SMART

Unprecedented productivity: how smart machines modernize the food & beverage and packaging industry

Life Is On | Schneider Electric

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Measuring the marketplace pulse

Survey of machine builders and factory end users reveals a need for enhanced, more open connectivity

Schneider Electric surveyed over 400 worldwide machine builders and factory end users in 2015. The questions they answered all centered around what their machines and plants would need to look like in 2020, if their businesses were to sustain growth and boost productivity. Their feedback has shaped (and will continue to shape) Schneider Electric digitized solution investments.

Key requirements identified included:

- **Tools that could accommodate a younger, less skilled, and less experienced workforce**

- **A need for simpler integration through open software connectivity and more open field buses**

- **A need for whole lifecycle support of the products they purchase**

"Digital transformation requires individuals, teams, and often entire companies to identify new values that may change or replace the vast amount of habits, norms, and culture deeply embedded in many established companies." - ARC Advisory Group

Machine builders identify key digitization challenges

"Companies that rely only on their current success may be slow to adopt new measures and adapt to the changing environment."
- ARC Advisory Group

Changing technologies and business models require a realignment of resources, but will enable faster time-to-market

Although trends such as Industry 4.0 are compounding the quantity of data available for driving new levels of factory and machine productivity, machine builders are challenged with how to drive business value from this data.

In addition, new, more lean machine builder business models are emerging from new regions of the globe such as China and Japan. An uptick in acquisitions means that many companies are now shifting from a regional business focus to a global one.

On the technology side, machine builders will soon be tasked with building voice recognition, image recognition, augmented reality, and other AI-driven technologies into their machines. As a result, they will be faced with talent and resource challenges. However, partnerships with key technology suppliers will help to ease these burdens as no one organization can handle the challenges of digitization alone.

New opportunity: service-driven business models

Cloud-based monitoring tools now enable machine builders to sell guaranteed machine performance

Many organizations are digitalizing their operations in order to improve the speed of their engineering, commissioning and maintenance tasks. New cloud-based tools, such as EcoStruxure Machine Advisor, open doors for machine builders to offer new services, like mining machine performance data, to help end users improve productivity. Some are seizing the new opportunities by enhancing their traditional ways of doing business. Others are reinventing their processes as a result of the new possibilities that digitized technologies present.

Schneider Electric has launched **Schneider Electric Exchange,** a marketplace where OEMs and other partners can be linked globally to either access resources for project implementations or to offer resources to support ongoing third-party projects. In this large global pool collaborators, the open Schneider Electric EcoStruxure architecture acts as the framework for facilitating transition to these new "coopetition" business models.

Visit Schneider-Electric Exchange

How standardized machine development leads to high predictability

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In food & beverage, success begins with improved safety

Machine design, software and digitization are critical in enhancing safety while minimizing product loss

Consumers want to be assured that the food they eat contains what it says on the label. Food & beverage manufacturers are right to make food safety a top issue. Failure to comply with regulations results in fines, lost business, and a tarnished reputation.

Machine builders and companies like Schneider Electric have much to offer in the areas of product safety. New technologies surrounding processes that support production information management (PIM), food packaging serialization (assigning and tracking a unique serial number to individual lots or items in the food supply chain), and automated label assurance are being rolled out. These breakthroughs in traceability technologies help to advance the cause for better safety control.

"Insurance claims for a product recalls reached an average of $9.5 million, with the F&B industry being the second most impacted, just behind the car industry."
– Allianz Global Corporate & Specialty

Fast changing production requests now require advanced machine connectivity

Seamless connectivity relies on robust linkages between hardware, edge control, and software/analytics levels

The global organic F&B market alone will reach $3.28 billion USD by 2022, bolstered by a compound annual growth rate of 16.4% between now and 2022." – TechSci Research

Food & Beverage manufacturers are seeking machine connectivity up and down their production lines. Machine builders can no longer rely on building isolated, standalone machines.

Connections locally to SCADA and MES systems, and also to outside of the plant, allow end users to quickly respond to fast-changing production requests and demands for increased SKUs.

The ability to achieve such linkages depends on an open and connectable platform which combines connected products, edge control and software that enables analytics and easy application integration. The Schneider Electric EcoStruxure open platform allows machine connections through various types of field buses and ethernet buses. Libraries are also provided to support 3rd party products and platforms outside of Schneider Electric. When technology enables automation suppliers to smoothly link together, F&B end users benefit through reduced product losses, enhanced predictability, and rapid time-to-market.

