diagram

#180 / December 2019

the Bühler magazine

ER *CREATING* TOMORROW **TOGETHER** *CREATING* TOMORROW TO

PULLING TOGETHER TO REACH A SHARED GOAL

COLLABORATION IS A POWERFUL FORCE FOR TRANSFORMATION

HOW INDUSTRY CAN CHANGE THE WORLD

SUNNY VERGHESE URGES BUSINESS LEADERS TO ACT NOW

FACING THE AFTERMATH OF A TROPICAL CYCLONE

BÜHLER AND MEREC REESTABLISH FOOD SECURITY IN MOZAMBIQUE

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DEAR READER,

IN HIS WORLD BESTSELLER "Homo Deus – A History of Tomorrow" author Yuval Noah Harari reflects on why we as a species have taken over control of the entire planet. He writes: "Humans nowadays completely dominate the planet not because the individual human is far smarter and more nimble-fingered than the individual chimp or wolf, but because Homo sapiens is the only species on earth capable of cooperating flexibly in large numbers." It is the power of collaboration which makes the difference. Building on these collaboration capabilities – of which language is by far the most important one – we have created the safest, wealthiest, and most civilized world in history.

Most of us enjoy a lifestyle which was unthinkable just a few generations ago, not only in countries such as Switzerland, the United States, and Japan. However, the standard of living of modern societies comes with a hefty price: increased emissions, exploitation of resources, and the extinction of entire species to name a few. This price is far too high, and the way we live and consume puts our livable world at risk for future generations.

Collaboration was a conditio sine qua non that provided us with the luxury of living in excess of our planetary boundaries. And it is only through collaboration that we will find a way out of this dilemma. What we need is a kind of Collaboration 2.0 driven by the purpose of transforming global challenges into good business by changing certain behaviors and by applying new technologies. This includes harnessing the power of digitalization, which operates seamlessly across value chains on a global scale, and which is more open and transparent than ever before.

This is what we at Bühler aim for. This is why we have built our CUBIC innovation campus, and hosted the Networking Days. And, this is why we invite our industry partners, start-ups, customers, and academic networks to join our innovation ecosystem. Driven by our guiding principle of achieving 50 percent less energy, water, and waste in our customers' value chains – and driven by our mission to create innovative technologies that industries can apply – I am convinced that we can come up with the solutions.

Fences, walls, and isolation are useless, counterproductive attempts to answer the big, demanding questions of our time. It's not less, but rather much more intense collaboration that is needed to preserve a livable planet. This is our obligation – because we don't own this beautiful little star in the universe; we have only borrowed it from our children.

Sincerely,

Stefan Scheiber
CEO Bühler Group

GETHER CREATING TOMORROW TOGETHER CREATING TOMORR

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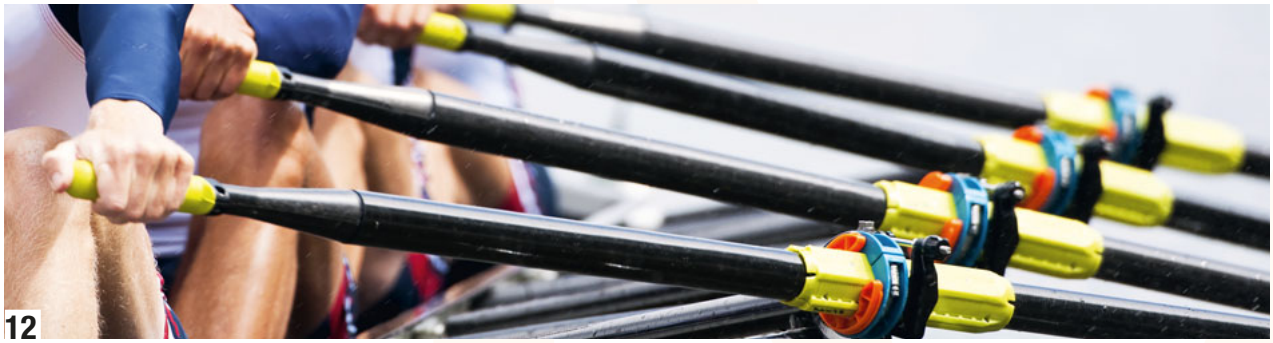

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A CHALLENGE SHARED

TEXT: IAN ROBERTS, CHIEF TECHNOLOGY OFFICER, BÜHLER GROUP

We face daunting challenges concerning food security and global warming and are faced with a growing population. Only if industry, academia, governments, and NGOs come together with a common purpose will a sustainable future be within our grasp. In this issue of Diagram, we explore how collaboration at Bühler works and share examples of successful models for tackling climate change together.

READING RECENT NEWS ARTICLES or listening to radio programs confirms: more and more people, institutions, and companies are making commitments to tackle the world's most pressing challenge – climate change. From all regions of the world, scientific evidence is accumulating that points out that humanity's future is unsure, if we don't act responsibly now. More individuals are taking up the baton for climate action. The most recent pledge for action comes from more than 11,000 researchers from 153 countries. They published a statement in the journal "BioScience" on November 5, 2019 – 40 years after the first climate conference, which was held in Geneva in 1979. "Despite 40 years of global climate negotiations, with few exceptions, we have generally conducted business as usual and have largely failed to address this predicament," state the researchers, who call themselves Alliance of World Scientists. Their pledge is an outcry: "We declare clearly and unequivocally that planet Earth is facing a climate emergency."

If more than 11,000 researchers from all around the globe form an alliance to make this pledge, it has power. Next to replacing fossil fuels, cutting emissions, eating less meat, heightened regulations to protect ecosystems, and stabilizing population growth, they also call for a sustainable change in the global economy – to business leaders.

Industry is well positioned to make a difference. "We can ensure that systems use less energy and water, we can increase the efficiency of our value chains, and optimize our processes to produce less waste. We can invest in research and development to bring new low-emission solutions to the market. Our new technologies can make a big difference," says Stefan Scheiber, CEO of Bühler Group, and he calls for broad collaboration across industries. "Industry must become part of the solution."

Climate emergency

The seriousness of the challenges we face should not be sugarcoated. The Intergovernmental Panel on Climate Change (IPCC) warns we have 12 years to keep global warming to a maximum of 1.5 Celsius above preindustrial levels or risk hundreds of millions of people suffering floods, extreme heat, and poverty. If we slip over the 1.5 Celsius threshold the damage done will be irreversible.

Evidence also tells us that the food industry is key to finding a solution. A quarter of greenhouse gas emissions are linked to agriculture, 71 percent of the planet's water is embedded in the food we eat and a third of the world's energy goes into food production. The real challenge is that a third of these resources are going into food that is either lost or wasted along the food chain. According to the United Nations, if food waste were a country it would be the third biggest contributor to greenhouse gases behind China and the United States. Meanwhile, by 2050 the food sector will have to sustainably feed an expected population of 9.8 billion people. The bottleneck is that there won't be enough arable land to nourish this population

At its first Networking Days in 2016, Bühler shared its mission to help cut energy consumption and food waste across its customers' value chains by 30 percent by 2020. Since then, the IPCC findings have meant ratcheting up this ambition. At the Networking Days 2019, Bühler announced ambitious new targets to cut energy and waste within customer value chains by 50 percent by 2025, adding a third target of reducing water usage by 50 percent.

If we are to create real impact by 2030, by 2025 Bühler must have good solutions in place that are ready to be multiplied globally. Announcing the new targets at the Networking Days 2019, Bühler CEO Stefan Scheiber told delegates: "We do this because we know it is necessary." Warning that the targets were challenging and admitting that Bühler did not have all the answers, he called for cross-industry cooperation: "We are reaching out to you to collaborate so that we can enable you to make your plants and systems more efficient." The clear message from Bühler's CEO was that the enormity of the

"WE ARE REACHING OUT TO YOU TO COLLABORATE SO THAT WE CAN ENABLE YOU TO MAKE YOUR PLANTS AND SYSTEMS MORE EFFICIENT."

STEFAN SCHEIBER
CEO Bühler Group

targets to be achieved for the good of future generations are beyond a single company. Achieving these will require businesses across the food value chain to come together with academics, entrepreneurs, start-ups, and NGOs to form different ecosystems with the resources and skills to innovate real and urgent change.

The audience that Scheiber was reaching out to is itself an example of a uniquely powerful ecosystem. Networking Days 2019 was a gathering of 800 delegates from 500 companies across 80 countries. It is estimated that the conference represented decision-makers and managers from companies that between them feed 4 billion people daily across the globe and move 1 billion people through the automotive sector. The people attending the Networking Days 2019 conference have the potential to increase productivity, yield, and efficiency on such a vast scale that it could have a significant impact on protecting some of the planet's most precious existing resources.

Leveraging resources

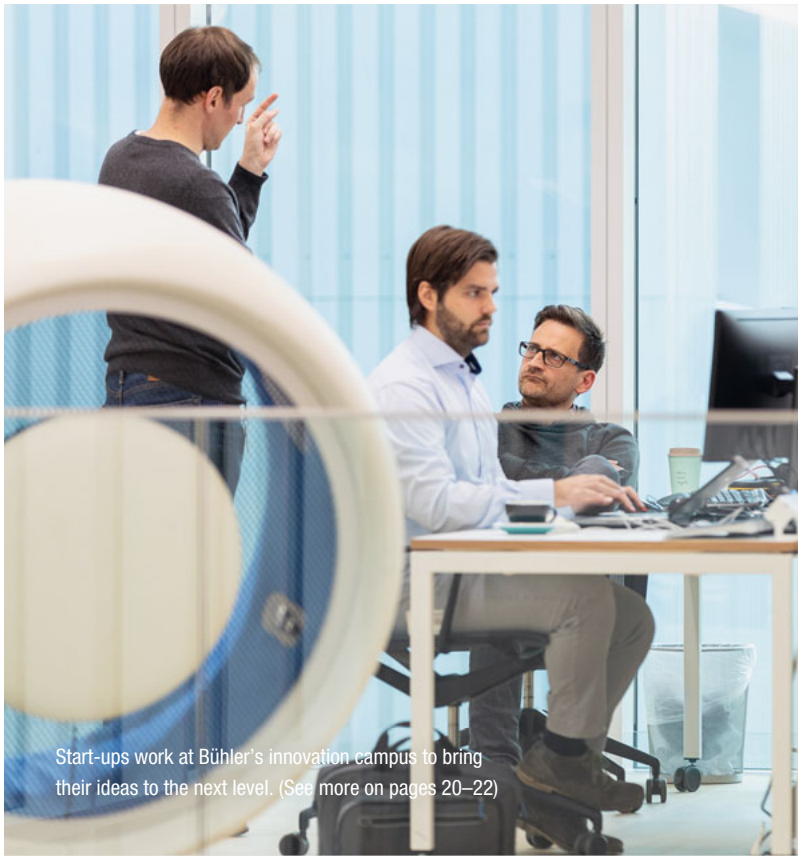
There is no single panacea to fight climate change. Everything that impacts the system must be reviewed, from the reduction of emissions through technologies all the way to what we put on our plates. Bühler is looking beyond its own customers and is expanding its collaborative networks in which to work and drive innovation. The seeds of change are often sown in academia, where research takes place in areas such as data processing, material science, new protein sources, and environmental and agricultural techniques.

The UNITECH International Society is an example of how the gap between the academic and corporate worlds can be bridged to enable multinational companies such as Bühler to make early contact with the next generation of engineers looking to tackle future global challenges. Through the UNITECH network, Bühler is currently supporting students from nine leading universities across Europe to explore ways of decreasing the carbon footprint of manufacturing and industrial processes through the entire value chain.

Bühler has also partnered with the science and technology institute EPFL, based in Lausanne on the shores of Lake Geneva. Created to act as an interface between academia and businesses, the EPFL Integrative Food and Nutrition Centre is working on the next generation of breakthroughs in the field of food and nutrition. The global population is currently dependent on a narrow set of plant-based food sources. Some climate change scientists have suggested that finding more robust crop varieties capa-

Bühler presented its heightened sustainability targets to 800 guests at the Networking Days in August, 2019.

ble of handling greater extremes in weather might be the single most important step we can take to adapt to climate change. The recently published EAT-Lancet report shows that our current sugar-rich and meat-dense diets are not only environmentally unsustainable but also threaten human health. It is clear that we are going to need more varied protein sources as we reduce meat consumption for both environmental and health reasons. Research in nutrition has already become a big part of the future story.



Start-ups work at Bühler's innovation campus to bring their ideas to the next level. (See more on pages 20–22)

Future innovators

However, research and innovation are of little value unless they can be commercially developed. In recent years digital solutions have changed the way we live our everyday lives by disrupting the old business conventions. It is from today's entrepreneurs and start-ups that the equivalent disrupters needed to tackle climate change will evolve. It is also within the startup community that the innovative research originating in academia will have the chance to transition into commercial solutions.

Established companies are already recognizing that the old business practices that treated all competition as a threat can no longer apply. Rather than fearing start-ups as a potential risk to a market, they are now being seen as useful crucibles for the development of the sort of innovation that could mitigate the challenges we face.

The NGO, MassChallenge Switzerland, was set up three years ago with this very purpose in mind. Designed to facilitate links between start-ups and industry leaders such as Bühler, Nestlé, Givaudan, Barry Callebaut, and others, the MassChallenge ecosystem aims to accelerate new commercial ideas around sustainable food production and e-mobility. Being a nonprofit organization, MassChallenge does not take an equity stake and has to date received over 20,000 applications, accelerated 200 start-ups, and created over a thousand new jobs.

"We are trying to create the sort of value that can change society," explains Matt Lashmar, Managing Director of MassChallenge Switzerland. "Start-ups with great ideas often fail because they don't have market access or the right product that fits the market, so if we can give them the opportunity to access big business and their distribution channels, then the combination of access, insight, and distribution gives them a terrific start."

MassChallenge not only benefits the start-ups but it also provides invaluable insight into the way a particular market is being influenced by technological change. By supporting start-ups, larger companies no longer have to rely solely on their own research and development teams but are able to access some of the best and brightest ideas on the horizon. "If a corporation comes to one of our demonstration days, they may end up talking to 12 start-ups in a single day, which is going to provide invaluable insights into the way the market in changing," says Lashmar. As more models of successful collaboration are established and are able to demonstrate the power of leveraging resources, such as funding, talent, ideas, and innovation, so too will more companies want to be involved. Existing ecosystems need to develop scale so they can become larger and more effective, while ever more creative links must be made to find new ways to address climate change.

Massive demographic shift

Partners in Food Solutions is an NGO that has been set up to link expertise in six global food companies, including Bühler, with African food processors. Africa is likely to see the biggest global population growth and demographic shift in coming years. The management consultant McKinsey has predicted a staggering 24 million Africans moving each year from their rural homelands into cities over the next 25 years. It is going to take a radical change in Africa's existing food value chain to cope with such a dramatic shift in demand.

"At the moment Africa imports close to USD 40 billion of food each year and yet it is a continent that can feed itself and other parts of the world if it can

"IF WE CAN GIVE START-UPS THE OPPORTUNITY TO ACCESS BIG BUSINESS AND THEIR DISTRIBUTION CHANNELS, WE GIVE THEM A TERRIFIC START."

MATT LASHMAR
Managing Director of MassChallenge Switzerland

get its whole value chain working," explains Jeff Dykstra, CEO and Co-founder of Partners in Food Solutions. "We are taking 700 years of know-how acquired by the world's leading food companies and applying it to any problem, challenge or opportunity faced by an African food producer. The firepower of knowledge developed by these six companies is totally unique."

Partners in Food Solutions brings together a food processor in Africa that may be facing a processing, packaging, or marketing problem with expertise from the world's leading food processors in a bid to help improve food security, nutrition and economic development across Africa. In addition to Bühler the companies involved are General Mills, Cargill, DSM, Hershey, and Ardent Mills. According to Dykstra this sort of collaboration works both ways, providing invaluable knowledge on one hand and developing critical soft skills on the other.

"Imagine you are working for Bühler and you are part of a virtual team with colleagues in Cargill and General Mills solving a processing problem for a firm in Uganda without the resources you are used to," explains Dykstra. "The skills you are developing helping that firm in Uganda – cross-cultural working, virtual team effectiveness, solving problems with fewer resources – all help you to perform even better in your day job."

If we are talking about climate change and a sustainable future, then cross-generational collaboration has to be a key part of the solution. Bühler is a partner of the One Young World network of over 1,500 young leaders from every country and sector. In October Bühler sent 13 of its top performing young professionals to London for the One Young World annual summit, where they attended speeches, panels, networking events, and workshops addressing global issues from climate change to human rights. The ecosystem connects millennials from across the planet with hundreds of corporate partners who provide funding, support, and a platform for change. Members of the One Young World ecosystem use these resources to set up initiatives in their own countries to help achieve the United Nations' 17 sustainability goals.

Tackling these issues with a broad ecosystem will not only benefit the planet and future generations, it will also drive businesses globally. Climate change is a disrupter of business that can be viewed as a threat or an opportunity, according to the World Economic Forum. According to the Business and Sustainable Development Commission, new, sustainable business models have the potential to unlock USD 12 trillion in market value.

There are already successful models of collaborative ecosystems in operation, but many more need to exist. New networks are needed to make early-stage technologies available faster. The message is getting through that climate change is too big a task for us to fight alone. If we collaborate and are able to focus our resources, skills, and talents on a common cause, then we have a fighting chance of surviving this very real climate emergency and sustainably feeding future generations. Bühler plans to work with its customers and growing ecosystem to drive innovation and unleash new business opportunities.

To tackle any problem – let alone global challenges such as the climate crisis – it is imperative to bring the right partners together and drive collaboration and innovation on an unprecedented scale. Bühler has been steadily building an ecosystem of strategic partnerships with industry, academia, and non-profit organization that facilitate knowledge sharing, ensure first-hand access to disruptive innovations, and provide the best talents with platforms to bring about the change needed to create a more sustainable and livable planet. Dive into the following pages to learn more about a few of our many partnerships.

