

WHITE PAPER

Unlock the Hidden Factory through informed decision making

Create more with less

Transforming data into sustainable solutions.



Climate change and environmental degradation are a real threat to the world and will have a detrimental impact on future generations if nothing is done to solve these issues.

Working out how to do more with less is a task that the food and drinks industry is grappling with as it works towards a low-carbon circular economy. The drum beat of change is growing in urgency as major economies like the EU, Japan and China are looking at ways to create a post-COVID19 green recovery, whilst continuing to meet UN sustainability goals.

So, how can companies meet these goals as consumers increasingly push for more sustainable products and shareholders for better returns? The answer: to unlock the potential of what we call 'the hidden factory' and do more with less.

This white paper offers food and beverage (F&B) manufacturers insights into how to make more informed decisions, increase operational and cost efficiencies and grow sustainability, by unlocking the data and experience held within their plants and people. Through better data identification, analysis, visualisation and presentation of information, organisations can tap into their existing infrastructure unlocking 'the hidden factory'.

For the global food supply chain, the challenges are clear. It is responsible for 26% of global greenhouse gas emissions; a third of all food is lost or wasted somewhere in the supply chain; fossil fuel-based materials need to be phased out, and significant improvements are needed in the way packaging is dealt with after use.

As Industry 4.0, Big Data and Digitalisation continues to gain momentum and become a critical

tool in increasing productivity, F&B manufacturers are turning to Artificial Intelligence (AI), robotics and digital solutions to create a future connected factory. But how can we effectively manage human to machine interfaces to improve our decision-making process?

We know that data has multiple uses at different levels of an organisation whether it's digital, structured or unstructured and that not all data is digital. Only through visualisation can data be better understood and used to improve sustainability.

“We need data to make an informed decision, but the data can be either digital or non-digital. Digital data is what we all have in business, it can be computer or paper based. Non-digital data is best defined as subconscious data. Knowledge and experience are examples of subconscious data, and the ability to rationalise form parts of the non-digital aspect,” says Dean Griffin, senior services solutions manager, Tetra Pak Services AB.

Creating an interactive visual representation of a company's goals and strategy, allows it to get the best use out of its plants, people and machinery. The visuals can show things like the bottlenecks in production, current capacity utilisation rates, potential capacity and how to reach stretch and sustainability targets.

“Why spend \$25 million on building a new factory with all of the implications associated with it, when you can spend \$5 million and rationalise the resources you have already, to be able to do it better?” asks Griffin.

The visual representation of data creates a common language understood by those operating the plants and running the company. Well thought out clear graphics cut through the industrial data fog to support more informed decisions around sustainability or production goals.

Making the visuals interactive allows the viewers to better understand the information without drowning in the data. If it encourages the viewers to dig into the graphics, complex situations can be better understood.

Instead of drowning in data you can intuitively look and know what it is you need to do.

“If we can do more with what we have today, then we don't need to build or create more and we use less resources,” says Roberto Franchitti, Executive Vice President, Tetra Pak Services.

As 2020's edition of the [Tetra Pak Index report](#) shows, consumers remain deeply concerned about the environment – even in the midst of a pandemic – and want food and beverage brands to use sustainable packaging.

Governments for their part are ramping up their actions ahead of this year's COP26 UN summit to show how they will meet the goals of the deal. They in turn are asking industry to demonstrate what plans are being put in place to support this.

“It is unacceptable that hunger is on the rise at a time when the world wastes more than 1 billion tonnes of food every year. It is time to change how we produce and consume, including to reduce greenhouse emissions. Transforming food systems is crucial for delivering all the Sustainable Development Goals,” says UN Secretary-General António Guterres.

Climate change requires action. Our approach outlined in this paper will allow users to take action and identify a plan that will address most sustainability and business goals, doing more with less.



Transforming data into business results.

A simple principle – but how do organisations make sure that the decisions they act upon are informed ones? The current hype is that decisions can only be made on perfect, expansive sets of data.

But we believe this view is not true.