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An adaptive machine infrastructure enables flexible production

When technologies drive simplified machine engineering, plants benefit through enhanced agility

To gain competitive advantage, F&B manufacturers need to adapt quickly to changes in consumer tastes. Such rapid changes present production and process challenges. Machine builders can ease the burden by designing smart machines that can leverage the data being gathered to improve or adjust the business on the fly.

Flexible machine designs with simplified wiring and engineering enable a more standardized approach to machine building. Products that are new to the market such as TeSys island, digital load management system and Modicon M262 controllers

are designed to be IIoT-ready. These solutions allow easy configuration and connectivity to the cloud, and far less work and research is required to configure and connect these devices. Smart motor starters, controllers and comprehensive open architectures such as EcoStruxure Machine and Plant enable quicker recipe adoption, thereby enhancing overall plants agility.

Let's discuss how to get started

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Why machine adaptability looms as the critical success factor

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How machine builders can enhance packaging production speeds

Machine performance guarantees allow end users to operate with quantified production certainty

When a packaging machine on the factory floor stops, overall production drops and costs accelerate. Unanticipated downtime is a big end user concern and machine builders are challenged to not only maintain their machines in optimal working order but to also accelerate the pace of package production.

In fact, most end users don't really want machines at all — they want the productivity that those machines promise to deliver. Thanks in part to new digitization tools, leading-edge machine builders are beginning to offer machine productivity guarantees.

Tools like EcoStruxure Machine Advisor now provide machine builders with the confidence to execute precise tracking, monitoring and fixing of plant floor machines while offering end users mutually beneficial pay- per-use options on their machines.

"50% of companies see improved throughput and productivity or reduced downtime / production failure as the main benefits (of IoT)." – IHS Markit

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Sustainable package design: an important step towards abolishing waste

"Plastics are now expected to outweigh fish in the ocean by 2050."
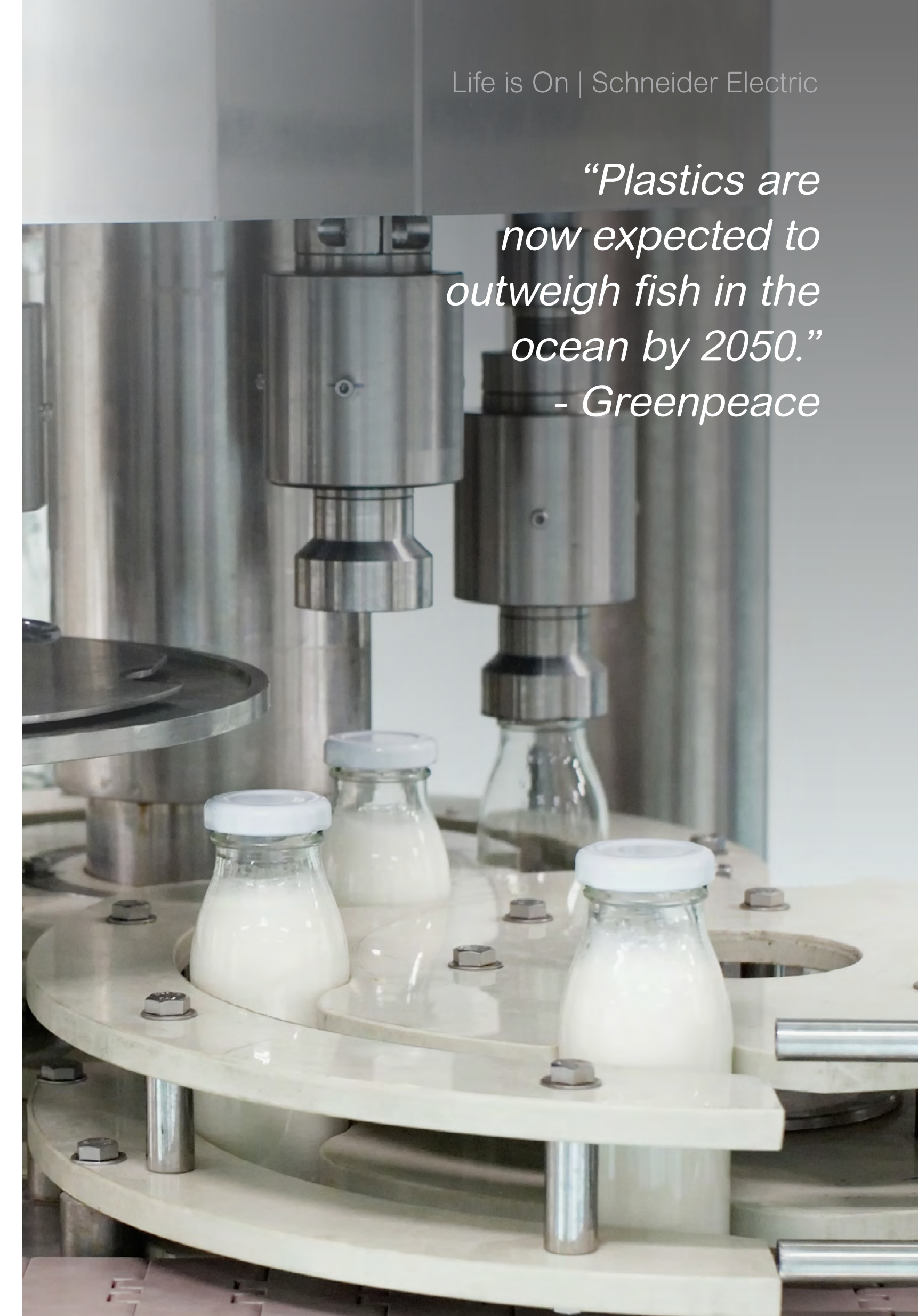*- Greenpeace*