BETTER TOGETHER

PARTNERS IN FOOD SOLUTIONS (PFS)

PARTNERS IN FOOD SOLUTIONS is a nonprofit organization which aims to strengthen food security, improve nutrition and increase overall economic development across Africa. Corporate partners from the food industry such as General Mills, DSM, and Hershey encourage their employees to volunteer and support food entrepreneurs in 10 African countries with their expertise. Bühler joined the initiative in 2013. Since then, 87 employees have supported 94 PFS projects. In total, Bühler employees volunteered 3,447 hours and passed on their know-how to 67 companies in Africa.

By sharing their expertise, the volunteers were able to assist local entrepreneurs in growing their business, support a supplier base of more than 31,000 farmers, and unlock over USD 50,000 of investment capital. One of these volunteers is Jesse Theis, Quotation Specialist at Bühler Minneapolis. He's supporting a maize bran drying project by a Tanzanian company called Sozi Integrity, together with students at the University of St. Thomas in Minnesota, US, and the University of Dar es Salaam in Tanzania.

"Sozi Integrity mills maize into flour, and also sun dries and sells the separated bran to animal feed processors. During the rainy season – September to May – the environment is not conducive to sun drying, and therefore Sozi loses about USD 833 worth of maize bran daily. In collaboration with PFS volunteers and the students, the team worked on designing a scalable dryer that would ensure the dried bran revenue stream year-round, and reduce food loss," Theis summarizes. After the design and testing phase, he expects the dryer to be replicated for many companies such as Sozi across Tanzania, making it a prime example of improving lives by sharing expertise.

LINK

Partners in Food Solutions links corporate volunteers from its consortium of world-class food companies with promising entrepreneurs in 10 African countries.
Visit the PFS site to learn more: **partnersinfoodsolutions.com**

PARTNERS IN FOOD SOLUTIONS
Connecting Expertise with Opportunity

PFS is working to help food producers in Africa to strengthen their processes.

VIDEO

How do you drive change? By bringing talented people together.

CARBON FOOTPRINT CHALLENGE (CFC)

THE CARBON FOOTPRINT CHALLENGE (CFC) is a UNITECH International initiative, enabled by its corporate partners Covestro, Evonik, Oracle, and Bühler, as well as nine top European universities connected to the UNITECH network. Bühler has worked with UNITECH since 2014. CFC provides a platform for passionate students and young professionals to form teams and participate in a challenge which aims to find the best solutions to fight climate change. About 150 teams applied in 2018, and six made it to the finals at the Swiss Federal Institute of Technology (ETH Zurich) campus in Switzerland. The partners benefit mutually: while the teams get the unique opportunity to fine-tune their ideas with innovation experts, the corporate partners get first-hand access to innovative ideas as well as a unique resource – young talent. The CFC is usually organized by Bühler interns in collaboration with their peers from UNITECH and it takes place every year.

VIDEO

Learn more about the students and young professionals who joined the Carbon Footprint Challenge to fight climate change.

CARBON FOOTPRINT CHALLENGE

STRATEGIC PARTNERSHIPS

ONE YOUNG WORLD (OYW)

Thirteen delegates from Bühler locations around the world joined the 2019 One Young World summit held in London. They will bring their key learnings and motivation back into the Bühler organization.

ONE YOUNG WORLD has a clear mission: to identify, promote, and connect young leaders to facilitate a more sustainable, fair, and livable world. Since its foundation in 2009 by Kate Robertson and David Jones, the charity has grown from an idea to a powerful movement. In 2018 alone, 3.4 million people have been positively impacted by One Young World Ambassadors through projects that address the 17 Sustainable Development Goals of the United Nations, such as no poverty, quality education, or climate action. In addition, the London-based organization awarded 352 scholarships worth GBP 1.3 million last year.

Driven by co-founder Kate Robertson's assessment that "a serious lack of leadership quality is at the heart of every global threat", the young leaders take matters into their own hands. In addition to their projects across the globe, they organize 14 regional caucuses annually where they share knowledge and experiences and plan future initiatives. In May 2019, Bühler's Generation B team, led by Vivienne Koch, organized the first One Young World Switzerland Caucus at the CUBIC innovation campus, which brought together more than 200 participants from around the world. Koch is still buzzed by the spirit of the event: "Meeting so many dedicated change-makers from all walks of life who are working towards the common goal of making the world a better place is an unforgettable experience."

The annual summit draws an even bigger crowd and has gained worldwide attention, not least due to the attendance of Meghan Markle, Duchess of Sussex, with world leaders and influencers such as Mary Robinson, Former President of Ireland, Professor Muhammed Yunus, Nobel Peace Prize Laureate, and Richard Branson, Founder of Virgin Group, among others. In 2019, over 2,000 participants from more than 190 countries met in London, including delegates from over 190 partner companies.

During the summit, Ian Roberts, CTO of Bühler, announced the World Business Council for Sustainable Development and MassChallenge Switzerland joined forces to support the 10 most impactful solutions for climate change mitigation every year until 2025, and multiply them globally by 2030. The leaders of the two organizations met during the Bühler Networking Days 2019.

VIDEO

In May 2019, Bühler's Generation B team organized its own OYW Caucus Switzerland. Watch the video of the highlights.

John Harthorne spoke about the power of start-ups at the Bühler Networking Days 2019.

MASS (MC) CHALLENGE

"RATHER THAN fight over slices of the existing pie, we would rather make more pie," said John Harthorne, founder of MassChallenge, during the Bühler Networking Days 2019 in Uzwil, Switzerland. With locations in Boston, Israel, Mexico, Rhode Island, Switzerland, and Texas, MassChallenge strengthens the global innovation ecosystem by accelerating high-potential start-ups. Bühler has been a partner of the world's largest cross-industry start-up accelerator since 2014 and joined MassChallenge Switzerland as a founding partner in 2016.

Bühler CTO Ian Roberts, who is on the Board of Directors of MassChallenge Switzerland, highlights the importance of this collaboration: "We need the disruptive, out-of-the-box-thinking power of start-ups now more than ever to address the issues we're facing. In return, MassChallenge provides start-ups with an accelerator program and – most importantly – a network of corporations and partners which enables them to scale up their business and create the necessary impact on a global level."

The statistics speak for themselves: Since its foundation at the very depth of the recession in 2010, MassChallenge has accelerated 1,975 startups that have raised more than USD 4.3 billion in funding, generated more than USD 2.5 billion and created more than 125,000 jobs. As staggering as these numbers are, John Harthorne predicts a lot more pie to be made since both the start-ups and MassChallenge are driven by purpose rather than greed: "Instead of supporting a system that focuses on short-term profit and the exploitation of labor and raw materials, we want to help startups create a new system that fosters a collaborative environment in which we're all solving massive problems."

VIDEO

Watch the interview with John Harthorne about MassChallenge and how to accelerate start-ups.

MASSCHALLENGE

IMPROVING LIVES GRAIN BY GRAIN

TEXT: LUKAS HOFSTETTER

Two billion people globally suffer from micronutrient deficiencies. The Food Fortification Initiative addresses the issue on many different levels by promoting the fortification of industrially milled wheat and maize flour, and rice. With the endorsement of the World Health Organization supporting their cause, the initiative is on a journey to improve nutrition for millions of people across the globe with the support of an extensive range of partners and collaborations.

SCOTT MONTGOMERY, Director of the Food Fortification Initiative (FFI), has a clear message to legislators around the world. "Millions of people suffer from iron deficiency anemia or neural tube birth defects. At the same time, over 90 percent of the population consume wheat, maize, or rice or a combination of it on a daily basis. I can't think of a more efficient way to tackle micronutrient deficiencies than by fortifying these basic foodstuffs."

Montgomery is certainly not alone in his assessment. The FFI has the backing of the World Health Organization (WHO) among many other organizations. The WHO highlights that food fortification – or food enrichment with micronutrients – has the advantage of being able to deliver nutrients to large segments of the global population without requiring radical changes in food consumption patterns. The FFI estimates that in 2016, 107,000 deaths were caused by iron deficiency anemia and other nutritional deficiencies. If one adds to that the issue of hidden hunger caused by deficiencies in vitamins and minerals and the dramatic impact malnutrition has on the cognitive development of children – which only worsens the cycle of poverty – food fortification surely must top priority lists across the globe. However, many countries have yet to adopt legislation to mandate fortification.

Awareness is key

With clear WHO recommendations on the types and amounts of vitamins and minerals to add to wheat and maize flour, it's surprising that food fortification isn't yet a standard procedure across the world. Montgomery provides a simple reason which at the same time is probably the hardest obstacle to overcome: cultural perception. "More than 80 countries have compulsory fortification of at least one of the grains, but if you take Europe as an example – with the exception of the UK – you realize why that number is still relatively low. Western Europe does not fortify any cereal grains because the cultural perception is 'don't put anything in my food'," he explains. "Fortification benefits individuals at every point in life, from conception to aging."

According to the FFI, about 4,500 pregnancies in the European Union are affected by a birth defect of the brain and spine every year, and an estimated 72 percent of the pregnancies are terminated. The risks of micronutrient deficiencies, however, are not limited to the health of babies and mothers. It has a detrimental impact on adolescent development, on adults in their reproductive years, and on productivity and healthy aging, states the FFI. With a diet predominantly based on wheat and corn (maize), Europe would be in an ideal position to provide healthy food to its more than 700 million people.

Fighting misconceptions

Changing cultural perceptions starts with getting rid of widespread misconceptions. A common misconception the FFI is fighting with facts is that fortification is not a natural process. In wheat milling, for example, some of the vitamins are actually being removed, so fortifying it afterwards is nothing less than replenishing the natural ingredients that were

Wheat and maize products are food staples around the world.

there in the first place. Scott Montgomery identifies potential impacts on food quality as another source of myths. "Fortification means putting parts per million in a food. It doesn't impact the food's quality, flavor, or the way it cooks – it's basically invisible, yet still enables a producer to reach the masses with the essential vitamins and minerals," he clarifies. To reach the masses the FFI needs more than facts – it needs a global network.

Meanwhile, rising temperatures and carbon emissions are also impacting the nutrient quality of food. An Intergovernmental Panel on Climate Change report released in late 2018 reveals that increased carbon dioxide levels, rising temperatures and changes in precipitation will result in lower yields and nutritional loss for staple crops such as corn and wheat.

An ecosystem of partners

Since FFI was founded in 2002, it has been helping country leaders promote, plan, implement, and monitor fortification efforts around the world. One main reason for its success is sticking to its core values: fostering public-private-civic partnerships and including every sector throughout the fortification process. Walter von Reding, Managing Director of the Flour Service Business at Bühler and Member of the Executive Management Team at FFI, has witnessed the organization's growth since 2008.

"A high level of collaboration with all stakeholders is absolutely key to implement fortification programs in the target countries in a sustainable way. If you want to bring about change, you need determined partners, in-depth know-how and a global network," he explains. "Bühler with its vision "Innovations for a better world" is in a position to contribute substantially with its fortification solutions and process expertise and with the different partners. It is absolutely key that the millers and rice processors themselves realize the incredible potential and responsibility they have to improve and safe lives and that they all make a real difference. Through FFI, we provide clear guidelines and broad expertise as a service," von Reding concludes.

Harnessing new technologies

Montgomery is confident that the Food Fortification Initiative is on track, not least thanks to its vast global network. "Funding is an issue we're working on, but we also have high hopes for technological advancements that make fortification more cost-effective and thus sustainable," he explains. "Look at rice fortification, for example: Bühler with its NutriRice technology is now able to add an extra level of quality by mixing broken kernels for rice flour production with vitamins and minerals, then adding them to natural whole rice kernels at a set ratio. It's our job to continue informing and keep pushing for compulsory fortification standards whereever there is need – at the end of the day, access to healthy nutrition leads to a smarter, stronger, healthier world."

VIDEO

Watch the full interview with Scott Montgomery, Director of FFI, to learn more about the benefits of fortification.

PARTNERSHIPS WITH START-UPS

WITH START-UPS INTO THE FUTURE

TEXT: LILIAN WEHRLE

(From left) Norbert Kern, Director Global Product Management at Bühler Grinding & Dispersing, Yuchen Zhang, Research Engineer Aquantis, Gokarna Pandey, Research Engineer Aquantis, and Prasanna Premendra, Management Trainee at Bühler.

AQUANTIS

THE START-UP AQUANTIS is revolutionizing the measurement of particle size and moisture content in industrially processed products. Its new micro and millimeter wave enables users to measure both external and internal conditions of solid and liquid products. Aquantis has developed a tool that can be installed in machines to measure the conditions of solid and liquid products and transmit them to the machine and its control system in real time.

Aquantis took part in the MassChallenge accelerator program in Lausanne, where Bühler first noticed the start-up, recognizing its potential. The Grinding & Dispersing business unit at Bühler has now joined forces with Aquantis for a project with the goal of demonstrating the technology's potential, testing it in installed customer systems and establishing its relevance for other business units. In collaboration with Grinding & Dispersing, the current focus is wet milling. During the industrial milling process, the Aquantis technology can be used to determine how the particle size of the processed product changes, providing precise insights into particle properties that have an effect on product properties and thus quality.

In May 2019, Bühler officially opened the CUBIC innovation campus and its eight renovated application centers. The campus is a center for collaboration that offers customers, suppliers, partners, universities, and start-ups the opportunity to exchange know-how and develop new solutions for a sustainable future. Various start-ups have already taken up residence in the CUBIC. Two of them are Legria and Aquantis – both start-ups whose ideas have already convinced at MassChallenge.

Carsten Petry und Mary Olwal introduced their start-up at the Bühler Networking Days 2019.

LEGRIA

BORN OUT OF an internal Bühler micro-MBA program, the Master of Bühler Management, Legria is an internal start-up at Bühler that is passionate about providing healthy human nutrition within the boundaries of the planet's resources. In 2016, Mary Olwal (former Bühler Head of Customer Project Controlling) and Carsten Petry (former Bühler Global Product Manager Human Nutrition) started the development of a food ingredient that is produced by upcycling a byproduct of the beer brewing process – spent grain. By using the natural ingredient, Legria, instead of sugar, it is possible to improve the nutritional profile of food by reducing up to 50 percent of the sugar content, and adding valuable proteins and fiber to the end products such as cookies, waffles, cereal bars, breakfast cereals, hazelnut spread, and snacks. The team realized that it is not enough to create just a nutritious, safe, and sustainable product – it also had to taste great. They teamed with Givaudan – a leading flavor and fragrance company based in Switzerland – to improve the flavor of the product. They participated in the the MassChallenge Start-Up Accelerator program in 2018. Olwal and Petry found their new home in the CUBIC and are working on achieving the successful market entry for Legria. This includes acquiring their first customers and building the supply chain in close cooperation with partner companies.

VIDEO

Watch the video interview where Mary Olwal and Carsten Petry explain the benefits of Legria.
More information: www.legria.ch

The CUBIC is a place to network and innovate, says Marcello Fabbroni, the new Director of the campus.

PARTNERSHIPS WITH START-UPS

SUCCESS FACTOR: CUBIC

INTERVIEW: LILIAN WEHRLE

Marcello Fabbroni will become the new Director of the CUBIC innovation campus in 2020. In our interview, he explains what the CUBIC stands for, what role sustainability plays, and why collaboration is essential.

Marcello Fabbroni, the CUBIC stands for collaboration. What exactly is behind this concept?
Albert Einstein once said: "We're trapped by the limits of our thoughts." A statement that is more current today than ever. This is why we created our CUBIC innovation campus to foster collaboration. We want to bring together people from different spheres, countries, and cultures, to exchange knowledge and develop new ideas together. In view of the challenges we are facing, we consider this essential. Our innovation campus has everything needed to foster collaboration. Architecturally, the CUBIC has an open design, and everyone is welcome with their ideas and innovations.

What does the CUBIC offer Bühler customers?
Collaboration has become a success factor for surviving in the complex, dynamic environment of the modern world. This goes for our customers and for Bühler. The CUBIC combines space for collaboration and exchange with the equipment and technology of our application centers. Providing ideas to be created, developed further and tested on industrial processes under one roof. In this sense, the CUBIC is a unique place for inspiration and for realizing business concepts. Its direct connection to our application centers enables us to implement new ideas or test them out. In this sense, the CUBIC is a unique place for inspiration and for realizing concepts.

Why does Bühler work with start-ups?
Generally, start-ups are impartial and have fresh, innovative ideas, which can benefit Bühler and its customers. To create an inspiring environment, it's important to give fresh ideas space. This is why we're delighted that start-ups are taking advantage of this and working in our innovation campus. It allows our customers, partners and even the business units at Bühler to see things from another perspective and harness insights for various areas of business – in line with the motto of the Networking Days 2019: Creating Tomorrow Together.

We are proud we were able to take this approach at the Bühler Networking Days this summer. 13 innovative start-ups introduced themselves and met with our customers and partners. We will need new technologies, new approaches, and a strong network to be able to provide mobility and food to ten billion people in the year 2050.

Does this approach have anything to do with Bühler's sustainability goals of reducing energy needs, waste and water consumption in the value chains of our customers by 50 percent by 2030?
Yes. We must act fast and collaborate with all the idea holders to create businesses that ensure a sustainable future, not just for us, but for future generations, too. Our goals are 50 percent less energy, waste and water by 2030 in the value chains of our customers. With the CUBIC, we're leading the way. The innovation campus needs 50 percent less energy for heating and air conditioning compared with similarly sized buildings. A 100 cubic meter container underground collects rainwater, which is reused for running the toilets and the garden facilities.

What is the long-term goal of the CUBIC?
The CUBIC should be the epitome of innovation and drive ideas and innovations within our network. Collaboration will always be a crucial component for developing innovations for a better world.

ACADEMIC PARTNERSHIPS

GLOBAL ACADEMIC NETWORKS

TEXT: DALEN JACOMINO PANTO

Companies and academic institutions have been collaborating for more than a century. The increasing complexity of the challenges ahead, however, has intensified the need for partnerships that go beyond monitoring early stage research and engaging when something of interest arises. Universities and companies such as Bühler are planting seeds in areas of interest to them, building competence networks based on relationships that involve co-creation, sharing of risks and responsibilities, and leveraging partners' strengths.