All organisations, irrespective of their maturity, do make decisions daily. The impact and effect of these decisions vary from customer to customer. Twenty-five years ago, data was growing at a rate of 100GB a day. Fast forward to today where the amount of data created each year is growing faster than ever before. By 2020, every human on the planet was creating 1.7 megabytes of information

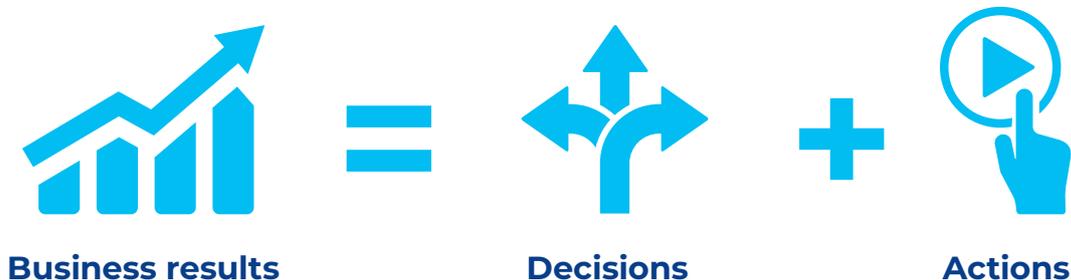
each second. In only a year, accumulated world data will grow to 44 zettabytes, according to an IDC study.

As the volume of data grows, it is becoming more difficult for companies to make sense of it, and it often confounds rather than illuminates strategic decisions. We are facing sensory overload leading to a situation where the data is throwing up barriers to productive decision-making. Capturing more data will not automatically generate more value for a company. Data is only good when it results in accurate and relevant insights.



Big data is useful for connecting dots that would otherwise go unconnected. But you also need to understand its context to make the best decisions when looking across geographies and along the supply chain. This paper outlines the key aspects of informed decision-making and how to make the most out of available data.

We define the types of data and the levels of decision making and how that links to people's experience and knowledge. We also discuss how data should be presented for maximum effect and understanding.



Significantly increased data growth within the industry.



With so much data, maybe the issue is not related to what data organisations have, it is more about how we present that data. Our brains simply can't process so much information unless it is presented in an easy-to-digest manner, since the majority of us are visual learners.

Your message is only as good as your ability to understand and share it. How often do teams drown in numbers or are the numbers used to confuse?

“To be really useful in decision-making, data has to be democratised and readily available,” says Martin Börjesson, Director of Data Management at Tetra Pak. It is important to think about how we find the meaning in data.

This can be done through elements like colour, size, orientation and flicker. Visual clues the brain processes to show hierarchy, colour for patterns, orientation for trends, size for quantity.

“Rather than just reactively recording what we did yesterday, we need to use data to foresee the future, to optimise, predict and do pattern recognitions so we can take the right decision at the right moment in time. That brings completely different value to the organisation,” says Börjesson.

At a time when F&B manufacturers are looking at ways to improve and meet sustainability goals, the ability to use data in a format which everyone can understand and act on is vital.

“It requires us to collect, organise and structure data in a way that makes it both accessible and reusable across applications, organisations and geographies,” says Börjesson.

Visual cues matter

A large body of research indicates that visual cues help us to better retrieve and remember information. For example, you recognize a logo by seeing the visual graphic, even before reading the name of the brand. The research outcomes on visual learning make sense as the brain is mainly an image processor, not a word processor. The part of the brain used to process words is quite small (10%) in comparison to the part that processes visual images.

A study by MIT neuroscientists found the brain can identify images seen for as little as 13 milliseconds.

“The fact that you can do that at these high speeds indicates to us that what vision does is find concepts. That’s what the brain is doing all day long — trying to understand what we’re looking at,” says Mary Potter, an MIT professor of brain and cognitive sciences and senior author of the study. “The job of the eyes is not only to get the information into the brain, but to allow the brain to think about it rapidly enough to know what you should look at next,” adds Potter.

Data growth
100GB
per day



1995

Data growth
50 000GB
per second



2020



65%
are visual learners



13ms
to identify an image
or concept



90%
of information transmitted
to brain is visual

Visuals are processed **60 000** times faster than text



Clearing the data fog.