Machine builders, manufacturers and technology providers now join consumers in prioritizing product reuse efficiencies

Eco-friendliness is emerging as a clear packaging industry concern. As more and more plastic clogs landfills and ocean waters, the demand is growing for new eco-packaging solutions. Machine builders are responding by designing smart machines capable of producing reusable product packaging. In turn, manufacturers are positioning themselves to offer "wastefree shopping" whenever customers purchase their packaged goods.

Schneider Electric has for years offered packaging industry machine builders a wide and deep solution portfolio. New generation digitalized engineering tools offer industry-specific function blocks and Tested, Validated, Documented Architectures (TVDAs), making it easier and less costly for machine builders to produce sustainable designs. Specialized tech teams across the globe support OEMs on their journey towards building machines that will produce a new generation of highly sustainable and earth-friendly packaging.

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Adaptable packaging machines a prerequisite for business growth

Machines that adapt to upstream deviations allow manufacturers to address fast changing consumer demands

To accelerate time-to-market, machines on the factory floor must be highly adaptable to changing conditions. In order to achieve expected levels of flexibility, manufacturers are challenging their machine builders to produce machine designs that, from the same basic frame, are capable of easily adopting new features.

Schneider Electric supports machine builders in addressing these challenges by offering modular and connected solutions that remove the complexity of machine adaptability. PacDrive technology, for example, provides easy-to-use templates which modularize the machine.

The Modicon M262 also offers built-in function blocks and libraries that facilitate quick adaptation. Software tools ensure that quick changes to the machine occur with little or no reprogramming. New servo motors, for instance, can be added outside of an original cabinet and connected with a cable, without altering the original programming code.

See how new tools and software make machines more adaptable …

Click here to get started

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Where open machine systems remove productivity constraints