In September, the University of St. Gallen organized a project management course for the participants of Women Back to Business at the CUBIC innovation campus.

FUTURE FOOD INITIATIVE

IN MARCH 2019, Bühler, the Swiss Federal Institute of Technology (ETH Zurich) and École polytechnique fédérale de Lausanne (EPFL), and industry partners launched Future Food Initiative – a Swiss research initiative. Its mission is to develop research and education opportunities in the area of food and nutrition through the exchange of knowledge between universities and companies.

Projects led by Future Food Initiative should accelerate the development of healthy food products, boost the search for solutions for sustainable, plastic-free packaging, and secure access to affordable nutrition. The initiative is fully aligned with the Bühler strategy of building a sustainable food future. "We are stepping up as an industry to address challenges in the food value chain. Bühler's ambition is to create innovative and sustainable solutions, partnering with leading research institutes, industrial partners, and promising start-ups in the world of food," explains Stefan Scheiber, CEO of Bühler Group.

Ian Roberts, CTO of Bühler Group, highlighted that "the goals of the initiative align perfectly with Bühler's ambition of addressing global challenges of hunger and malnutrition. The initiative will help make Switzerland a global lighthouse for innovation across the food value chain."

The Future Food Initiative was funded by a donation from industrial partners with a total amount of CHF 4.1 million. That money finances the fellowship program, co-led by ETH Zurich and EPFL, which is at the center of the initiative.

UNITECH INTERNATIONAL

IN 2014, Bühler and UNITECH International started a partnership that has been fruitful for both parties. UNITECH International is a professional network between leading European universities of technology, such as Politecnico di Milano, the Swiss Federal Institute of Technology (ETH Zurich), and TU Delft, and corporate partners, including Bühler.

Founded in 2000, UNITECH offers high-potential engineering graduates the possibility of developing their management and practical capabilities through an international exchange program.

On the other hand, the organization gives companies the chance to get in contact – and work together – with talented engineers who come from different cultural backgrounds and share an interest in a career in management.

For a period of six months, the students partake in an internship in a company, supporting projects in areas such as Internet of Things (IoT), Research & Development (R&D), and business evaluations, among others. Since 2015, Bühler has been inviting the talented engineers from the UNITECH network to participate in the Carbon Footprint Challenge, a platform focused on developing ideas to create a more sustainable future.

JIANGNAN UNIVERSITY

JIANGNAN UNIVERSITY, based in Wuxi, Jiangsu, is one of the leading universities in China for engineering and food science. With its 20,000 full-time undergraduates and over 11,000 part-time students receiving continuing education, the university offers five post-doctoral research stations in the fields of Light Industry Technology and Engineering, Food Science and Technology, Control Science and Engineering, Chemistry Engineering and Technology, and Textile Engineering.

In September 2019, Bühler signed a cooperation agreement with the Chinese university with the goal of driving innovation, building another bridge between the company and academia. Together, Bühler and Jiangnan University teams will conduct joint research projects in the food sector, looking for application solutions for key technologies in the areas of textured vegetable proteins, high-tech food, and other related fields.

The collaboration is also opening a space for constant communication and exchange of knowledge, ideas and experience. Both parties also have plans to establish the Bühler-Jiangnan University Innovation Lab, which will specialize in the research of novel food processing technology and equipment. Professor Chen Jian, President of Jiangnan University and Member of Chinese Academy of Engineering, highlighted that the cooperation, as well as the resource sharing, will benefit both partners.

UNIVERSITY OF ST. GALLEN

BÜHLER AND THE UNIVERSITY OF ST. GALLEN (HSG), one of Europe's leading business universities, have been partners in various education initiatives over the last years. For example, since 2012 they have been running an education program for product managers at Bühler. The program was set up to ensure that the participants have access to the state-of-the-art theory as well as best practices from Bühler and outside industry. In 2017, Bühler took another step and became member of the HSG's Best Practice in Marketing program. The course works as a platform for the exchange of experiences on current marketing and sales topics between leading companies, moderated by the university. Central to the program is the concept of "benchlearning", a process in which participants learn from good practices, and then can adapt their learnings to their specific circumstances and challenges. They learn together and become better together.

In 2019, another relevant initiative took place: Bühler became an official partner organization of Women Back to Business, organized by the Executive School of Management Technology and Law at the University of St. Gallen. Women Back to Business is a continuing management education program for women wishing to re-enter the labor market or to embark on a new professional career.

Over 100,000 women in Switzerland with a degree from a university or a university of applied science are jobless, according to the Swiss Labor Force Survey. "We have clear business objectives towards diversity, because we believe that well managed diverse teams perform a lot better than homogeneous teams. And we still don't have enough women in the company, especially in senior positions," explains Dipak Mane, Chief Human Resources Officer of the Bühler Group. "I believe that Women Back to Business is a very nice shortcut for us, to have access to the know-how of these experienced women. And it also gives a directive to the women who are working today at Bühler. If they need to take a break, they can take a break. It doesn't mean that they can't come back."

STRATEGIC PARTNERSHIPS

GETTING DOWN TO SUSTAINABLE BUSINESS

TEXT: JANET ANDERSON

The WBCSD council met in Lisbon, Portugal in October.

In March 2019, Bühler joined the World Business Council for Sustainable Development (WBCSD), a global network of some 200 companies that are working together to help the transition to a more sustainable future. As a global player in food, mobility, and other key sectors, Bühler can make a significant contribution to this effort while also benefitting from best practices, and gain ideas and inspiration from the membership.

"WE ARE NO LONGER facing a climate crisis. We are in a climate emergency now – the world is literally melting." With these words, Sunny Verghese, CEO of Olam and Chair of WBCSD addressed the audience of industry leaders at Bühler's Networking Days 2019 in Uzwil, Switzerland. His speech was a stark warning, and also a call to action to the businesses present. "We have to come together to find solutions," he said. "And we need the private sector. We want companies that are more sustainable to become more successful."

This has been the driving idea behind WBCSD since its creation in 1995 to inject a business voice into the global conversation on sustainability and environmental issues. Today, it is a CEO-led organization of over 200 companies working together to accelerate the transition to a sustainable future. Bühler, which joined the organization in March this year, is now one of those companies, contributing to solutions that will help build a better world.

It is a goal that fits well with Bühler's own vision of "innovations for a better world". This year, recognizing that the need for action has become more urgent, Bühler has announced it is stepping up its commitment to sustainability, setting new, more ambitious goals to reduce energy requirements, water consumption, and waste by 50 percent in its customers' value chains.

"When it comes to sustainability, we at Bühler question ourselves in three areas: are we doing enough as an industry, as a company and as an individual?" says Jonathan Abbis, Bühler's Partner to WBCSD and Managing Director Bühler Die Casting. "We want to play a role in the industry. That is why we organized the Networking Days, to inspire and to lead, and why we have now joined WBCSD. Its commitments fit with our overall strategy."

"ARE WE DOING ENOUGH AS AN INDUSTRY, AS A COMPANY, AND AS INDIVIDUALS?"

JONATHAN ABBIS
Bühler's Partner to the WBCSD and Managing Director Bühler Die Casting

Source: WBCSD

> **"THE ADVANTAGE OF BEING A MEMBER OF WBCSD IS THAT IT OFFERS US A PRE-COMPETITIVE SPACE TO EXCHANGE IDEAS."**

JONATHAN ABBIS
Bühler's Partner to the WBCSD and
Managing Director Bühler Die Casting

Change across all systems

WBCSD is not just about specific process solutions or small parts of the value chain – it is about changing the whole ecosystem. Its work is organized around the United Nations Sustainable Development Goals. "These 17 goals, agreed by 194 countries, represent noble aims," says Verghese. "However, it will take the practical input, ideas and effort from the private sector to realize them. With leading businesses from across the world and from all relevant sectors onboard, the chance of achieving them is greatly increased."

In order to do this, WBCSD is seeking systems transformation in six areas, or "meta systems": Circular Economy, Cities & Mobility, Climate & Energy, Food & Nature, People, and Redefining Value. Bühler has decided to start by taking part in the Food & Nature program. However, in time, the company will also contribute to the other programs. "These are all areas of focus where we can gain knowledge and understand the overall trends, on the one hand, and on the other hand, where we can also contribute with what we are doing as a company," says Abbis.

Within the Food & Nature program, a project called FReSH – Food Reform for Sustainability and Health – offers a perfect opportunity for Bühler to collaborate. It is one of the key initiatives to drive transformation in the food system, with partners from across the sector coming together to exchange ideas in areas such as plant-based protein alternatives and extrusion products. "Many of the companies involved in FReSH are either our customers or partners. We are already working with them to make change happen. But the advantage of being a member of WBCSD is that it offers us a pre-competitive space to exchange ideas and experience with them and with other companies we do not already know," explains Abbis.

WBCSD is working to drive transformation in several key areas, including Cities & Mobility.

Providing a confidential "safe space" for open discussions between companies that, otherwise, are fierce competitors, is key to the way WBCSD works. It not only opens up possibilities for collaborations that otherwise might not happen, it also enables cross-sectoral solutions to emerge.

The members, who represent all business sectors, come together at regular Council Meetings to define areas of work for the organization while taking stock of the progress made across programs and projects, share best practices on business and sustainable development issues and also develop innovative tools to change the status quo. "For Bühler, it is a big advantage to be aware of where the system is moving and what the trends are – it means we can predict what kind of changes our company can expect in the coming years. We also learn a lot about how to drive sustainability in specific regions and areas," says Abbis. "It is a perfect way to explore opportunities together with industry."

The practical details are what count. Member companies meet regularly during the year to update their peers on what they are doing about sustainability, how they measure progress and how they tackle the hurdles. "It's very helpful and inspiring," Abbis explains. "For example, we contribute to the Food Loss and Waste Group, which is one part of the FReSH project. This is an area where we can discuss with customers how much loss is in the value chain and what kind of solutions we can provide."

The biggest challenge

With its global relevance in other key sectors, too, Bühler is in a unique position to contribute toward solutions that will protect the climate, for example with energy-efficient cars, buildings and machinery. Together with WBCSD partners, the overall aim is to drive the systemic change necessary to achieve the Paris Agreement on climate change – to keep a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

As people, governments, and businesses around the world become aware of the risks that climate change poses to our way of life, WBCSD has a vital role to play. "To ensure quality of life today and for future generations, we have to take decisive action today. In joining the world's most responsible business leaders in WBCSD, we are broadening our collaborative approach," says Abbis. "Only through collaboration within and across sectors will it be possible to scale the innovations that are necessary to make food production or mobility sustainable."

Verghese works tirelessly to galvanize the global business community toward this goal. There is no time to waste, he argues, because the world is already melting. He points to the high temperatures experienced in Europe the summer of 2019, the melting of the Arctic ice, and the fires raging across different regions of the planet.

It is time to act now

The stakes could not be higher. In October 2018, the Intergovernmental Panel on Climate Change (IPCC) published its starkest warning yet on the impact of global warming.

The report concludes we have just 12 years left to ensure that global warming keeps to a maximum of 1.5 degrees above preindustrial levels. The scientists warn that if we exceed the 1.5 degree Celsius threshold, even by half a degree, the risks of floods, extreme heat, and poverty will increase for hundreds of millions of people. It calls for "rapid and far-reaching" transitions in energy, industry, buildings, transport, and cities in order to cut carbon dioxide emissions to 45 percent below 2010 levels to limit global warming to 1.5 degrees Celsius.

We are already living with the consequences of a 1 degree Celsius temperature rise. The food industry is on the climate change front line. The IPCC report shows that increased carbon dioxide levels, rising temperatures and changes in precipitation will result in lower yields and nutritional loss for staple crops such as corn (maize) and wheat. Temperatures rising another 1 degree Celsius will mean insects being twice as likely to lose half their habitats, impacting plant and crop pollination as well as our finely balanced ecological systems.

"Our vision is that all the people that inhabit this planet – it could be anywhere between 9.5 and 10 billion people by 2050 – should live well within the planetary boundaries," says Verghese.

INFO

Founded in 1991, WBCSD is a global, CEO-led organization of over 200 international companies. Its goal is to accelerate the transition to a sustainable world. The member companies come from all economic sectors and all major economies. Together, they generate a total turnover of USD 8.5 trillion.
www.wbcsd.org

wbcsd

STRATEGIC PARTNERSHIPS

WE CAN CHANGE THE WORLD

INTERVIEW: JANET ANDERSON

Sunny Verghese has spent much of his career in leading roles for international companies in the food and agricultural sector, gaining praise and awards for his work. But for his children, this was not enough. When they asked him what kind of world he would leave for them, it opened his eyes to the impact business has on the environment. Since then, he has been devoted to ensuring business makes a positive contribution toward building a better world.

Sunny Verghese, what, for you, is a better world?

Each of us will have a different notion of what a better world is and come at it from different angles and different perspectives. It is important to try and agree what we mean by a better world.

For me, the 17 United Nations Sustainable Development Goals, the 169 targets and the 246 key metrics to measure whether we are progressing along that line are a good definition of what we all want to become, the future we want to share, the collective prosperity that we all want. I don't think there can be much disagreement about that vision. It is for that reason that 194 countries came together and agreed to define the world that they want to create. Imagine 194 countries agreeing on a future for the world? That is remarkable.

Your company, Olam International, is one of the world's leading food and agri-businesses. What do these goals mean for your sector?

The first goal is to end all forms of poverty. The second is to get to zero hunger. This is where my sector comes in. It is a huge challenge because the global food and agriculture system, as it currently stands, is

Sunny Verghese, CEO of Olam and Chair of World Business Council for Sustainable Development, addresses over 800 guests during the Bühler Networking Days 2019.

broken. Today, 817 million people still go to bed hungry every day, 2 billion people suffer from micronutrient and vitamin deficiencies, while 1.9 billion people are overweight and obese.

A third of children in developing countries are stunted or wasted, which means they really have no future, because the effect of these diseases on cognitive development is irreversible. At the same time, the travesty is that a third of the food we produce is wasted. And more than that, we are emitting a lot of carbon and consuming a lot of water.

Agriculture accounts for 25 percent of the world's greenhouse gas emissions, including the impact of change in land use. It accounts for 71 percent of the world's freshwater use and for 75 percent of all biodiversity loss. My question is, can we feed 9 to 10 billion people in 2050 without destroying our planet? That is our challenge.

Could you give us an example of what that means?

Look at China, for example. They have made enormous progress, but they have a difficult track record in terms of the environment. China uses 439 kilograms of fertilizer per hectare. The world's next largest user of fertilizer per hectare is Germany, which uses 139 kilograms per hectare. China uses three times more. The consequence, according to the World Health Organization, is that 80 percent of China's surface water – lakes and rivers – is polluted in terms of the biological oxygen demand. We need to produce more food, feed, and fiber but we cannot destroy our planet at the same time. There has to be an alternative way to do this more sustainably.

Does this mean that we have to change the way progress is measured?

I think we have been measuring the wrong things. When we look at countries, we look at GDP per capita growth. Saudi Arabia and Kuwait have some of the highest GDP per capita but among the lowest wellbeing scores in terms of gender equality and basic human rights. Rwanda, on the other hand, is a poor country in terms of per capita GDP but has a very high wellbeing score because they emphasize education, health, and environmental sustainability. They have a broader definition of what economic progress means. Being the wealthiest country or individual does not guarantee wellbeing. The key

"WE NEED ECONOMIC GROWTH AND WE NEED DECENT JOBS. IF THERE IS NO ECONOMIC GROWTH IT WILL BE VERY DIFFICULT TO ACHIEVE SOCIAL AND ENVIRONMENTAL PROGRESS."

SUNNY VERGHESE
CEO of Olam International and Chair of World Business Council for Sustainable Development (WBCSD)

challenge is how you define wellbeing and how do you convert economic prosperity into wellbeing. These are critical questions for individuals, companies, and nation states.

Is economic growth the wrong thing to focus on?

We need economic growth and we need to provide decent jobs, because if there is no economic growth it will be very difficult to achieve social and environmental progress. This means that we cannot focus only on economic growth.

Where does responsibility lie for looking after the environment and taking sustainability forward?

I think it starts with the individual. We all need to be the change we want to see in others, so if it doesn't start with the individual, I don't think there's anything else we can do realistically. The second level of change is at the company level. As companies we need to know our carbon footprint, our water footprint, and our waste footprint, and be committed to doing more with fewer resources. The third level of change has to occur at the sector level. We have to develop a sectoral roadmap to do more with less without destroying the planet. We need the companies in different sectors to come together and work for change. And that's a tough challenge because companies are intensely competitive and not accustomed to collaborating. We don't normally work together unless there's a real crisis. But I believe we are in more than a crisis now; we are in a climate emergency, so we need to come together.

What about the role of civil society, governments, and industry?

We need more collaboration here too. Again, this is unusual – industry sectors and civil society normally treat each other with mutual suspicion and spend a lot of money and effort to keep each other at bay. But I don't think we can really change the world unless we come together to find a collective solution. Governments and policymakers have to come to the party. For example, governments need to impose a carbon tax at a sufficient level to incentivize good behavior. If carbon is free, we're going to pollute indiscriminately. We need to understand the true cost that we incur in producing the things we consume – Mother Nature does not issue us those invoices, so we assume those costs don't exist. Take the world's four major grain crops: wheat, corn, soybeans, and rice. The Food and Agriculture Organization (FAO) has calculated that the externalities of producing 80 percent of these crops is USD 1.15 trillion per annum. They did the same for the four major protein items – poultry, beef, pork and lamb – and established that the figure was USD 1.85 trillion. Combined, that is roughly USD 3 trillion of costs in terms of Mother Nature being depleted. We have to make those costs more visible to everyone.

How do we move forward?

Understanding those costs is just the starting point. Beyond taxation, governments and policymakers should insist that all companies disclose their foot-

print. And finally, researchers and innovators need to come together to find new solutions that can address these challenges, using digital technologies, artificial intelligence, robotics, or combinations of technologies.