As the speed and volume of data grows exponentially in business, how do we clear the data fog to allow more informed, repeatable decisions?

Whether organisations use the data available to them or not they still make operational, tactical and strategic decisions every day. These decisions achieve varying business results.

To unlock greater levels of performance and sustainability, organisations need to understand what data they have, its quality and how to present it to create better understanding. They must also understand their audience.

The goal is to use the data available to drive the business objectives as it is possible to deliver more benefits and reach business goals by being more efficient in using all the available data.

Sometimes the way data is presented locks out large groups within an organisation, and knowledge and experience remain untapped. “People like to work with the tangible and if you have got good information in front of you, which is presented well, then it becomes readable by everybody. You might find you have financial, management, maintenance and operation people involved, and everyone can understand the information and numbers you are trying to present. It does work,” says Griffin.



A number of companies from Asia to Latin America have used this model to cut costs, produce more and generate less waste, tapping into their hidden factory.

“We created various visual representations of a customer’s operation and their future strategic ambition. We did this to show them how they could expand their existing operation to reach a 75% increase in volume with fundamentally the same asset base. We then demonstrated that with some additional investment a stretch target of a billion packs was possible without building a new factory. This translated to a multi-million Euro saving for them. The visual representation was

simple for everyone to understand and not just a nice PowerPoint slide. Visualising the hidden factory capacity enabled them to realise both financial and sustainability benefits,” says Griffin. “They could see just by looking – if a line is running at 26 percent of total effective equipment performance, and you add some efficiency improvements and run it at 60 percent, you will get extra production volume. In that simple visualisation you can start to see the hidden factory.”

By using visualisations, you can pull all the strands together to create a more complete picture. In so doing you clear away the data fog which can cloud decisions and thwart action.



Understanding the Data to Business Results paradigm.

The goal is to move from data to decisions, drawing on the experience and knowledge of teams to gain insights and be able to take action at the right time and meet sustainability and other goals.

Many F&B manufacturers are considering ways to create the same volume of product with less resources.

They know this is more profitable for a company as well as being environmentally beneficial. But the problem often comes in the manner in which engineers present information to financial professionals.

Using the approach of better visualisations, it is easier to highlight the correct information, and put forward a stronger proposal, so as to make a more informed decision.

It is possible for Tetra Pak to create the visualisations with any tool a business has, for instance Power BI, Tableau etc, or our own, all will work. The key is to understand the graphic you want to create and design it in a way that is easy to understand for the target audience. We use different visualisations and infographics across the entire customer lifecycle from sales through to operational delivery.

For example we can present an operational cost model to customers which allows us to see a cost per 1000 litres as well as the productive time versus the non-productive time spent producing the product.

“A lot of customers can’t see this level of detail in their systems. We can take the cost model down to the product level (SKU) as well. Then you can start to look at the products that make money versus those that don’t or those produced most or least sustainably,” says Griffin.

Once you have this level of information it is easier to plan out how you can meet your objectives and

what measures you need to put in place. It also makes it easier to measure performance at a glance.

“Unless the results are presented to the right people at the right time in a meaningful way then the size of the data sets or the sophistication of the analytics tools won’t really matter.

“You need to make sure the insights gained from your data are used to inform decision making and, ultimately, improve performance.

“These days there are more interesting ways to present data and exciting tools to help you do it,” says Bernard Marr, author and strategic business & technology advisor.

Data + Visualisation = **Information**

Information + Experience = **Insight**

Insight + Objectives = **Decisions**

Decisions + Actions = **Business results**

Better understanding leads to faster decision-making.



Data + Visualisation = Information

Around 65% of people are VISUAL LEARNERS and when data is presented in a clear visual manner people understand it easier. Better understanding leads to faster decision-making.

Since people also work at different levels of detail, the visual and interactive representation of the data allows individuals to explore the detail and get better insights for their role.

Dashboards often are the best way to look into an organisation and its various departments, operations, and performance. But the visualisation needs will be quite different for strategic, tactical and operational uses.