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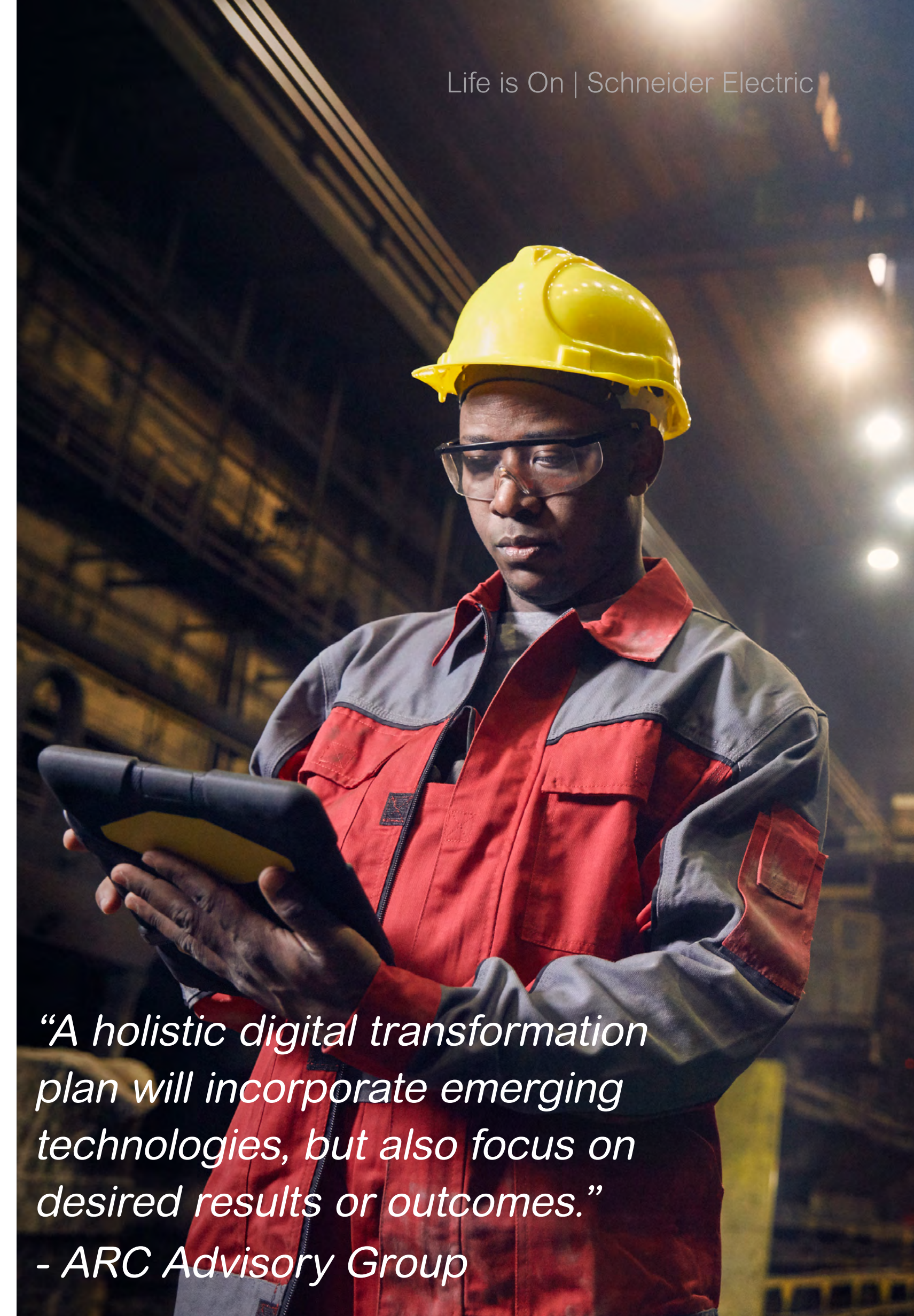Modicon M262 controller

TeSys island

Material handling outsourcing trends drive need for technology linkages

The machine builder parts supplier role is evolving towards participation in a more connected, holistic approach

Machine builders are tasked with providing the machinery and mechanical parts that support core logistics processes. This ensures that supply chains to and from factories work as planned. With products in constant motion, accurate tracking is mandatory throughout the product manufacturing, warehousing, distribution, consumption and disposal life cycle phases.

In order for handoffs and transitions to operate smoothly, material handling technologies add value by minimizing product delivery constraints and delays. In a domain where linkages and advanced connectivity to outsourcers and manufacturers are critical success factors, Schneider Electric supports machine builders and their customers through an open architecture, EcoStruxure Machine (see next slide for detail), that links connected products regardless of manufacturer, to both edge control and core process apps and analytics. In this way information can be centralized as products are tracked along their journey to their destinations, thereby minimizing interruption and delays.

"A holistic digital transformation plan will incorporate emerging technologies, but also focus on desired results or outcomes."
- ARC Advisory Group