Olam International employs around 74,500 people worldwide. How have you got this message across to all your employees?

The first thing to start with is a shared purpose. Our purpose is to reimagine global food and agriculture systems so that we can feed the growing population of nine and a half or 10 billion people without destroying the planet. People come to work at Olam because they feel that all of the effort that we ask them to put in the company means that we can really change the world.

As Chair of the World Business Council for Sustainable Development (WBCSD), what role do you see this organization playing?

The fact that multilateral agencies have managed to agree the Sustainable Development Goals, the Paris Climate Accord and the Biodiversity Convention is a miracle in itself. But how do you translate these ambitious goals into action? Unless the private sector steps in and supports the implementation, there's a massive action gap.

The 200 companies that are members of WBCSD together account for 8.9 trillion dollars of revenue, employ more than 19 million people worldwide and represent every sector, from oil and gas, to big pharma, food and agriculture, and transportation. We are a cross section of the world's multinationals with huge reach and influence. Our ambition is to get all of us to average up our standards and learn from each other so that we develop best practices and practical solutions. And because it's the CEOs themselves who are at the table, there is no escape from the commitments they make.

How you will know when you've made a difference?

Our aim is to achieve systems transformation in several meta-systems. These correspond to the greatest challenges that we face as a society. First, we need to address the climate and energy system and make it more sustainable. I think this is urgent. The second meta-system is the circular economy. We need to find ways to recycle more of what we produce. For example, we have just launched the Alliance to End Plastic Waste, with 40 companies signing up to prevent plastic waste from entering the oceans. They have already committed USD 1.5 billion to start tackling this problem. The third meta-system that we want to change is food and nature. This is the sector in which my company is active. We need to reduce its contribution to greenhouse gas emissions, reduce the amount of freshwater withdrawals and grow food in ways that do not cause biodiversity loss.

Can you give some examples of how you have made changes at Olam International to achieve these goals?

Today the world uses 4.9 trillion cubic meters of water and 71 percent of that goes to agriculture. By 2030, that is predicted to rise to 7 trillion cubic meters to feed the world's growing population, unless we make changes.

At Olam we asked ourselves, how can we get more crops per drop of water? We are the largest almond orchard owners in the world. Many of our orchards are in California where, in terms of weather and climatic conditions, it is the best place to grow almonds. But it is a water-stressed region. Water is as precious as gold there. In the past, we needed 12.5 mega liters of water for every hectare. Today, we attach IoT sensors on the trees that measure the stress of the plant. Through this, we have improved water usage efficiency by 26 to 27 percent. But there is far more that can be done.

In California I need 14.5 gallons of water to produce 1 pound of tomatoes. In China – the world's biggest producer of tomatoes and tomato paste – they require 24 to 26 gallons of water to produce 1 pound of tomatoes. Yet the Netherlands can do the same with 1 gallon of water. The country has become the world's second largest exporter of fruit and vegetables after the US which has 270 times the land mass of the Netherlands. It is a staggering feat and should be an inspiration for all countries.

INFO

Sunny Verghese is Co-Founder and Group CEO of Olam International, a leading global food and agri-business, and Chair of the World Business Council for Sustainable Development, a CEO-led coalition of over 200 companies from around the world which have come together to bring about a transition to a more sustainable world of which Bühler is a member.

What are the other meta-systems in which you are driving transformation?

The fourth system is cities and mobility. There's a revolution in urbanization happening in different countries. India is only 30 percent urbanized, and China is now 51 percent urbanized. When China hit 30 percent urbanization, the economy took off. India, Indonesia, Vietnam, Africa, and Latin America are all urbanizing rapidly. We have to make sure that urbanization takes place in an organized and balanced way. With rapid urbanization you have various problems: you have more urban slums and urban infrastructure such as sanitation collapsing under the weight of migrants coming in from rural areas. And urban populations also have higher consumptive power. For example, they consume three times more meat per capita than rural populations. Also at the heart of living in cities is mobility. Solutions need to be found so that we can have a more sustainable and inclusive urban mobility in the future.

What promising solutions are you already seeing in this sector?

The first is autonomous vehicles. They have the potential to improve safety and productivity while requiring less real estate than conventional vehicles. Then there is electrification – we expect 3 million vehicles around the world by the end of 2020. After that, I hope we will see further development of hydrogen-fueled vehicles. These are still expensive, but they can recharge 15 times faster than electric vehicles today and will therefore require less investment in infrastructure. Together with increased connectivity and further growth in ride sharing, I think these developments will have a massive impact.

How do you see employment changing and what impact will this have on people's livelihoods?

The fifth meta-system we are looking at is all about people. Because of artificial intelligence, robotics, and digitalization we are going to lose roughly 120 million jobs. But we are going to create 130 to 140 million new jobs for the new economy.

The problem is, the people who are going to lose their jobs might not be in the countries and in the sectors where the new economy jobs are being created. Look at our operations in Africa – it used to take seven workers to process one bag of cashews, from raw cashew nuts into blanched cashew kernels. Today, we can do it with one worker. There are six workers who are now redundant. Many of them are women and there is no alternative form of livelihood or employment for them. Governments do not have the finances or the resources to equip them with the new skills required for the new economy, nor is there a social welfare net to take care of them. The burden therefore comes back to the employer. I cannot just tell my shareholders 'I have saved six jobs and dramatically increased my productivity, but I have left six families without their livelihoods.'

If governments can't fill that gap, we have a sense of responsibility to reskill those people and bring them back into the labor force, whether as farmers who become our suppliers or as entrepreneurs and micro-entrepreneurs. That's the role and responsibility of a company.

> ***"WE CAN TRULY CHANGE THE WORLD, BUT FIRST WE HAVE TO CHANGE OURSELVES. IF THERE IS NO INDIVIDUAL CHANGE, NO CHANGE IS LIKELY TO HAPPEN."***
>
> **SUNNY VERGHESE**
> CEO of Olam International and Chair of WBCSD

What about innovation?

Globally, on aggregate, between USD 4 to 5 billion is spent annually on agriculture food research, for example. However, we need to be spending at least USD 50 billion to find the next productivity breakthroughs. What Bühler is doing is very inspiring and encouraging to me. That's the kind of innovation that we need to find the next breakthrough solutions to address this problem.

What is your message to readers of Diagram?

We can truly change the world, but first we have to change ourselves individually. If there is no individual change, no change is likely to happen. As companies, we have to be mindful of what our foot-

Source: WBCSD

At the beginning of 2018, Sunny Verghese officially took up his role as the new Chair of WBCSD.

prints are, be courageous and disclose our footprint and make public commitments on how we are going to do more with less.

We have to come together as sectors and collaborate with unusual partners to drive change, because we cannot accept the status quo or continue with business as usual while the world is literally burning. I would ask every reader to think about this: Do you know what your carbon footprint is, your water footprint, or your waste footprint? I'm sure you know what your annual income is, but do you know what your impact is on nature or what your activities contribute to biodiversity loss? This is not top of most people's sensibilities.

I am 60 years old now. Until I was 45, I was clueless about the impacts of business on the environment and the interlocked processes. My Road to Damascus was through the eyes of my children, when my son and daughter asked me what the point is of making so much effort and running such a big company – you deal with 4.8 million farmers in over in over 70 countries, they said; you have so much reach and influence, but are you really leaving the world a better place for us? This question set me on the path I am on today.

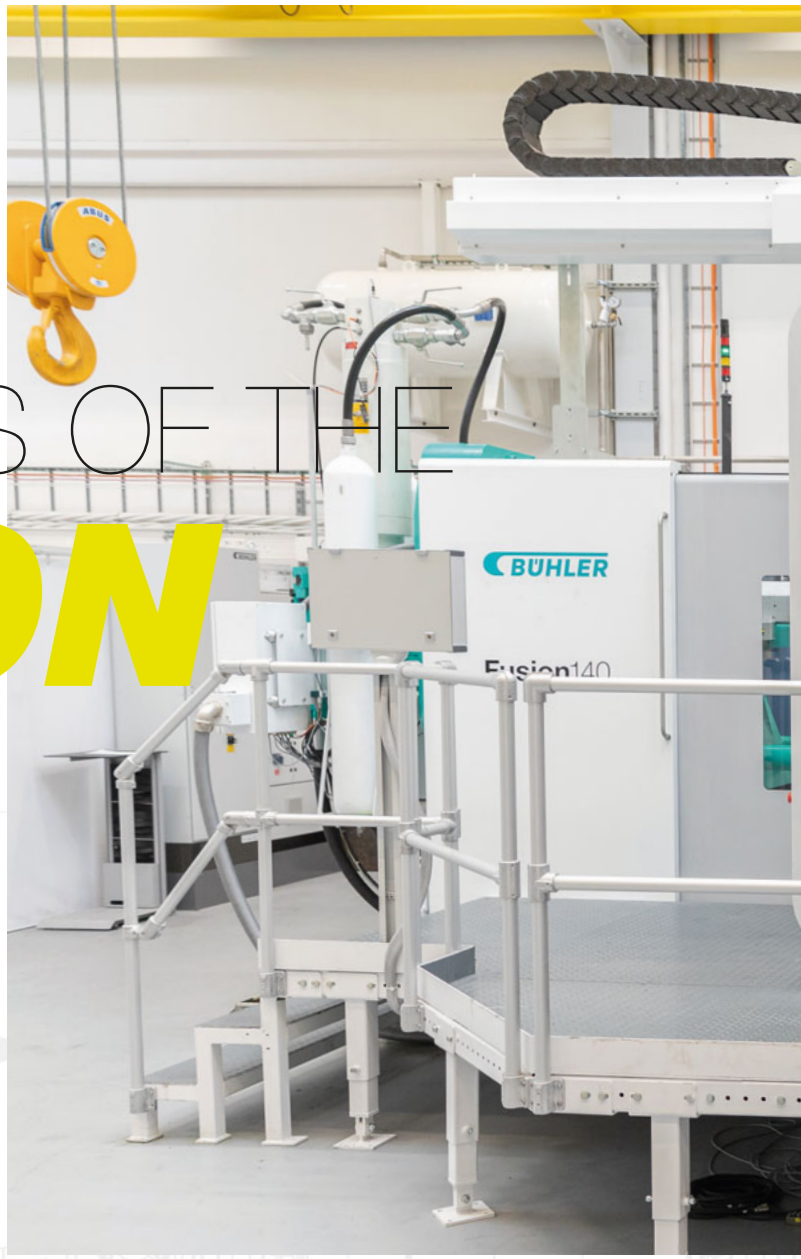
VIDEO

Sunny Verghese was a keynote speaker during the Bühler Networking Days 2019. Watch his full speech here.

Sunny Verghese took part in an interview for Bühler's "The Future is Now" thought-leadership series. Watch the video to learn more about how to create a better tomorrow.

THE MANY DEVELOPERS OF THE FUSION

TEXT AND PHOTOS: ANJA METZGER



A machine is never the product of a single genius – it is the result of teamwork. In the case of the 2019-launched Fusion die-casting system, a global network of Bühler employees, customers, suppliers, and academic partners worked together to determine what was needed to bring die-casting technologies to a new level of performance. The Fusion team spared no effort to gather valuable feedback – and the results speak for themselves.

ONE AFTER ANOTHER came forward, sticking their colored post-it to the wall, some with small drawings and others with only text. The keywords: Drawer principle for maintenance, fall protection, accessibility for cleaning. The scene is reminiscent of group projects at university. But the stakeholders are experienced supply chain managers, sales staff and service technicians, and the occasion is a "design thinking" workshop for developing the new Fusion die-cast solution that was presented to the market in June. Few of them have ever designed such a machine, but still their task is essential to the project.

"If we were only a group of developers, we would be inclined to see the topic from a very technical perspective," says Christoph Ziltener, who supervises the development of the Fusion as Project Manager. This is why he and his team sought help right from the start, from Bühler employees from other units and geographic regions as well as from customers, suppliers and academic partners. Every perspective counts. The goal was for the Fusion to become the most user-friendly, safest, most attractive and, above all, most efficient die-casting machine, so external input was just as important as internal.

Setting priorities

In many companies, it used to be normal to develop a machine in isolation, in the utmost secrecy, after all they wanted to protect their intellectual property. A countertrend can be seen especially from agile

Upper row from left to right: Daniel Bieli, Lukas Hersche, Orhan Alaca, Hermann Roos, Benping Wang, Christoph Ziltener, and Marco Tobler.
Lower row from left to right: Phillip Rozema, Dominik Widler, Fabian Stucki, Patrick Reichen, and Michael Cinelli.

software development, and traditional industries are following suit. The key is to be as close to the market as possible during the development process through close collaboration with customers and partners. "It doesn't do anyone good if after four years a finished product is launched on the market that no one actually needs or wants to buy," says Marco Tobler, Bühler Fusion Product Manager.

The risk is not only being unable to deliver functions the market needs, but also to include functions no one expected and that customers can't use. "The widely supported collaboration takes us out of our internal engineering perspective and helps us set priorities," says Tobler. As such, the goal isn't to develop the fanciest machine, either, but a machine tailored to the needs of the market offering the best price-performance ratio. To define the direction of the journey, 10 foundries from all over the world as well as countless Bühler employees from all regions, and the development teams in the US, China, and Switzerland provided an answer to the big question: What does the Fusion have to be able to do? The challenge was to prioritize the requirements. "We created a sophisticated system with direct encounters of two requirements. Like in a soccer tournament, the stronger requirement eliminated the weaker one," says Tobler. "We cut down until we had a compromise with the five most relevant requirements capable of winning a majority."

It was all about looking at things from a customer's perspective. The entire development team received training to develop a design thinking mindset with the help of academic partners Swiss Federal Institute of Technology (ETH Zurich) and the University of St. Gallen (HSG), Switzerland. This concept, focusing on requirements while the solution is

> *"FROM THE OPERATOR, TO THE TECHNOLOGIST, TO THE TECHNICAL MANAGER, EVERYONE ALWAYS HAD VALUABLE INPUT."*
>
> **CHRISTOPH ZILTENER**
> Fusion Project Manager

still unclear, acted as a common thread for the entire project. By constantly taking the customer and user perspective into consideration, the developers can also put existing concepts to the test. In the case of the Fusion, this included the cleaning and the safety concepts.

Attractive workplace

Machines may be a technical thing, but it is people who operate them. That is why these people have to share their input during the development phase. How easy is it to perform maintenance and cleaning? How quickly can the operator working on the casting cell get an overview of the processes? The user must not be disregarded in product development. Especially when thinking long-term: As a workplace, foundries are not the most attractive for drawing talents. "A lot of people associate die casting with dirt, smoke, and heat," says Matjaz Turk, Technical Manager of the LTH Castings Group. "To change that, we need attractive equipment and a workplace where employees can feel safe and comfortable."

The Slovenian location of LTH was involved in the project right from the start, as the first market requirements were compiled, later for feedback workshops and finally as a test customer for the first Fusion 140 in a foundry. The developers regularly traveled to LTH in Ljubljana. In an iterative process, meaning repeated feedback rounds, they confronted LTH with project progress and design concepts. "From the operator, to the technologist, to the technical manager, everyone always had valuable input which we were able to incorporate into correction rounds," says Ziltener.

The development team went to a lot of trouble to put themselves into the machine operators' shoes. "Together, we cleaned a die-casting machine for a local customer to learn for ourselves where the difficulties lie and what causes problems doing this job," says Ziltener.

Product design as added value

But actually overturning existing concepts required a partner from outside the industry, unprejudiced by die casting. The product designers at Formfabrik in Zurich, Switzerland may be unable to operate die-casting machines, but they are used to seeing things from the customer's perspective. They were a driving force for change in the Fusion project. "When asked why they do something, many customers answered: 'Because we've always done it that way,'" explains Product Designer Christoph Jaun from Formfabrik. "We ask critical questions and try to sense if it is really good to continue in the same way, or is there a better solution? Maybe there are newer aspects to consider?"

While it's hard to imagine developing consumer goods without product designers, they are less common in industrial projects according to Jaun. "It pleases me that the project teams in mechanical engineering are more and more often noticing the added value design can offer." Added value, that means shedding old habits and placing the focus on improved user friendliness and productivity.

Internationally positioned

Fusion isn't the child of one single developer, and it has more than one nationality, too. The project was managed from the Bühler headquarters in Uzwil, but two additional development centers in the US and China were also closely involved. The goal was to produce and deliver the same machines in the same quality in every region, right from day one. Two video conferences were held each week, one with the colleagues in the US and the other with the colleagues in China. "The greatest challenge in communication was living in different time zones," says Phil Rozema, in charge of the Bühler project on American soil.

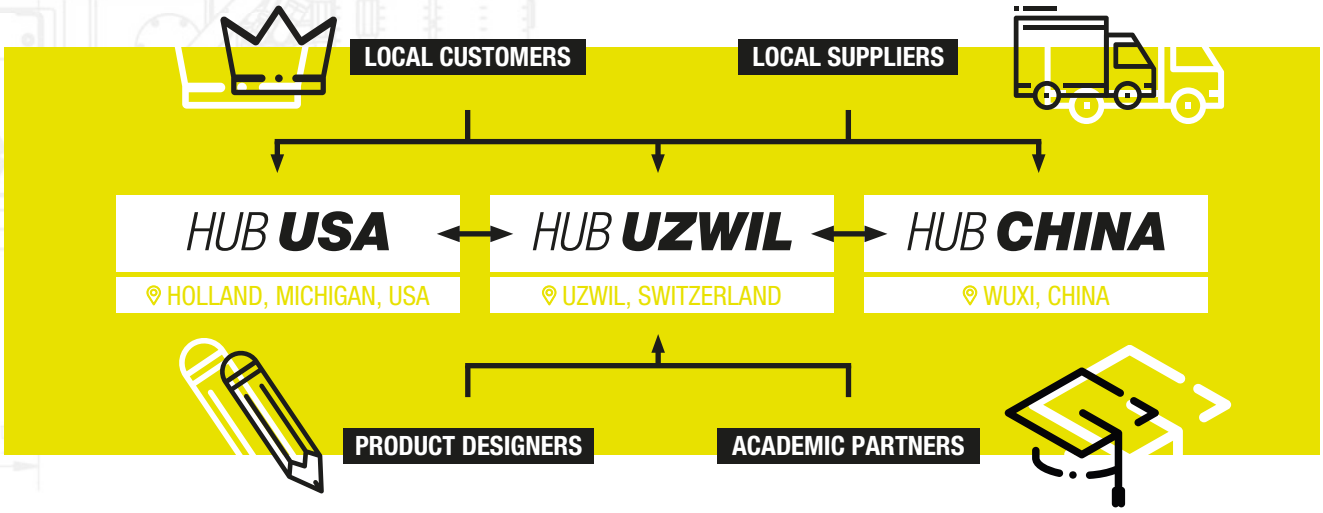
But the pros outweigh the cons. The regions gave valuable insights into the local markets, as illustrated by an example. Fort Recovery Industries, the test customer in the US, had very specific requirements for connecting the machine to its own molding tool that were not covered by the modular concept. "This helped us see a gap in the concept and to close that gap for the future," says Rozema.