F&B manufacturers are familiar with the benefits of operational dashboards and they already have experience of using data to improve operational efficiency. But these dashboards have their limitations.

Analytical, strategic and tactical dashboards allow a F&B manufacturer to be able to consider scenarios, what-if questions, goals and targets in different ways. And critically – because of the easy visualisation – provide a level of understanding that is instinctive. This in turn prompts knowledge and experience-based decision making.

Representing insights in a visually impactful way means you will have a better chance of influencing the decisions of senior leadership and other staff. A visual analytics solution means moving away from large amounts of data, for example on

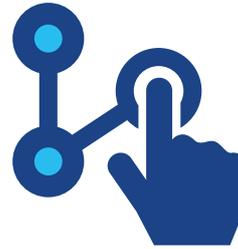
Strategic dashboard

Focuses on long-term strategies and high-level metrics associated with them



Tactical dashboard

Used by middle-management to track performance at a more granular level



Operational dashboard

Shows shorter time frames (days & weeks) and operational processes



Analytical dashboard

Contains vast amounts of data created by analysts used for analysis & scenarios



spreadsheets, to a dashboard with clear, actionable insights. When visual analytics are embraced by everyone in an organisation, data becomes a critical asset, that means everyone from the line operator up to the CEO is empowered to make better decisions every day. But this is not achieved by simply choosing the appropriate analytics technology to identify the next strategic opportunity. It is done by making visual data-driven decision-making synchronised across the operational, tactical and strategic levels of the company.

In order to remain competitive, you need insight and intelligence and different types of dashboards which will enable you to convey an improved message, organise your data more effectively, and boost business processes across the board.

When we look at a car dashboard it instantaneously identifies and provides feedback regarding the status of the car's speed, servicing needs, tyre pressure, fuel level, etc. This is an example of an operational dashboard. Dashboards in business do the same thing but not all dashboards are equal. Climate change requires everyone to play their part. Each of us has a role to play and by using dashboards it allows multiple teams to understand the strategy and goals and helps work towards achieving them.

"In Latin America a customer made huge savings and a lot of that is due to the data visualisations they use on a day-to-day basis. It's not necessarily a conscious activity – it's part of a process that works because it's visual," says Griffin.

Insight comes from experience driven by information.



Information + Experience = **Insight**

Gut feel or experience-based decisions are all examples of the use of non-digital data. Often the success of these decisions varies. They are also reliant on the people that make them. It can place the organisation at risk if these individuals leave.

Digital data is system based and held in an electronic form whereas non-digital data resides in the knowledge, experience and context of the workforce. So how do we manage the human to machine interface?

A good example of sub-conscious data or knowledge is when you drive a car. When you are learning to drive you have to work hard to remember everything while also navigating the roads and other drivers.

After driving for a period of time the act becomes easier as it is more instinctive or habitual. Analogue or sub-conscious data is used without understanding how or why. It just is, we 'tag' it as knowledge, experience, habit or whatever we can as that's what we do.

When organisations combine the use of experience with the information (visualised digital data) better repeatable decisions are made. Informed decisions use all data available.

When an individual views an image, dashboard or graphic the brain identifies patterns then shape, colour and orientation all within milliseconds of seeing them. The conscious mind then connects to the sub-conscious mind and draws on what we call 'experience or knowledge' to rationalise the images intent and context.

The better the human understands the information presented, the more informed the decision will be. The secret lies within the visualisation of the data – not the requirement of more and more data. Of course, the better the data sets, the better the potential decisions will be. So digitalisation and automation are, and always will be, key elements of the future connected factory.

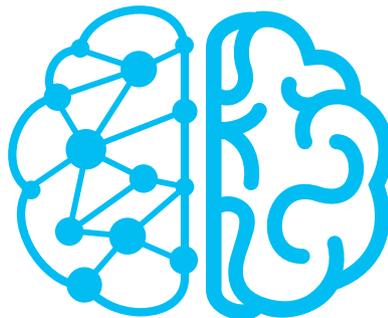
What we need to understand is whether we are making bad decisions because we are presented with incomplete data or is it due to the manner in which we present the data to the decision maker. We believe that it is the latter.

