large companies have already started their digital transition, often with technology as the focus and main driver. At the same time, however, we believe small and medium size companies could obtain a quicker return on Bionic investment thanks to their greater agility, fewer silos and ability to operationalise their vision quickly.

(3) Internal data policies and security standards are the drivers for the technology upgrade or Advance Planning System (APS) solution. Internalising a Bionic solution vs externalising vs Build-Operate-Transfer (BOT) solution is mostly driven by the security criteria and possible data exchange agreements between the parties involved.

Additional insights

(4) Many organisations, regardless of the size and market, have started or will soon embark on a digital planning transformation. Bionic is not the phase 0 of that transformation and it involves several angles: process, technology and people. Planning software should include technical capabilities for advanced forecasting and machine learning and at the same time user-friendly analytics and flexible dashboards.

(5) Companies' guidelines also play a vital role. A non-negotiable "Plan Centrally, Execute Locally" way of working might lead to Centre of Excellence developments for Bionic, while an "as local as possible, as global as needed" approach might tend to build and spread Bionic concepts at a very granular level (local demand planners).

(6) The maturity of the demand planning community and the vision are also key criteria as companies need to assess the type of investments needed to bring in-house new sets of skills and capabilities deemed fundamental for the future state of planning. A strong regional or local community could quickly harvest Bionic benefits.

On the other hand, a lack of expertise or manpower could lead to the decision to outsource the Bionic journey. Finally, the presence of a Centre of Excellence could foster the decision to restrict Bionic to a specific group of super users.

(7) The available budget is another leading factor for a Bionic journey. Depending on the dedicated budget an all-in option can be envisioned as well as a prioritised selection of initiatives such as capability first, tooling second. The internal headcount capacity is as fundamental as the budget, because undertaking a Bionic transformation requires business counterpart availability to provide company specifics and to ensure ownership, adoption and sustainability of the solution.

(8) Regulatory constraints or new laws might require a change in the Demand Planning Process, most importantly the Demand Planning Level and the way the baseline is created, reported, and assessed. Therefore, a door could open to combine mandatory changes with a Bionic initiative, with the future trends at hand.

Antonella Leone Kammler, Global Supply Chain Director - Films Division, Eastman

"For industries with high volatility and short business cycles, getting insights with higher precision means also increasing the degree of agility of the supply chain.

A Bionic and Insightful Supply Chain will help in translating information into decisions and execution. Consequently, adopting Bionic has implications for how to set up and configure the end-to-end supply chain, beyond demand planning and without forgetting capability uplifting".

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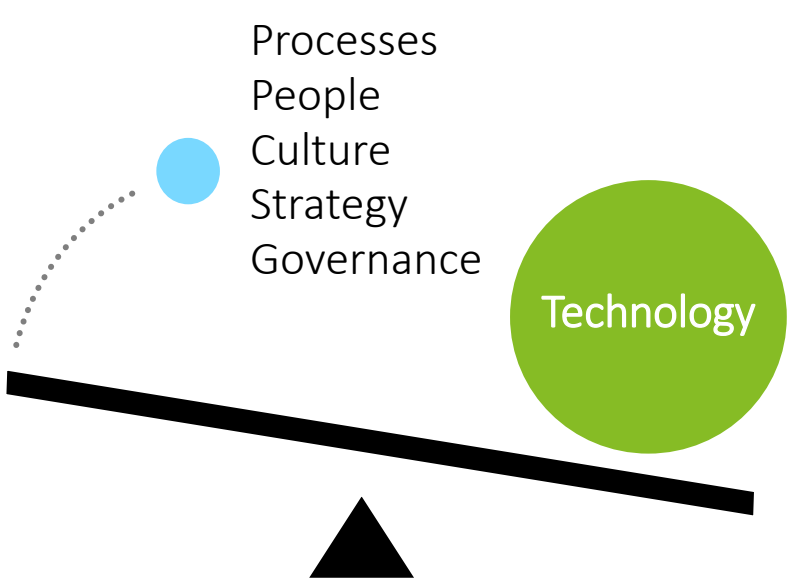
The trap

Do not fall into the trap of implementing a Bionic transformation in an unbalanced way: a sound vision of the company is essential as well as a clear objective and outcome for the transformation.
We have seen across several implementations how the IT side takes the lead over other functions, resulting in the end in disproportionate levels of maturity across key company areas. In addition, a narrowly focused technical drive leads to disappointing results in terms of business value, adoption and satisfaction. We see technology as an enabler for the underlying business strategy.

At Deloitte Synchronised Planning we believe in a holistic approach that spans vision, process, technology, analytics, talent and governance, giving the right weight to each in the different phases of the journey.

We propose to mitigate the trap by conducting pulse checks on process adherences, grow talents in the community based on the latest trends and avoiding top-down templates that might jeopardise adoption and the embracing of change.



Maturity Balance

Antje Ritz, Demand Planning Business Process Owner, Takeda

The more complex the technology, the more important communication and user trainings are, combined with process adherence measurements before and continuously after the project roll out.

Indeed, **when ownership of the project and the budget lies with the IT department**, most likely there will be a tendency to focus more on the technical element. For this reason **it is crucial to request in the project statement a full CMO resource for change management and to plan sufficient time for user trainings**.

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Bionic Value Add

The results

Based on our experience, we see two main categories of benefits for Bionic: quantitative results and qualitative achievements. The quantitative results – in forecast accuracy, bias, working capital reduction – are common and recognised across companies and organisations; the qualitative ones are often underestimated and less pursued. They can be summarised in the graphic below:

Antonella Leone Kammler, Global Supply Chain Director - Films Division, Eastman

"**The level of capabilities built through Bionic provides Supply Chain professionals with the ability to integrate sophisticated models with business information**; without any doubt, this new set of skills must be replicated in other functional domains.

Therefore, **Bionic drives upskilling beyond demand planning**. This implies "raising the bar" in the entire supply chain, for example by increasing the need for sophistication in supply scenario planning and offering companies a new platform to think and brainstorm on how to elevate overall supply planning and execution."

Data-driven culture

The demand planning community aligned with the vision and anticipating upcoming trends in the demand planner role

Monitoring and Measurements

The key steps in the Bionic demand planning process are driven by performance, value add in the process, and root cause analysis

Glass box environment

The demand planning community understands better the system's behaviours and the algorithms, fostering trust, adoption and usage

Variability reduction

Demand plans stabilised across cycles, with key assumptions debated rather than key numbers

Community enablement

The whole demand planning community behaves as one, strengthening the connection with the supply side

Job retention & attraction

The company is widely recognised as a leading trendsetter in the market, with highly satisfied planners and with great offerings for employee development

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Ready For Bionic?

Contact us

Early respondents will be offered a **free demand planning capability assessment**!

Federico Sasso – Supply Chain Planning Expert, Synchronised Planning

Federico Sasso has 6 years' experience in Supply Chain Management consulting across multiple industries. His primary focus is Supply Chain Planning (IBP/S&OP), from APS vendor evaluation and design phase to actual implementation, deployment and support. He has in-depth experience with SAP IBP and Demand Driven Material Requirement Planning.

Marcus Kutzner– Partner, CH, Planning, Sourcing & Procurement

As a Partner at Deloitte, Marcus leads the Sourcing & Procurement practice of Deloitte Switzerland and EMEA. He has strong process, systems and business transformation expertise. He brings vast experience in end-to-end strategy development, IT enabled transformation, organisational operating model design and global implementations incl. Europe, LATAM, South Africa and US.

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