With the active support of the regions, the obvious solution was to build not just one but three machines for customer tests: one on each continent. Each of the test machines contains parts made by local suppliers. "We consciously decided to take advantage of the local supply chains for each test machine," says Ziltener. Now, in a second step, the team is currently deciding which parts will be delivered by which suppliers based on criteria such as costs, risk and quality. "Being able to compare the three test versions gives us great potential to build the best quality at the lowest price when it comes to series production," states Ziltener. Plus, this parallel approach ensured that local departments such as purchasing and assembly were also involved in the project early on.

Collaboration at its best

It wasn't always easy. "While building the test machines, we were often confronted with design changes from Uzwil and had to respond last-minute," says Wei Xie, Project Member from Wuxi, China. "This made good communication critical. I could fully depend on the team in Uzwil." For Marco Tobler, the intense international collaboration was definitely worth it. "Of course it's more work to maintain such a large collaboration network, but it's also more sustainable. We learned from three machines while covering three different markets before going into production."

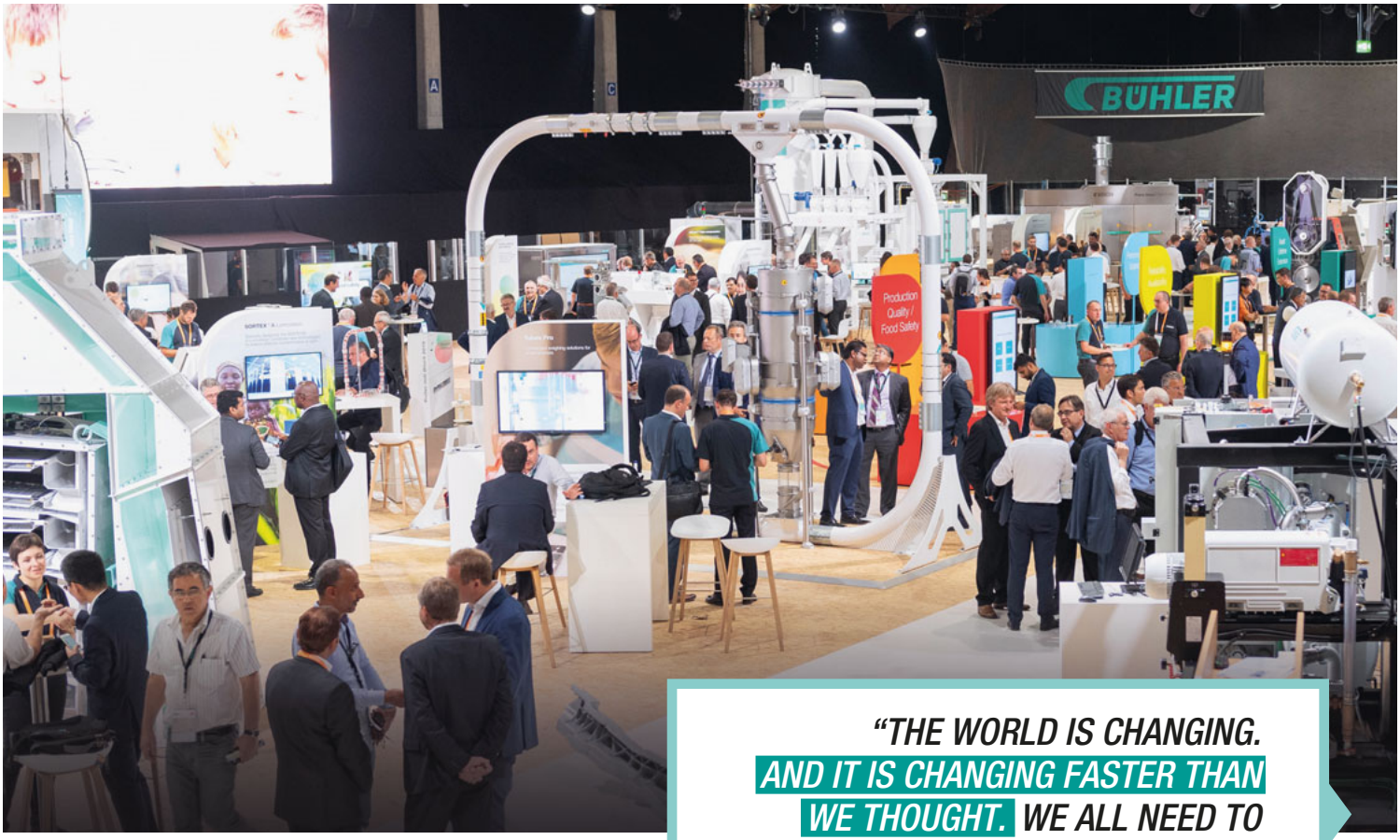
The collaborative approach to developing the Fusion ensured that the machine reflects market needs. That became clear with the positive feedback from customers at two large trade fairs. The project team is currently in the process of incorporating the latest insights from the test machines into the final product design, and it will continue to rely on the international network going forward. "Everyone is responsible for the product in their own way and has made a vital contribution to the project's success," says Tobler.



KICK-OFF FOR CHANGE

TEXT: BIANCA RICHLE

In August, 800 guests from industry and research accepted Bühler's invitation to Networking Days 2019 and convened in Uzwil, Switzerland. The primary goal of the three-day event was to offer a platform for inspiration and exchange, to create a common understanding for the urgency to make use of our planet's resources more sustainably, and, following the motto of "Creating tomorrow together", bring about industry commitment for rapid action.



Bühler displayed more than 20 new solutions for guests to explore. To learn more about them, please visit: **networkingdays2019.buhlergroup.com**

"THE WORLD IS CHANGING. AND IT IS CHANGING FASTER THAN WE THOUGHT. WE ALL NEED TO ACCEPT THIS FACT AND TAKE STEPS FOR CHANGE."

DR. HANS PETER ANDRES
Board Member Purchasing, Materials Management and Logistics, Josef Manner & Comp. AG, Austria

Uzwil was transformed during the Networking Days to host 800 guests. They met with start-ups in the CUBIC, visited the new application centers, and enjoyed the speeches and food in the tent area.

DR. GRO HARLEM BRUNDTLAND

Dr. Gro Harlem Brundtland, former Norwegian Prime Minister and former General Director of the World Health Organization said: "There's no going back. The necessity of the private sector's engagement is bigger than ever. We cannot solve all of the challenges without the resources, expertise, technology, and intelligence of business."

> ***"THE FIRST THING I WANT TO IMPLEMENT IS TO CREATE A POSITION IN THE COMPANY THAT DEALS WITH ADVANCING THE TOPIC OF SUSTAINABILITY."***
>
> **RAJ MALDE**
> Owner and Board Member, Mjengo Limited, Kenya

PATRICK DUPIN

Speech

Interview

If you've seen the CUBIC, you've seen his company's work: Saint-Gobain SageGlass uses Bühler Leybold Optics technology to coat glass, which can create up to a 35 percent energy savings in buildings that use it. Patrick Dupin, CEO of Saint-Gobain Northern Europe, has worked for the company for 20 years advancing innovations and contributing to making it a global leader for sustainable environment. To learn more about the benefits of smart glass, listen to his speech and also the interview with him and Alan McLenaghan, CEO of Saint-Gobain SageGlass.

> ***"WE CAN NEVER DO ENOUGH FOR SUSTAINABILITY. THERE IS ALWAYS MORE. I HAVE SO MANY GOOD IDEAS TO TAKE HOME WITH ME, THANKS TO BÜHLER NETWORKING DAYS."***
>
> **ALAN MCLENAGHAN**
> CEO of Saint-Gobain SageGlass, United States

> ***"IT IS OUR RESPONSIBILITY TO THINK ABOUT SUSTAINABILITY AND ABOUT THE NEXT GENERATION. AND IT'S VERY, VERY IMPORTANT THAT WE WORK TOGETHER TO IMPLEMENT SOLUTIONS."***
>
> **DAN DYE**
> CEO Ardent Mills LLC, United States

VIDEO

Everything about the event, including all of the speeches, can be found on the Bühler Networking Days 2019 site.

You can find the wrap-up movie about the Networking Days 2019 on YouTube.

> *"WE WILL STRENGTHEN OUR ENGAGEMENT IN RESEARCH AND DEVELOPMENT AND INCREASE OUR COLLABORATION WITH BÜHLER IN ORDER TO FIND SOLUTIONS FOR THE FUTURE."*
>
> **CARLOS VASTO**
> President of GF Casting Solutions, Switzerland

STEFAN PALZER

Speech

Nestlé CTO Stefan Palzer shared his insights on how food companies can embrace the opportunities of emerging consumer trends. New and exciting foods, such as meat analogue products, emerge when producers listen to consumers. They expect the industry to produce food more sustainably. To do this, he says, requires a lot of activism from different players, and collaboration. Discover more about future food trends in his speech.

PROF. TOM CROWTHER

Speech

Interview

One of the biggest threats to biodiversity is global warming. Tom Crowther, Professor of Global Ecosystem Ecology at the ETH Zurich and Founder of the Crowther Lab explains the potential that reforesting the world has on reducing carbon. In his speech and his interview you will learn how everyone can make a difference.

> *"WITH OUR CURRENT STATE OF TECHNOLOGY, BÜHLER'S SUSTAINABILITY GOALS ARE COMPLETELY POSSIBLE. I THINK THAT BÜHLER CAN ACHIEVE THEM WITH OUR SUPPORT."*
>
> **YELENA PISKUN**
> Head of Oat and Cereals, Lantmännen, Sweden

FRANCOIS PIENAAR

Speech

Interview

Francois Pienaar is the captain who led the South African rugby team to win the 1995 World Cup – a momentous occasion for the team and especially the country. Nelson Mandela presented the cup to Pienaar in a moment that united the nation. As the final speaker of the Networking Days, he inspired everyone to grow, unite, and think beyond themselves. Relive his speech and listen to the interview with this leader to learn more about the power of collaboration.

DR. MICHAEL WU

As the Chief AI Strategist for PROS, Dr. Michael Wu is recognized as one of the world's leading authorities in artificial intelligence, machine learning, and data science. He believes industries have the potential to create a more sustainable world, and gain tangible business value from this evolving technology. To learn more about leveraging AI-enabled solutions, listen to his speech and the in-depth interview.

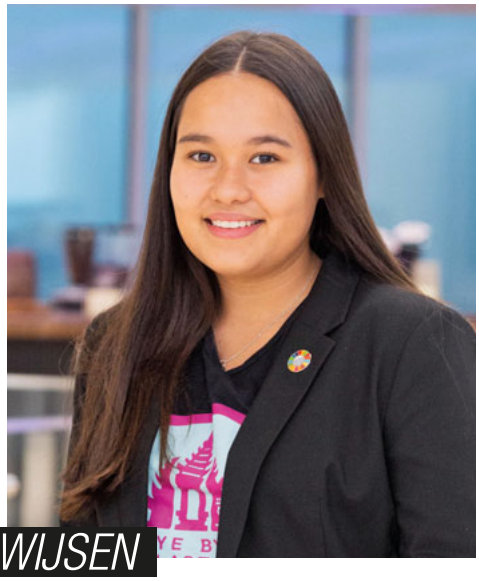
Speech

Interview

> ***"I THINK BÜHLER'S GOALS ARE POSSIBLE AND THAT WE AS AN INDUSTRY ARE MORE THAN PREPARED TO HELP WHEREVER WE CAN. WE WANT TO FOCUS ON THESE GOALS: LET'S DO IT TOGETHER!"***
>
> **HARJIV S. SWANI**
> Director of Swani Spice Mills Pvt. Ltd., India

Speech

Interview



ISABEL WIJSEN

Isabel Wijsen and her sister Melati founded Bye Bye Plastic Bags in Bali when they were 10 and 12 years old. Six years later, their organization has become a global movement to say goodbye to plastic bags. Today you can find Bye Bye Plastic Bags in about 50 locations around the world, run by young people. Wijsen proves the impact that can be made when people work together to drive change. In her speech and in the video interview, you can learn more about her journey and what you can do to be part of the solution.

Speech

STEFAN SCHEIBER

"After all the inspiring talks, impressive discussions and insights into new technologies, I can say with confidence: Yes, we can do more as an industry, a business, and as individuals. For me, there is no excuse for not acting immediately and to drive our numerous initiatives forward," said Bühler CEO Stefan Scheiber after the Networking Days 2019. "We as industry leaders have a particular responsibility because we are in a position to transform the many challenges into good, sustainable business possibilities. Let's all be part of the solution."

> ***"THERE ARE SO MANY INDUSTRIES REPRESENTED AT THE EVENT AND SO MANY DIFFERENT COMPANIES WITH DIFFERENT PERSPECTIVES. IT IS VERY INSPIRING TO HEAR ALL THE IDEAS AND TO LEARN MORE ABOUT THE SOLUTIONS THAT WE CAN JOINTLY DEVELOP."***
>
> **WILLIAM BONIFANT**
> Vice President Engineering at The Hershey Company, United States

PARTNERS *FOR GENERATIONS*

TEXT: ANJA METZGER, PHOTOS: EHRIN MACKSEY AND THOMAS EUGSTER

The die-casting market is highly competitive, and yet some relationships last through the ages, such as that of Handtmann and Bühler. The two companies have worked together for decades, always finding ways to prevail despite the global competition. Its Carat machine series, the expansion into China, and the number 500 all play an important role in this.

Markus Handtmann leads the company factory in Tianjin, China.

"DIE CASTING IS HERE TO STAY, AS IT OFFERS A GOOD COMBINATION OF STRENGTH, LIGHTWEIGHT DESIGN AND VALUE FOR MONEY."

THOMAS HANDTMANN
CEO of the Handtmann Group

The Handtmann Group has been counting on Bühler as its technology partner for decades.

BACK THEN, the world was a bit slower: There were emperors and beer riots, and workers were paid in gold coins. In 1873, almost 150 years ago, Christoph Albert Handmann founded a mechanical workshop and brass foundry in Biberach, southern Germany. The first products sold by Handtmann included beer taps and faucets. Today, the company is positioned internationally with five business segments supplying big names in the automotive industry and producing entire plants for the food industry.

Sound familiar? The similarities with Bühler's history are uncanny: Both companies began in the 19th century as simple foundries, are still family-owned today, and are successful international industrial groups. Perhaps this is why Handtmann and Bühler work so well together. For several decades, Handtmann has relied on Bühler as a die-casting technology supplier. "Bühler is a reliable partner with which we collaborate closely. My grandfather bought machines from Bühler, as did my father," says Markus Handtmann, General Manager of the company's plant in Tianjin, China. Handtmann generates 90 percent of its annual sales within the business area Light Metal Casting with die-casting processes. Of the nearly 3,700 employees working worldwide at Handtman, about 2,300 work in this field. The company produces approximately 72,100 tons of aluminum and magnesium parts annually. After casting, the parts are then processed in-house before delivery to customers – most of which are in the automotive industry.

Handtmann plants in Germany, Slovakia, and China feature nearly 100 die-casting machines, more than 50 of which are from Bühler. One model stands out in particular: the Carat. Handtmann opted for this model for the first time in 2007, just after the series was launched. Its compact design in comparison with its predecessors and its easy use tipped the scales in its direction.

Setting a standard

Ever since this first installation, the Carat has continued its triumph at Handtmann, which now produces cast parts such as structural components, battery and gear housings, and oil pans for cars on 41 Carat machines. The Carat has aided the company

The 500th Carat die-casting machine has found its home in the Handtmann factory in Tianjin, China.

"MY GRANDFATHER BOUGHT MACHINES FROM BÜHLER, AS DID MY FATHER."

MARKUS HANDTMANN
General Manager of the Handtmann plant in China

in reaching new standards, as it is easy to operate the machine. In addition, the Carat allows for changes to numerous machine parameters to improve the quality of cast parts and to make more complex parts with enhanced precision. This includes structural components – thin-walled and therefore lighter parts – which have seen a major upturn in recent years.

Compact high performance

At the time of its launch, the Carat was a small-scale revolution. The two-plate Carat generates its closing force through four large hydraulic cylinders. No toggle system is needed, saving a great deal of installation space and improving closing force distribution significantly. "This means foundries can install a Carat with a higher closing force in the same space where a smaller machine previously stood," explains Christoph Hartmann, Area Sales Manager

at Bühler and Handtmann's first point of contact. A key advantage in Europe especially, where space is a valuable asset. With today's production pressure in the automotive industry, Handtmann has also had to make adjustments wherever possible to optimize plant efficiency and win contracts. A major order from Volkswagen for the Chinese market in 2012 was the deciding factor in expanding its business to China. Bühler came on board right from the start as a partner in building the new Handtmann production site in Tianjin, an important industrial hub with freight ports.

Down to the day

It was a rush order, so seamless project management was pivotal. Handtmann opted for Bühler based on past experiences of its delivery on schedule. The local Bühler team in China delivered and installed the first die-casting cell on time in 2013. From then on, it was just like the series production of die-cast parts: As soon as one cell was finished, Bühler set the next one up – 16 times to date.