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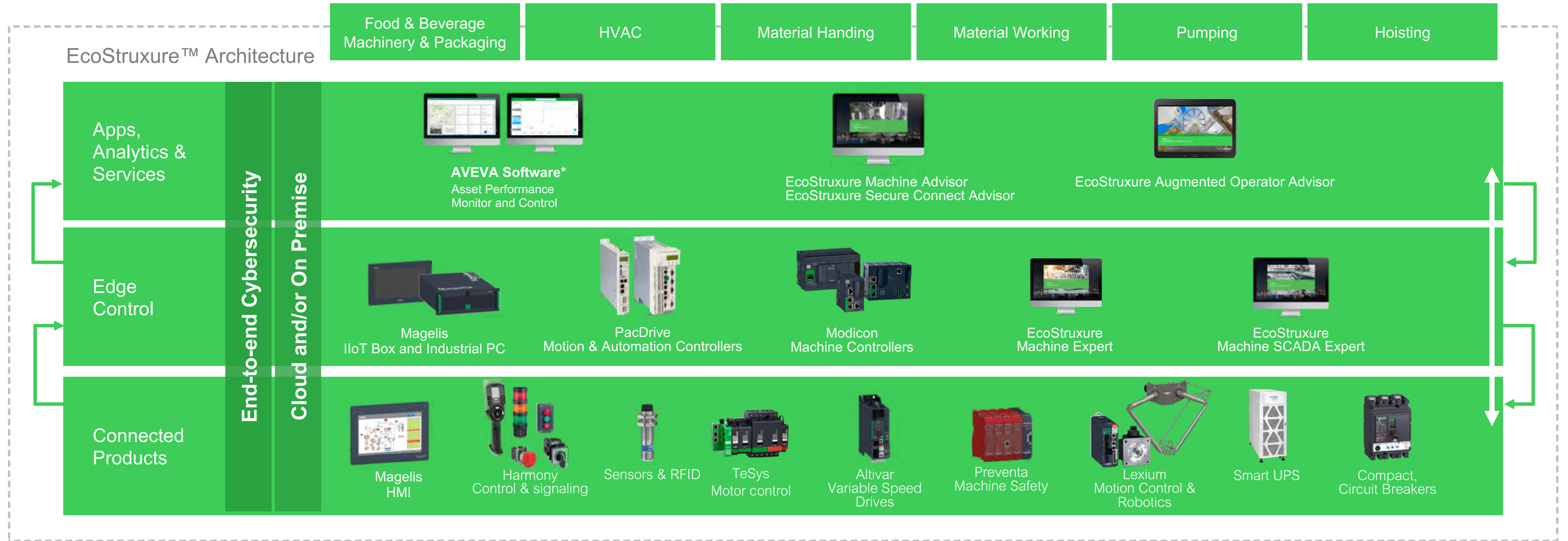
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EcoStruxure™ Machine

Innovation At Every Level

Food & Beverage Machinery & Packaging	HVAC	Material Handing	Material Working	Pumping	Hoisting

EcoStruxure™ Architecture

End-to-end Cybersecurity

Cloud and/or On Premise

Apps, Analytics & Services

AVEVA Software*
Asset Performance Monitor and Control

EcoStruxure Machine Advisor
EcoStruxure Secure Connect Advisor

EcoStruxure Augmented Operator Advisor

Edge Control

Magelis
IIoT Box and Industrial PC

PacDrive
Motion & Automation Controllers

Modicon
Machine Controllers

EcoStruxure
Machine Expert

EcoStruxure
Machine SCADA Expert

Connected Products

Magelis
HMI

Harmony
Control & signaling

Sensors & RFID

TeSys
Motor control

Altivar
Variable Speed Drives

Preventa
Machine Safety

Lexium
Motion Control & Robotics

Smart UPS

Compact,
Circuit Breakers

*The Schneider Electric industrial software business and AVEVA have merged to trade as **AVEVA Group** plc, a UK listed company. The Schneider Electric and Life is On trademarks are owned by Schneider Electric and are being licensed to AVEVA by Schneider Electric.

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Convergence of open systems drives enhanced product availability forecasting

Uptime and connectivity emerge as critical success factors in helping logistics to align with forecasts

Consumers want to receive their ordered goods as quickly as possible. In the Food & Beverage industry, for example, freshness is a critical success factor. Manufacturers need the ability to properly forecast quantities to be shipped so that costly under and oversupply situations can be avoided.

Digitization enables forecasting with the highest degree of accuracy possible. However, digitization only bears fruit when logistics systems are linked and when supporting systems such electrical infrastructures are resilient. Schneider Electric works with machine builders and their end users to help specify digitized logistics systems that both support multi-vendor environments and that reduce unanticipated downtime.

"Digitization around an open architecture such as EcoStruxure allows us to deploy solutions that create more transparency so we can better automate and visualize our data."

– Peter Herweck, EVP, Schneider Electric Industry

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Technologies that fuel material handling efficiency gains

Enhanced flexibility of controllers provide shorter machine development and programming times

As supply chains adapt to consumer expectations of shorter delivery times, more robots and automation will appear around conveyors, storage systems, and delivery systems.