“We produced a dashboard of production time utilisation which looked across the different types of product in flavoured milk. It showed the countries they are in, the percentages and product volumes as well as the machine types they are produced on and then the machine production time utilisation for that. In that one picture you could go from a very high level of the whole company all the way down to a specific line, within a specific customer, within a month,” says Griffin.

We use a lot of these dashboards in our everyday life, like in cars where they are an everyday experience, and they work. We need to translate that into industry and understand it's not all about pie charts. We would see things a lot easier if they were presented visually but we insist on putting tables and charts or numbers in front of everyone in an organisation and we often miss the message as a result.

Digital

Financial data
Performance data
Equipment data
Systems



Non-digital

Experience
Tacit knowledge
Training/Intuition
Cognitive awareness

Making effective decisions.



Insight + Objectives = **Decisions**

Organisations need to empower and enable their workforce across all business levels. The business goals need to be clearly communicated and understood so that they are considered when making decisions.

Empowered, effective people make decisions that align and drive the business and sustainability goals.

“I believe the combination between the conscious and the subconscious or the digital data and the non-digital is a relationship we need to understand and develop in people,” says Griffin.

“It’s not just about faster systems – it’s also about people learning. If we put the right information in the right format in front of the right people, then we get decisions.

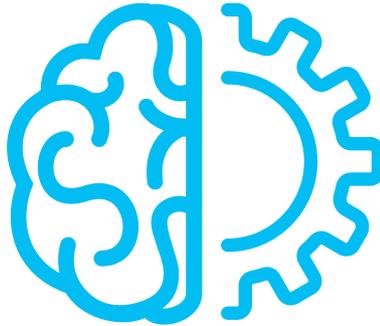
The more people understand the information, the more informed they become. Because it is then an aligned discussion, not a collection of different viewpoints.” says Dean Griffin.

With Industry 4.0 and IoT becoming increasingly relevant to the F&B sector, machines need to be supported with digital data-focused solutions.

The combination of Effective People and Effective Machines enables better decisions and delivers better operational performance.

Effective people

Are empowered
Aligned to objectives
Make decisions & act
Build on experience



Effective machines

Meet business objectives
Have reliable performance
Produce at required quality
Use data to learn & improve

World class F&B organisations recognise that business value is created by those who make the product the customer buys. Improving the decision making of the operational staff directly drives business results.

By empowering the operational staff to make these decisions, middle management are freed to focus on tactical business challenges using all experience and information sets available.

Senior management support the middle management by providing strategic direction and clarifying objectives. These strategic decisions are driven by operational and non-operational information sets.

“By understanding the human interface better, we can present data and information in a manner that is easier to understand and facilitates more informed decision making with incomplete data sets,” says Griffin.

Action is the foundational key to all success.

Decisions + Actions = **Business results**

As Pablo Picasso said: “Action is the foundational key to all success.”

So how do we take action to meet the sustainability and resource challenges ahead?

- Establish data visualisation solutions and dashboards within the business.
- Invest in establishing both effective people and effective machines so that they create a solid foundation for better use of digital and non-digital data.
- Empower people to use the information to create insights and ultimately better, informed decisions.

- Get the right information, in the right format to the right people.

Tetra Pak’s founder, Dr Ruben Rausing, once said that a package should save more than it costs. While at the time he meant this from a financial perspective, Laurence Mott, Executive Vice President of Development and Engineering at Tetra Pak, says that Rausing’s statement can equally be viewed today from a sustainability perspective.

“Not that we should just be saving the product that is within the package, but that we should be ensuring that the package has the absolute minimal impact on the environment.



“We understand that the package should save more than it costs,” he says. “And it’s something of a guiding light through this innovation journey that we’re faced with.”

By using digital and non-digital data represented in a clear visual manner, organisations can clear

the data fog and unearth the resources in their hidden factory.

In this way they can take action to move towards achieving pressing sustainability goals.