The first of the two halls in the plant is full, and the second one now houses three machines. Handtmann's achievements in the industrial region of Tianjin are impressive. It's the first production site the company was able to build right on a green field.

"We saw this as a huge opportunity. We rounded up all our experts and drafted what you could call a blueprint for other locations," explains Markus Handtmann, who relocated to China as part of the expansion and has managed the location since. Machines are neatly lined up one after another to the left and right of a wide aisle. Daylight floods the hall. It is a stark contrast to the popular image of foundries. No nooks and crannies or darkness – instead it is bright and standardized. The fact that 16 machines all come from the same series reinforces this impression.

In China, Handtmann produces exclusively on Carat machines. Only one is slightly different: A specially designed machine door indicates that this machine is number 500 – the 500th Carat ever produced by Bühler. If you've ever stood before such a large die-casting cell, you can imagine how many tons of material Bühler must have delivered to customers across the world in the last decade. "The Carat is our most successful machine series to date," says Hartmann, accompanying the project on behalf of Bühler. "We were so pleased that our 500th machine was installed at Handtmann."

Keeping the die-casting cells uniform helps Handtmann standardize. With the new DataView machine control, the company can program its processes quickly using the touch screen and adapt the user interface to the respective user. The foundry receives support from Bühler service technicians from the Chinese city of Wuxi. "Fortunately, Bühler in China provides not just machines, but local service and spare parts, too," says Markus Handtmann.

After all, the company in Tianjin has big plans: "Though the automotive market is currently showing signs of weakness, we are very optimistic and believe that we can secure a strong market position for ourselves," he explains. China will be an important market for the future, not only because of the country's size, but because of a growing demand for mobility.

> ***"THOUGH THE AUTOMOTIVE MARKET IS CURRENTLY SHOWING SIGNS OF WEAKNESS, WE BELIEVE THAT WE CAN SECURE A STRONG MARKET POSITION FOR OURSELVES."***
>
> **MARKUS HANDTMANN**
> General Manager of the Handtmann plant in China

One constant: innovation

High-quality structural components, in particular, are seeing ever greater demand on the Chinese market. They are crucial to lightweight car design, which plays right into Handtmann's hands. After all, these parts are the specialty of Carat machines. Compared with other materials and processes, ultra-efficient die casting still has key advantages according to Thomas Handtmann, CEO of the Handtmann Group: "Die casting is here to stay, as it offers a good combination of strength, lightweight design, and value for money."

Markus Handtmann is now filling the order books for the Chinese plant, with Bühler as an important partner in the project. "We plan to strengthen collaboration in the near term in advancing die-casting processes and improving machines especially," he says.

Neither Handtmann nor Bühler plan to let the long-standing family tradition fade away. On the contrary, innovations and the continuous push into new markets form a recipe for success – the recipe that has enabled both companies to become so successful over one and a half centuries.

Handtmann is making great strides in China with its high-quality, lightweight structural parts.

"WE ARE SO PLEASED THAT OUR 500TH MACHINE WAS INSTALLED AT HANDTMANN."

CHRISTOPH HARTMANN
Area Sales Manager, Bühler

A POWERFUL FORCE OF NATURE

TEXT: BIANCA RICHLE

After Cyclone Idai destroyed three mills and the pasta plant of Merec Industries in Beira, Mozambique, on March 15, 2019, the company turned to Bühler with little hope that the desperate situation could be salvaged quickly. The customer was all the more surprised that its systems were back up and running just 17 days later.

IN MARCH 2019, Cyclone Idai made its way over southern Africa, leaving a trail of destruction in its wake. According to the World Meteorological Organization, it was one of the worst catastrophes caused by weather ever to hit the southern hemisphere. The city of Beira in Mozambique was struck especially hard: over 240,000 people lost their homes, and over 600 their lives. Half of Mozambique's harvest was destroyed. Mhamud Charania, Founder and Board Member, and Luis Aveleira, Executive Board Advisor, of Merec Industries, have four manufacturing sites in Mozambique, one of which is located in Beira. At the time of the storm, they were fortunately at one of the other sites. "As we heard that our site had been affected by the cyclone, we wanted to head over to the location right away to assess the situation ourselves," says Aveleira.

No simple task. The city of Beira was cut off from the rest of the world – streets flooded, no power, no clean drinking water. Still, Aveleira and Charania managed to secure a flight just three days after the storm. "The situation at the airport was surreal. They were unable to issue tickets as the power was out. It was never registered that we were even on the flight," says Charania.

The steel grain silos not only had to be repaired, but also cleared of water and cleaned.

Tremendous damage

Once on site, the two confirmed the devastating scale of the destruction: two wheat mills and one maize mill were heavily damaged, the roofs totally destroyed, and a pasta plant was roofless and drenched with water. Five steel grain silos were damaged and the other silos had to be patched, flushed and cleaned, as they were contaminated with water from the storm. "It's a miracle that none of our employees were hurt," says Charania. They kept in touch with their families using a satellite telephone. Due to the clouds and the persistent rain, it was difficult to establish a connection. "We only had a few seconds to let them know we were alive," says Aveleira. They then contacted various suppliers, asking for help. Harry Blöchlinger, Head of the Southern Africa Region at Bühler, vividly remembers that call on Sunday. "I knew right away: We had to help! Quickly, and without red tape."

Martin Hoberg, Sales Manager Customer Service at Bühler, flew from Johannesburg to Beira the very next day, armed with a toothbrush, flashlight, and mosquito repellent. "At the drop of a hat, I took a journey into the unknown," says Hoberg. At that time, there was no information at all about the situation on site. "Surprisingly, it was eerily quiet. The people in Beira began to clean up, rebuild what the storm had destroyed and were searching for missing relatives and friends. Children were playing in the streets, which had transformed into small rivers. But the devastation had left its mark on absolutely everyone."

In action, day and night

After taking an initial inventory, Hoberg brought additional technicians and engineers from Bühler South Africa to Beira to get production up and running as quickly as possible. "I think we only left one single person back in South Africa; the rest of our entire team was sent to Mozambique. Even employees from production joined us to pitch in," says Blöchlinger. The team worked day and night.

"There was water everywhere, and getting rid of it seemed impossible. Coming out of every pipe, floor, stair," Hoberg explains. "The scent of rotting wheat in the water is something I am unable to describe. Dead, floating rats, spitting cobras, mosquitoes and extremely dangerous working conditions didn't stop any of us from carrying out the first clean-up."

Even today, the customer is still extremely grateful for the courageous support. "It's unbelievable what the team managed!" says Aveleira. "After the storm, it rained non-stop for a week. This quick

"A RELATIONSHIP BETWEEN COMPANIES IS ABOUT MORE THAN JUST BUSINESS."

LUIS AVELEIRA
Executive Board Advisor of Merec Industries

Mahmud Charania, Founder and Board Member, and Luis Aveleira, Executive Board Advisor of Merec Industries, are extremely grateful for Bühler's rapid and uncomplicated support.

repair was the only thing preventing more damage to the plant." Aveleira and Charania were also surprised by the speedy progress. "We thought the work would be delayed owing to the difficult circumstances," says Aveleira. "There was only food from cans, all the employees had to sleep in one room, and illnesses such as cholera were spreading. We really give Bühler credit for never abandoning us. The work and demeanor of the Bühler helpers was always extremely professional. Not once did anyone complain about the conditions."

The Bühler staff have astonishingly positive memories of their time in Beira. "Even though they didn't have enough themselves, the employees from Merec Industries supplied us with food every day and made sure our beds were reasonably dry. We were in very good hands," says Hoberg. "The commitment and dedication from the Merec team at Beira was overwhelming. Their support, and our know-how, together produced the outstanding performance of this plant rehabilitation process."

The legacy: profound trust

After just 17 days, the first wheat mill was running again. After about a month, all the mill equipment was in working order. The pasta plant took a little longer, but with just over two months after the incident all plants were running again at full capacity. Today, six months later, Merec Industries is shining like new – even the colors are new in the corporate design. "We are unbelievably grateful. This was a huge achievement on the part of Bühler. Especially considering that we have equipment from other suppliers that still isn't running today," says Aveleira. "Too dangerous, those suppliers say. We aren't sending anyone to Mozambique right now."

This close collaboration has yielded close friendships based on deep trust, which both sides truly appreciate. "They didn't say 'here's your bill' – they simply sent people and we settled the matter later on," Aveleira explains. "The catastrophe made clear that a relationship between companies is about more than just business – in a critical situation, it's friendship that matters."

INFO

Merec Industries is the largest food manufacturer in Mozambique. Founded in 1998, it currently produces corn meal and wheat flour, pasta, biscuits, and animal feed in a total of 13 plants in four different sites spread across Mozambique. The company's industrial units boast the highest standards of premium equipment and qualified personnel. It exports around 10 percent of its products to countries such as Zimbabwe, Malawi, Zambia, and South Africa.

MAGICAL *GLASS*

TEXT: BURKHARD BÖNDEL / PHOTOS: RALPH RICHTER AND TRAVIS JOHANSEN

Bühler's new CUBIC innovation campus is equipped with the latest glass technology. The dynamic transparency of the façade allows for a new level of openness and well-being – a positive stimulus for this venue of collaboration. The technology partner Saint-Gobain SageGlass is not only the leader and the supplier of such revolutionary windows, but also Bühler's customer.

WHEN THE BÜHLER CUBIC innovation campus was conceived, Bühler's Chief Technology Officer (CTO) Ian Roberts had a clear vision: "The building should be designed in a very cool way so that it becomes an icon for innovation," he said. More important, however, than the architectural aspect of the building was what would be happening inside: collaboration across internal and external borders to innovate for a better world.

"The building is only the tool," Roberts explains. "With this in mind, we had been looking for new technologies that allow for a new kind of transparency and openness." Roberts and his team did not have to conduct a lengthy search when it came to the glazing of the windows at the CUBIC. "From the very beginning it was clear that we would use the electrochromic glass from Saint-Gobain SageGlass for the façade," the CTO explains. SageGlass, a Saint-Gobain company, is a Bühler customer that uses Leybold Optics large-area coaters to manufacture this magical glass.

Magical? Yes, indeed. SageGlass is like the squaring of the circle. It is transparent, but controls glare; it is coated, but it's possible to adjust its tint; it insulates only when required; it may cost a little more, but it is extremely efficient to use. This is unique. To make the distinction clear, CEO Alan McLenaghan says: "SageGlass is not just another type of glass. If people think of it that way they are not being imaginative enough. It's all about the dynamic benefits it brings to the people who are occupying the space."

Nanometer-thin coatings breathe intelligence into the amorphous, transparent body of glass: equipped with sensors and software, the glazing adjusts its tint depending on the solar radiation and light, allowing an unrestricted view to the outdoors at all times and under any conditions. It automatically controls daylight, glare, and energy entering the

"SAGEGLASS IS NOT JUST GLASS. IF PEOPLE THINK OF IT AS JUST A NEW TYPE OF GLAZING THEY ARE NOT BEING IMAGINATIVE ENOUGH."

ALAN MCLENAGHAN
CEO of Saint-Gobain SageGlass

building – and it allows manual adjustment if the occupant wants to override the building management system. With the advent of SageGlass, curtains, roller shades, and blinds have become the glare protection of the Stone Age. "Using this as a basis, architects have the opportunity to use glass in ways and applications they previously could never have imagined," explains McLenaghan.

SageGlass allows architects and designers to create buildings that optimize the use of natural daylight while providing unobstructed views of nature and the world outside. "This is exactly what makes the experience inside the CUBIC so amazing," says Roberts. Standing in the center of the building, one has unobstructed views in all directions, even in the morning or evening when the sun is shining directly onto the façade. "This permeability itself creates an atmosphere which works as a stimulus to the open and collaborative culture we want to spark and foster in the CUBIC," says Roberts.

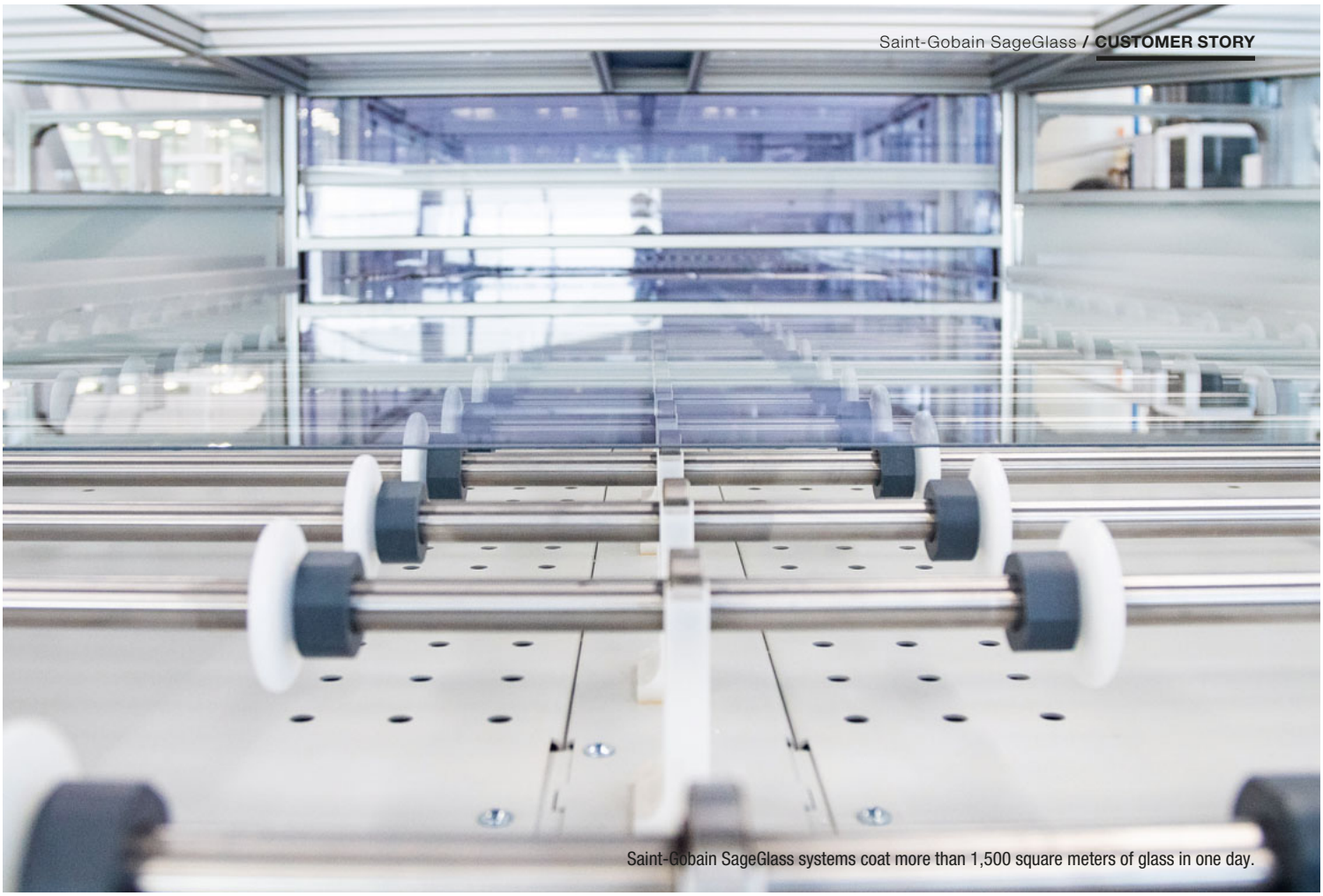
This does not come as a surprise. For thousands of years, our forefathers lived mainly in the great outdoors. Still wild creatures from a genetic point of view, modern urbanites also need sunlight for their health and well-being. For office buildings, there is ample evidence that sufficient daylight brings improved satisfaction in the workplace, reduces stress and absenteeism, improves the quality of sleep and overall well-being, and increases productivity. In hospitals, it has been observed that patients in rooms with a view and optimized daylight require less pain-relieving medication, and their recovery is accelerated. For schools, it's proven that daylight and views to the outside promote concentration, cognitive function, and attention in students, resulting in increased retention and improved test scores.

The environment also benefits from the intelligent glass. Up to 35 percent less energy is required to heat and cool buildings regulated by SageGlass. This also has a CO2 benefit of up to 10 percent. Operationally, SageGlass replaces the need for blinds or other solar shading devices, resulting in an annual cost and environmental savings that is created by eliminating maintenance and the replacement of traditional materials. As a result, the value of the real estate and the rental income increases.

Despite the higher initial investment of up to 1 percent of total construction costs, SageGlass calculates a return on investment of less than 10 years, based on energy savings alone. If other factors are considered, such as the glare protection that is no longer required, and the enhanced performance and well-being of the occupants, the return is realized even more quickly. "Our products are not a panacea for all problems, but they certainly enhance productivity, well-being, cognitive capability, and efficiency," says McLenaghan.

A dynamic approach

The basic principles of electrochromic coating have been known since the early 1960s. It consists of molecules or atoms that can change their optical properties with a flow of electricity. In the case of dynamic glass, this involves lithium ions and electrons. Applying voltage of only 5 volts creates a low current, moving lithium atoms from one layer to another, creating a darkening effect. The actual art here, originating from this chemical and physical principle, is to man-



Saint-Gobain SageGlass systems coat more than 1,500 square meters of glass in one day.

ufacture large high-quality products on an industrial scale to look the same, function flawlessly for 30 years or more, and to work together like a fully synchronized water ballet. With more than 500 patents granted over the past 20 years, Saint-Gobain SageGlass has taken this art to new heights – and Bühler has been a significant technology partner in this.

In 1989, John Van Dine founded the company in Valley Cottage, New York. Technology and processes were developed to market readiness, and the first product was launched – the starting point for rapid growth. The average rate of growth has been more than 50 percent per year; SageGlass is now installed in buildings in 30 countries. After a period of close partnership with Saint-Gobain, the global market leader for construction materials took over the company in 2012, complementing its own electrochromic technology with that of SageGlass. SageGlass is a wholly-owned subsidiary of Saint-Gobain.

In 2010, a close partnership was formed between SageGlass and Bühler. “SageGlass and Bühler had a symbiotic relationship from the beginning,” says McLenaghan. The expansion required a new factory, which SageGlass built in Minnesota – and with it new coaters. “The first coaters used in our expansion were Bühler coaters,” said McLenaghan. We selected Bühler because of its technical advancement, the innovation that it brings, the similar culture of the companies, and Bühler’s willingness to work with us on design changes we needed in the coater.”

A growing demand

The stringent requirements could not be met with a standard system. In order to achieve the desired characteristics, a vertical arrangement of the machines was needed instead of the usual horizontal layout. Another criterion was easier access to the key components of the machine to make maintenance and cleaning easier. The specially developed behemoth of a machine, with dimensions of 75 x 15 meters, met the demands with the highest reliability.

It coats more than 1,500 square meters of glass per day with precision of just a few atomic layers – typically up to six coats were applied for this. Temperature curves, vacuum, material deposits on the glass: All of this was controlled perfectly by the GLC 1850 V Large Area Coater from Bühler Leybold Optics. Although the factory and coater are still relatively new, it is already foreseeable that they will reach their limits. “We are already considering a new production location, which would undoubtedly be somewhere outside of the US,” says McLenaghan.

Salmeen Al Ameri, CEO of the UAE division of Al Dahra, is proud to contribute to the country's food security.

FOOD SECURITY *IN THE UAE*

TEXT: CARMEN PÜNTENER / PHOTOS: BECHARA EL KHOURY

Rapid population growth in the United Arab Emirates (UAE) has presented the region with a major challenge. How can it ensure enough food for nearly 9.8 million people in a country that is two-thirds covered by desert? A national food security strategy introduced in 2018 has already inspired numerous initiatives to enhance sustainable food production. One of them is Al Dahra, a modern rice milling, packing, and distribution plant in the Khalifa Industrial Zone Abu Dhabi.

The Al Dahra plant in the UAE stores, processes, and packages rice into bags ranging from 1 kg to 50 kg. This flexibility enables it to meet a wide range of customer needs.

SUPERLATIVES are strung together and compete for attention: The tallest building in the world, the Burj Khalifa skyscraper; the largest airport in the world 40 kilometers outside of Dubai and currently still under construction; the largest manmade harbor, Jebel Ali, with 67 anchoring berths.

The economic boom that has been in full force for decades has transformed the United Arab Emirates (UAE) into one of the most important commercial hubs in the Middle East. The allure of shopping in Dubai draws more and more tourists to it. With more than 15.7 million visitors a year, the UAE is 23rd on the list of most-visited countries in the world.

Business and tourism requires employees. In just 10 years, the population has doubled. Currently, there are nearly 9.8 million residents, of which nearly 8 million are expats who live and work there.

Dependent on imports

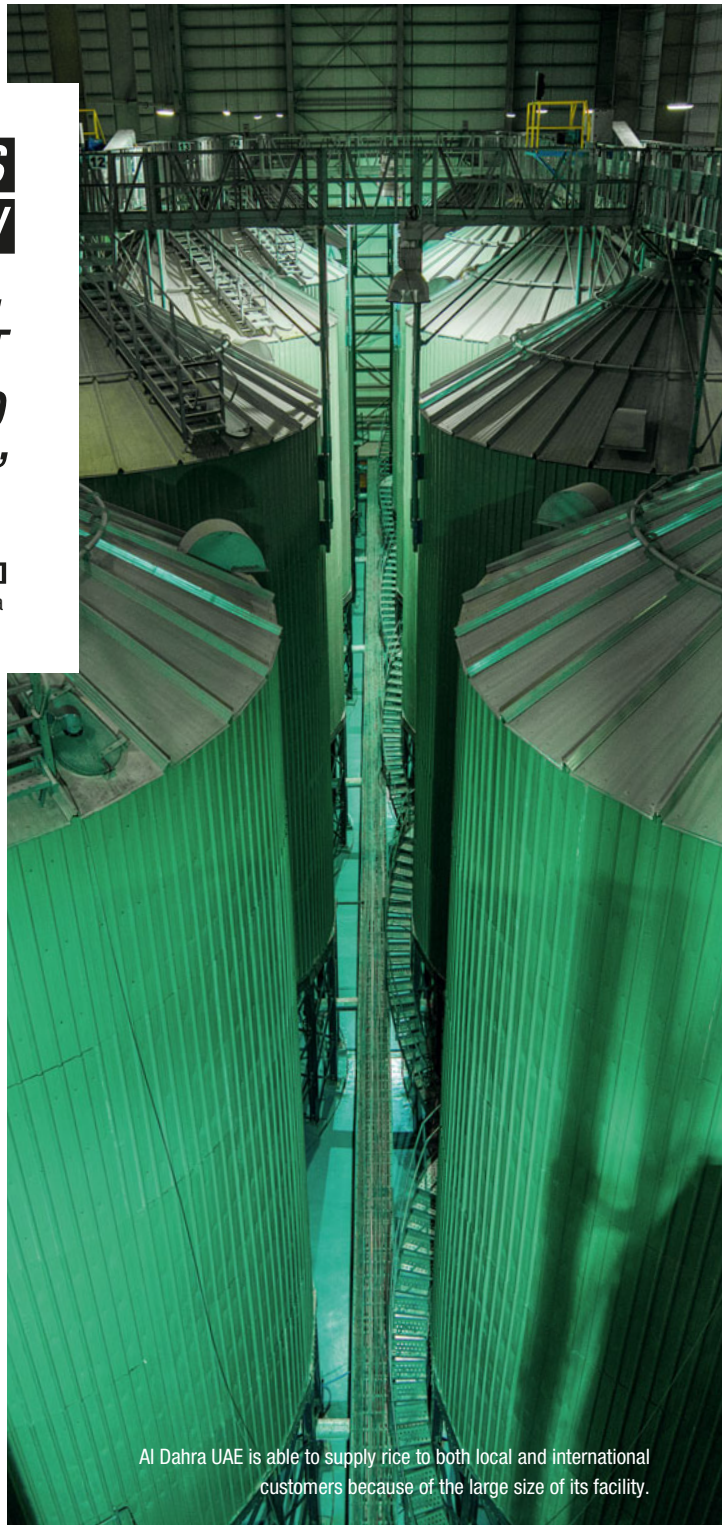
The dramatic population increase has presented the country with some major challenges. Water must be taken from the ocean and painstakingly desalinized and treated. This is because the Emirates are almost entirely covered by the Rub al-Khali desert. With merely 12 rainy days per year and daily high temperatures that regularly reach over 40° Celcius, the Arabic peninsula is one of the most hostile regions to inhabit on this planet. Agricultural products are rare and are limited to small quantities of citrus fruits, dates, vegetables, and the cattle industry. In these conditions, sustainable nutrition for its growing population seems to be an impossibility. “As a country, we are dependent on imports for food to a great extent. Both food as well as animal feed is currently imported at a rate of 80 percent,” explains Salmeen Al Ameri, CEO of the UAE division of Al Dahra. His country is always reaching its limits: “The global food trade is highly volatile and exposed to wide fluctuations,” he says.

The population explosion has made its contribution to this in recent years. As stated by the Foreign Agricultural Service in the United States (Grain Report 10/2017), food consumption increased every year in the last decade by 12 percent. The government of the UAE has already responded to this additional challenge.

In November 2018, they launched the National Food Security Strategy 2051 in order to become as independent as possible with regard to food supply. The driving forces behind this initiative are the need for diversification of imports, exploring new opportunities for local production, and minimizing food waste. The plan includes establishing free agricultural zones abroad where private companies from

"EACH OF OUR 40 SILOS CAN STORE 750 TONS OF RAW OR BROWN RICE. IN SO DOING, WE CAN MAKE A SIGNIFICANT CONTRIBUTION TO FOOD SECURITY IN OUR COUNTRY."

SALMEEN AL AMERI
CEO of the UAE division of Al Dahra



Al Dahra UAE is able to supply rice to both local and international customers because of the large size of its facility.

the Emirates can cultivate agricultural products and sell some of them locally while the balance gets exported to the UAE. The city of Dubai has also announced it will erect twelve new vertical farms. The country wants to become a pioneer in this area.

Rice on almost every plate

In the Emirates, practically nothing is served without rice. Residents, both natives and newcomers, consume an average of about 80 kilograms of rice a year, which corresponds to 220 grams per day. This is significantly higher than the global average of 54 kilograms per year.

Considering the consumption rates, the country would like to be less dependent on rice imports as well. Al Dahra, one of the most important food producers in the country, therefore set the goal a few years ago of processing paddy rice in its own facilities and storing it locally in order to have sufficient reserves right on site. "Rice is quite simply a staple for us. It's a giant market. And as a transit country we are continuing to grow in importance. This means our rice is also re-exported to the surrounding countries," Al Ameri says.

In 2013, the signal was given to start construction of the largest rice processing plant in the Gulf region. "It would make little sense if we tried to put a rice

VIDEO

To learn more about the state of the art Al Dahra facility, its high food safety standards, and the Bühler UltraLine, please watch the video.

plantation in the desert. About 2,500 liters of water are needed to produce one kilogram of rice (source: The Guardian Data Blog)," Al Ameri says. "The processing, however, is a whole separate activity. Each of our 40 silos can store 750 tons of raw or brown rice. In so doing, we can make a significant contribution to food security in our country."

Highest quality and food safety

The new rice mill is in the Khalifa Industrial Zone of Abu Dhabi (KIZAD), in the vicinity of Khalifa Port, the commercial port of Abu Dhabi. With an overall capacity of 120,000 tons of rice, it is a high-performance production facility. The focus is on processing basmati rice from India and Pakistan where Al Dahra has also made investments in rice mills. This type of rice is known for an especially long grain (7.3 - 8.5 mm) and a distinctive flavor. Basmati rice is difficult to process, because the aromatic grains are very thin and fragile. This means the special care is called for in its processing.

The state of the art Al Dahra rice mill covers the entire production process: from intake to cleaning, sorting, drying, bleaching, optical sorting, as well as packaging and storing. The polishing level and the optical sorting are especially important for maximum quality in the end product. With the UltraLine from Bühler, Al Dahra relies on the highest quality and maximum food safety which is validated through the in-house laboratory set up in the plant.

"Originally, we wanted to build a logistics hub for cargo handling, but then we decided to further invest in processing the rice ourselves and bringing the expertise directly to the UAE as part of building local competences and capabilities," explains Al Ameri. "From the very first idea on paper to this highly modern building, it took a mere five years."

Al Dahra imports five to six types of basmati rice from different countries. The processing capacity of

"OUR RELATIONSHIP WITH BÜHLER WILL CONTINUE FOR MANY YEARS. WE WILL CONTINUE TO IMPROVE THIS SYSTEM, EXPAND IT WITH THE LATEST TECHNOLOGIES, AND HOPEFULLY ALSO SCALE UP OUR PRODUCTION."

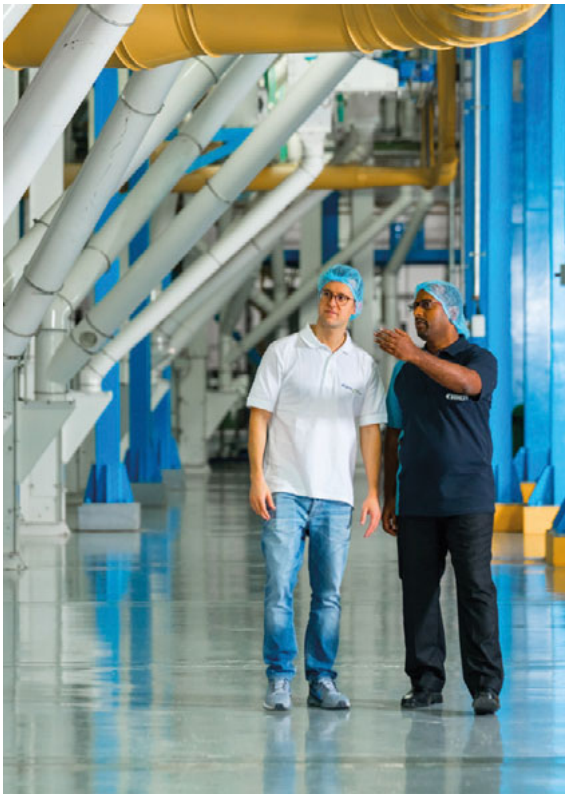
SALMEEN AL AMERI
CEO of the UAE division of Al Dahra

the new system is 18 tons per hour. Some of the ready-to-consume rice is sold in the market, and there is room to store a total of 50,000 metric tons. Processed basmati rice can last for decades if it is stored properly.

Strategic food reserves

Almost every country sets aside food as strategic food reserves. They are especially important to the UAE, because the country has few of its own food resources. “With regard to the storing of rice that is ready for consumption, we are working very closely with the Government in Abu Dhabi,” explains Al Ameri. “Our warehouse is part of the official emergency stockpile.”

The system at the KIZAD-based facility has lived up to the promise shown on the drawing table. “We had to learn a lot in the first year and make some adjustments. Today, we can proudly say that we offer the best equipment and expertise,” explains Al Ameri with obvious pride. For Al Dahra, it is clear that this is just the beginning. “Our relationship with Bühler will continue for many years. We will continue to improve this system, expand it with the latest technologies, and hopefully also scale up our production.”



Al Dahra wants to scale up their production in the future, and continue to work with Bühler.

Food safety is validated in the in-house laboratory.

INFO

Al Dahra is a multinational leader in agribusiness, specializing in the cultivation, production and trading of essential food commodities and animal feed. Serving a large customer base spanning government and commercial sectors, Al Dahra has a widespread geographic footprint. It has a workforce of 5,000 employees, operating in over 20 countries and catering to more than 45 markets, with a leading position in Asia and the Middle East. The rice factory in the UAE has the capacity to produce 60,000 metric tons of rice annually with a total trading capacity of 100,000 tons.

Production is scalable up to 120,000 tons a year in subsequent phases of operational expansion. Al Dahra has partnered with the UAE government to support the nation’s food security vision aimed at preserving national water resources and ensuring self sufficiency and sustainability of key commodities. The new plant will further help secure a strategic stock reserve for food security with a storage capacity up to 50,000 metric tons.

OPEN-NESS AND CURIOSITY

TEXT: BURKHARD BÖNDEL, PHOTO: JUDITH AFFOLTER

Under the banner of Industry 4.0, the next wave of digitalization has begun in Bühler's factories. It integrates production planning across sites and suppliers, does away with paper in production halls, and brings a higher level of automation with things such as robot assistance, all of which ultimately increase efficiency, flexibility, and planning security.

WHOEVER GOES TO the assembly hall for the five-roll mill for chocolate production at the Bühler Uzwil, Switzerland site will also find an area of about 150 square meters which doesn't seem to quite fit into the existing assembly area. The Digital Learning Center is a place for discovery, trying out, and testing, rather than about manufacturing according to today's production processes. "This is our 'future lab' for production," says Holger Feldhege, Chief Operating Officer (COO), Manufacturing, Logistics and Supply Chain (MLS) at Bühler.

Here, in the discovery zone, experts discuss and develop ideas. Meanwhile, in the prototyping zone, concepts and specific test models are created, such as self-driving vehicles, while practical suitability is determined in the testing zone. Only a few ideas make it to actual production. And as different as the individual components might be, they all have one

Vision of a cobot, a robot that will provide tools or parts to an employee.

"THIS IS OUR 'FUTURE LAB' FOR PRODUCTION."

HOLGER FELDHEGE
Chief Operating Officer, Manufacturing, Logistics and Supply Chain at Bühler

thing in common: digitalization. "Digital Transformation in MLS" is the name of the strategic initiative Bühler is using to usher in the digital age in production, logistics, and supply chain for the coming years, and with that, many benefits for customers, suppliers and the group itself. In the technical jargon used by production people, it's called Industry 4.0.

Universal networking and integration

Industry 1.0 brought steam and hydropower as well as mechanization. 2.0 was the beginning of the assembly line and standardization. 3.0 is microchip and automation. Industry 4.0 is universal networking and integration, which goes in two directions, as Holger Feldhege explains: "There is the vertical integration across all hierarchical levels within a company, and there is the horizontal integration across company borders and beyond, which includes supplier networks and customers."

Today, breaks in the system prevent continuous transparency and controllability. Order intake, which is initiated by sales, is not entirely systematically linked with production planning. Production orders are not automatically broken down into work steps. The factories are not systematically networked among each other, and it still takes a lot of manual effort to include suppliers. Often, planning and controlling is done on paper, using Excel tables and SAP applications. "To find out, for instance, how many productive hours are planned for the coming months at the sites, the factory managers have to enter the information into an Excel file. Continuous systematic assistance, not to mention a real-time dashboard, still does not exist today," explains Feldhege.

Not yet. However, with Industry 4.0, and thus with vertical and horizontal networking, entire systems and added value chains come into view. It was always about optimizing individual components and processes at all stages of the industry history: a machine, a manufacturing line, or a plant. Now, it's about the overall entity. Industry 4.0 makes collected real-time data transparent and, as a result, manufacturing manageable at an entirely new level. This has both medium- and long-term effects for increased efficiency.

Managing complexity

The Herculean task hiding behind this simple keyword can be revealed with a look at the complexity of production at Bühler. One component – a roller mill, say – internally triggers an average of 100 manufacturing orders with 300 processes and 1,200 individual work steps. One project consists of an average of about 50 components, 15 of which are made in-house. Bühler processes about 2,500 projects annually, which results in about 45 million work steps that are intertwined and dependent on one another, like a giant cog wheel. "When we succeed

in controlling these machines more consistently and with a better view to upcoming workloads due to market demand, as well as in terms of our order inventory, we will be more efficient, flexible, and reliable," says Feldhege. Customer orders would flow directly into manufacturing planning, while the system would make initial suggestions for execution. Internal production orders can be shifted from one factory to another using 'drag and drop' in order to optimally exploit capacity. Paperless, universal planning and controlling would be faster and there would be fewer mistakes. In addition, the high transparency would allow us to identify and learn from systematic sources of error. "With Industry 4.0, we transform a production operation into a network orchestrator and decouple our growth from our fixed production systems, such as machine systems and buildings," according to Feldhege.

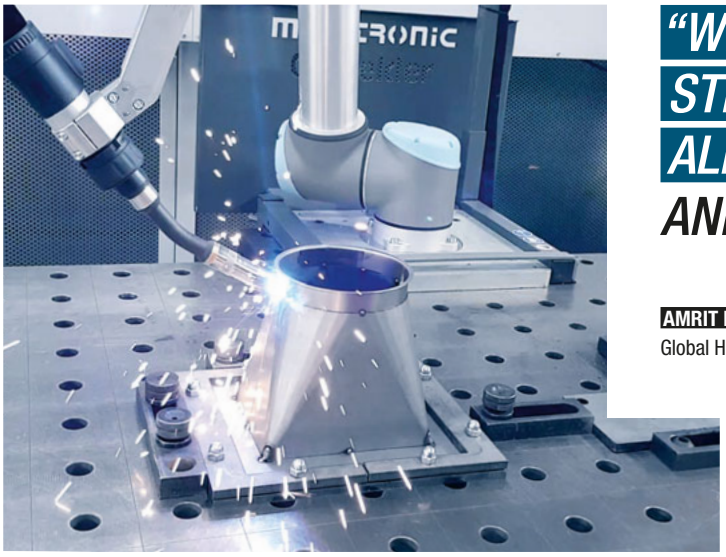
It is obvious that Industry 4.0 is not one-size-fits-all. Which is why the digital transformation is one of the central strategic initiatives at Bühler, and is being driven forward by Amrit Khanna, Global Head Digital Supply Chain Management. "Digital solutions which are valid for the automotive industry do not necessarily meet the challenges at Bühler. We need to have every single step into the digital world aligned with our own needs and include our employees in digitalization as well. That's why we have the Digital Learning Center," says Khanna. SAP has predefined the direction already. The existing SAP finance and customer account system is being expanded to become a digital core of manufacturing with the following applications: "Integrated Business Planning" for integrating sales, procurement and production planning (S&OP), and "Manufacturing Execution" for paperless and universal operation control.

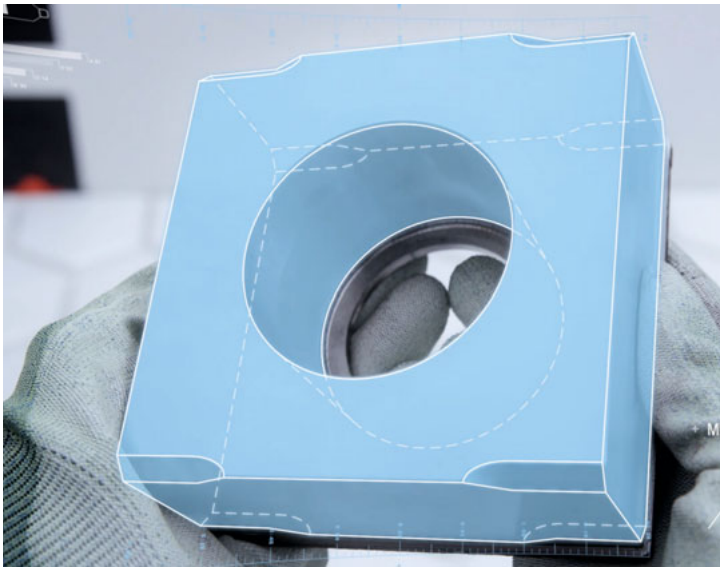
In order to get this mega-project under control, it has been structured into many packages of subgoals. "The "Digital Factory Management" package includes building dashboards that allow navigating from an overview to individual work stations in the factory. In the "Paperless Operation" package, graphic interfaces that can be intuitively used need to be developed, while the "Quality Control" package envisions integration with the existing quality control management system.

"INDUSTRY 4.0 IS A PROCESS THAT HAPPENS OVER MULTIPLE YEARS: ITS AN EVOLUTION, NOT A REVOLUTION."

HOLGER FELDHEGE
COO, Manufacturing, Logistics and Supply Chain at Bühler

Vision of collaboration: employees from engineering and manufacturing are working together on one common data basis.





(From top) A welding robot which is already in use in three Bühler locations; a vision for digital factory management; and the concept for digital quality control.

"WE NEED TO HAVE EVERY SINGLE STEP INTO THE DIGITAL WORLD ALIGNED WITH OUR OWN NEEDS AND INCLUDE OUR EMPLOYEES."

AMRIT KHANNA
Global Head Digital Supply Chain Management at Bühler

Include the employees

An essential aspect of the Digital Transformation is "Change Management" as well as training and educating employees. "Industry 4.0 does not imply that we here at Bühler will need fewer employees in the future," says Feldhege. Instead of envisaging fewer people, he figures that new skills and behaviors will need to be learned.

The Industry 4.0 technologies that Bühler is developing and implementing are assisting employees: artificial intelligence applications that can make planning suggestions to help optimally manage complex manufacturing system; robots that assist in welding or bring components to the assembly work station; mobile devices that replace conventional paperwork in order processing and quality control. "Such digital applications are on the rise. We will educate and train our employees correspondingly and to do this, I am hoping for curiosity and openness," says the Bühler production manager.

Step by step, Industry 4.0 is coming into play with some initial applications at Bühler. For instance, at Bühler Zamberg, in the Czech Republic, and in Uzwil, Switzerland, welding robots are being used which are taught by the employees to autonomously perform repetitive welding tasks. In China, Bühler Wuxi is using a smart testing method to ensure that rolls are installed error-free and to store corresponding data electronically.

In the Swiss town of Appenzell, metal processing has been brought up to the latest state-of-the-art with the goal of lowering throughput times by 20 percent and costs by 10 percent. "Industry 4.0 is a process that happens over multiple years and is more an evolution than a revolution," says Feldhege. "But the efficiency improvements will be significant."

VIDEO

Watch the video to learn more about our vision of how industry 4.0 is entering production at Bühler.

IN BRIEF

BÜHLER RALEIGH OPENS RENOVATED SITE

BÜHLER RALEIGH employees and their families celebrated the opening of the renovated site on September 27 and 28. From the reception to the offices to the production areas, Bühler Raleigh in North Carolina is now an even more open and modern location that promotes cooperation and innovation. These two core topics are also reflected in the two new application centers for drying solutions and Leybold Optics coatings, where customers can test new applications with Bühler experts.

INNOVATION OSCAR GOES TO BÜHLER AGAIN

FOR THE SEVENTH TIME since 1968, Bühler Great Britain has won the prestigious Queen's Award. In September, Bühler received the highest award for British companies that are pioneers in the fields of international trade, sustainable development, or innovation for optical sorting technology. It is capable of detecting the finest color and shadow contrasts in materials and food, and can be used in both food processing and plastics recycling. The camera technology thus guarantees very high food safety and 100 percent recycling rates for plastic food packaging.

LUMOVISION AT MICROSOFT'S HEADQUARTERS

IN THE NEWLY OPENED Microsoft Industry Experience Center in Redmond, Washington, US, Bühler's LumoVision is a showcase example of the use of IoT solutions in industry. The revolutionary sorting technology detects aflatoxin – a highly toxic mold in corn – by means of UV light, and it eliminates up to 90 percent of the contaminated grains. Thanks to its connection to the Bühler Insights online platform, LumoVision enables real-time analysis of the fungal infestation on site, thus reducing yield loss to below 5 percent.

INCREASING YIELD WITH DATA

TEXT: STUART SPEAR

In October, Bühler launched its new Bühler Insights Yield Management System in a bid to drive up production rates in smaller, often family-run milling operations in Asia, India, and Africa. Interest in this system is spreading to larger automated producers in all regions as early adopters report higher profitability from increasing yields.

REGARDLESS OF BUSINESS size every food producer needs to know how much raw material is entering their plant relative to the volume of product produced. This is the basic metric where profit is to be found. And there is no better way of keeping control of such a critical equation than to meticulously weigh, record and analyze every raw ingredient entering a plant and every finished product that leaves, which is why Bühler has recently launched its Bühler Insights-based Yield Management System (YMS). Initially targeted at the milling industry the YMS uses specialized intake scales to weigh every ingredient that enters a production plant and sends the data to Bühler Insights for analysis. Output scales then weigh all the finished products leaving the plant, again sending the data to Bühler Insights. Producers now have the data to be able to tweak a recipe and see what impact it will have on yield. They can assess yield over time, visualize and compare production lines within a facility or see which plants are operating most efficiently in different geographical regions. And it all happens in real time.

Speedy analysis

One of the most significant benefits of YMS is the immediacy with which data is collected and analyzed. It means producers get instant feedback on how changes in production parameters impact yield. Alarms can be set so that when yield falls below set parameters operators are instantly alerted to make adjustments. The presentation of data can also be customized. Customers are able to interpret the data picked up by the scales in an optimal way and then distribute the results to whoever requires it. The chief executive, plant manager, miller and operator receive the same up-to-the-minute information and so are all in a position to immediately contribute to

key production decisions. For large scale food producers operating in highly sophisticated automated environments this may already be underway. But food producers are a diverse community. Whether it is your geographical location, size, product type, scale of output or level of prior investment, there is nothing homogeneous about the food sector.

While Bühler believes that YMS and the added functionality it brings to producers is set to be of interest to a wide range of different food manufacturers, it has chosen to initially concentrate marketing on smaller scale, often family-run milling operations in regions such as Asia, Africa, and India. These are the food producers anticipated to see the greatest production growth in the coming decades as their economies expand.

"The good thing about YMS is that you don't already need to have an automation solution, all you need are the specialized scales such as Bühler's TUBEX Pro and Bühler Insights," explains Gernot Ruppert, Bühler Product Manager Milling Solutions. "It means smaller companies will be able to easily transition from manual records to a system where you can see production rates, last week, last month, and compare what is now being produced using a certain recipe or a certain process. YMS means you can go back in time to see what you produced when and how."

Early on-site installations of Bühler Insights YMS are producing encouraging results, with the new data streams resulting in yield improvements of around 1 percent.

Bühler plans to modify and improve the new YMS by the middle of next year so that larger clients, who may already be operating plants with automation solutions can also be connected to YMS. "We can see there is a need for customers who already have a yield monitoring system as part of their automation solutions to provide greater transparency," explains Ruppert. "For example, we have customers with multiple plants in several locations, some with Bühler solutions, some with non-Bühler automation, and some with no automation. These clients are interested in Bühler Insights YMS to be able to monitor and compare yields from all of these plants."

Only the beginning

The most powerful functionality of YMS relates to the way that it links to Bühler Insights, an online platform that enables customers to collect data and information from their plants and machines. This data is stored on secure servers on the Microsoft Azure Cloud. Bühler Insights offers powerful data analytics and data visualization capabilities with the goal to increase transparency of production processes and make the potential for optimizations visible. Today, 85 percent of Bühler machines can be connected to Bühler Insights and benefit from the enhanced data analytics and data visualization capabilities to increase product yield and quality. Part of that process involves using historical data to calculate the most efficient production parameters. So, the longer the YMS is in operation, the more efficient the data analytics algorithms will become. "Once we have enough yield data and are able to detect anomalies, we will be able to better correlate data, analyze parameters and provide feedback to customers based on the monitoring we are doing," explains Ruppert. The idea is that more efficient algorithms will result in higher yields and hence, greater profit.

But there is another rationale for embedding YMS into Bühler Insights. Bühler has set itself a series of sustainability targets to cut water consumption, energy usage and food waste by 50 percent in its customers' value chains. Bühler Insights is key to achieving this goal as it drives up food production efficiencies. Because of its stand-alone nature and the relative ease with which it can be installed, YMS is able to provide yield production increases to thousands of smaller, manual milling operations that may have previously been unable to benefit from the power of digitalization. By increasing productivity in this harder-to-reach manufacturing community, Bühler is one step closer to achieving its new sustainability goals by 2025.

ADDED VALUE

- Results in yield improvement of around 1% that directly impacts the bottom line.
- Allows you to compare yields across production lines using different manufacturing and automation solutions.
- Enables smaller companies to easily transition from manual solutions to the benefits of digitalization.
- The ability to set alerts when production falls below set parameters to enable operators to make immediate adjustments.

Would you like to know more?

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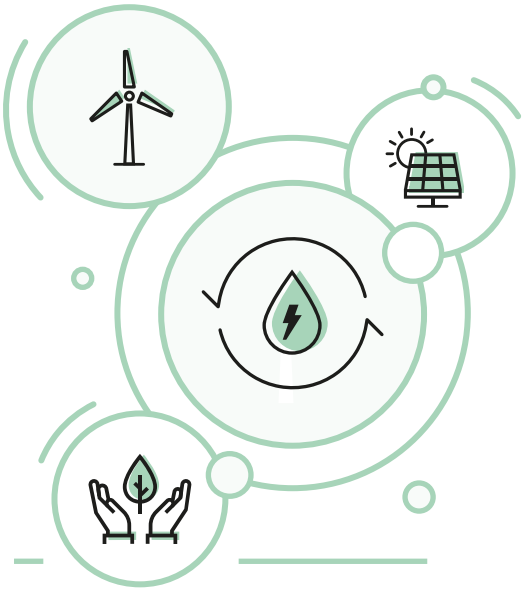
DID YOU KNOW...?



...that if the Internet was a country, it would take sixth place in power consumption?

Google's data centers alone require about as much power as a city of 200,000.

...that video streaming caused over 300 million tons of CO2 equivalent in the year 2018 alone?

This is the same amount the country of Spain emits in an entire year.

...that Norway wants to be the first country to use entirely renewable energies?

Today, 98 percent of power consumption in Norway is already covered by renewable energy, 96 percent of that is produced with hydropower.

...that performing a single Google search uses about as much power as an energy-saving light bulb does in one hour?

But there are green search engines, such as Ecosia, that compensate for the emissions caused by each search request by planting trees.

...that China is the world's largest producer of wind, solar and geothermal power?

In 2018, China generated 634.2 terawatt hours of these renewable energy sources.

...that the energy of the sun reaching the earth in one hour is enough to cover the world's energy needs for a year?

It would take 51.42 billion solar cells to supply the whole world with solar power.

...that two-thirds of global power consumption is still covered by fossil fuels?

Renewable energies come in at 18 percent.

...that the largest solar installation in the world is located in the desert of the United Arab Emirates?

With 3.2 million installed solar panels, the new Noor Abu Dhabi solar plant will supply 90,000 people with clean power.

...that 75% of silver paste used in solar panels is produced on equipment from Bühler?

The world's installed photovoltaics capacity is growing by an average of 38 percent per year.

Sources: „Clicking Clean Report", Greenpeace, 2017; oeko.de; the shift project.org; umweltnetz-schweiz.ch; ecotality; ecosia.org; bp.com; solarify.eu; energiezukunft.eu; srf.ch; bgr.bund.de; energinorge.no

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"WE DEVELOP THE SKILLS OF TOMORROW"

THIERRY DUVANEL, DIRECTOR OF COLLABORATIVE INNOVATION

THIS YEAR, the Ecole Polytechnique Fédérale de Lausanne (EPFL), sister to the ETH Zurich, celebrates its 50th anniversary. At the same time, Bühler is celebrating the 5th year of its EPFL Innovation Satellite, which marks our presence on this highly entrepreneurial campus. Did you know that we have a team of about 12 people on site? It's high time that we introduce you to this top academic institution and our activity there.

The EPFL has a perhaps obvious, yet invaluable benefit: it is a campus where meetings on site are never more than a 10-minute walk away. With close to 20,000 students, professors, researchers, and staff, it offers a unique body of knowledge which we tap into to fuel our innovation strategy. And we are not the only organization to do so: over 50 companies are located on site, increasing the amount of interactions and ideation between corporations.

At the heart of our presence at EPFL is the Swiss Data Science Center (SDSC). Its mission is to accelerate the adoption of data science within academia and industry. This new discipline is at the crossroads of software, data analysis, statistics, and machine learning, and the center is composed of a large multidisciplinary team of data and computer scientists. Bühler plays an important role in this sector, with six scientists based at our Innovation Satellite, working closely with the SDSC. Most of our new digital services were conceived and developed there.

Another key aspect of our presence on the campus is the Integrated Food and Nutrition Center (IFNC). Together with other corporations such as Nestlé, Firmenich, M-Industrie, or ADM, we run research and development projects, either in collaboration or bilaterally with select EPFL laboratories. On many occasions, the IFNC organizes meetings with professors and researchers on site, in order to stay in close touch with the 350-plus research laboratories. At our Innovation Satellite, we also focus on developing the skill sets Bühler will need tomorrow. Our internship program hosts eight to 12 students per year. Engaged by our various business units, they produce their Master theses with us over a period of six months. The fields are diverse: from root-cause analysis to rice milling modelling to automation, all our businesses are involved. Another example of this competencies development is our pilot partnership with the EPFL Extension School, which enables everyone to hone the necessary skills for the digital age. Through this program, our employees learn at their own pace the basics of software programming and data analysis, forming the basic building blocks of digital thinking.

EPFL is known for its outstanding start-up activity. No fewer than 270 companies have spun-off since year 2000, and in 2018 alone, the start-ups on the site have raised CHF 217 million, the biggest volume pulled up in Switzerland. And let's not forget the nearby-based MassChallenge Switzerland program, which draws together over 90 start-ups each year, and also contributes to the hive of activity and innovation that Bühler's Innovation Satellite at EPFL represents.

More than ever, we need a collaborative approach to innovation. At our last Networking Days, we announced our goal to lower the energy, waste, and water in our customers' value chains by 50 percent. This is ambitious. But we believe it is possible by nurturing collaboration between all parties. Which is exactly what you can witness at EPFL, and we are always happy to introduce new partners to this ecosystem – join us!

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