Dual purpose controllers such as the Modicon

M262 controller, which accommodate both logic and motion applications, ease the integration burden of both machine builders and end users. Built-in open protocols allow for collection of data from both Schneider Electric and 3rd party

controllers. In synchronized motion machine applications, the Modicon M262 integrates seamlessly with PacDrive motion controllers to enable linkages to VSDs and servo drives.

Machine-to-machine and system-to-system communications, however, represents an even bigger potential for driving operational optimization. Open frameworks such as Schneider Electric EcoStruxure, leverage smart devices, edge control, software and analytics to orchestrate the linkages and data sharing across power distribution, secure power, building automation, and process automation systems.

See how new tools and software make machines more adaptable …

Discover the right approach for you

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Connecting I/O and the cloud for fast logic and motion performance

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The Modicon M262 controller: a connectivity doorway for enabling smart machines

"IoT is a catalyst in 49% of all business digital transformation projects in the manufacturing segment." - IDC

Remote visibility into machine performance enables machine builders to offer new global machine support services

IIoT is accelerating end user demand for technical support of industrial machines located across the globe. New, IIoT-ready digitized technologies, such as the Modicon M262 controller, address this requirement by providing cybersecure connectivity, data management and visibility to remote machines.

The Modicon M262 is designed and shipped with embedded cloud connectivity. No gateways are required. This opens the door to machine builders for managing both overall equipment efficiency and predictive maintenance, in a

secure manner, without having to send engineers to remote end user sites.

[EcoStruxure Machine Advisor](#), a digital services software platform, can provide insight to the Modicon M262 through libraries and protocols that are preconfigured and ready to use. This open platform allows machine builders to collect data from both Schneider Electric *and* 3rd party controllers, thereby expanding possibilities for generating end user services revenue.

Modicon M262: a key that opens up to a greater digitization ecosystem

Digitization benefits are magnified when technologies are deployed within a holistic context

"Services enabling improved machine learning and AI are radically transforming businesses' usage and understanding of data." – IHS Markit

The Modicon M262 is a new, highly intelligent and flexible machine controller, which plays an important role in the overall IIoT-ready architecture called EcoStruxure Machine. Modicon M262 sits in the middle level of this architecture as an edge controller, which links to both connected products and to critical data analytics apps. Smart devices gather important performance data, utilize that data to optimize machine performance, and then analyze that data to predict trends.

The Modicon M262 is also analytics-friendly, both supplying and accessing data, so that operators can enhance both operational efficiency and drive unprecedented productivity.

This open digitization framework allows machine builders to drive productivity and competitiveness via embedded connectivity to the cloud. Machine builders can now maintain, and even reprogram, machines thousands of miles away without leaving their home country.

Machines can be registered into a digital service platform and OEMs can see machine locations, monitor component usage, identify firmware versions, and gather data surrounding the overall equipment efficiency and health. With powerful analytics, machine builders can predict and optimize the productivity and the availability of their machines.

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A controller 4 x faster in logic and 30% in motion*

When the milliseconds count for application and communication, the Modicon M262 Controller responds with a dual core CPU

By using dedicated cores for application and for communication, the Modicon M262 is the fastest smart controller* in the marketplace. Processing speeds range from 5 to 3 nanoseconds per instruction for application, and address in parallel, both communication and encryption. End users don't have to sacrifice machine performance when they want to connect to the internet, SCADA, or additional PLCs.

The Modicon M262 controller addresses logic application needs, and can also function as an "All-in-One" motion controller, embedding required features such as motion bus, encoder input and touch probes. With 4 to 16 synchronized axes, and a scalable motion-task cycle time as fast as 1ms (independent from communication tasks), the Modicon M262 Controller responds with high performance when addressing the demands of synchronized motion applications.

* Compared to equivalent competition products

Now, one controller for both logic and motion control

The Modicon M262 controller breaks new ground by providing flexible options across multiple environments

The new Modicon M262 is designed to leverage digitization speed and flexibility benefits by providing both logic and motion control functions in one controller. With built-in connectivity to both the cloud, to I/O systems, and to drives, the Modicon M262 acts as a key edge control element, linking apps to smart devices.

Modicon M262 also provides the ability to support multiple networks within one machine. Users often require one network to run their machine, another to connect machines to each other, and a third to connect to a plant management system. Through support of multiple networks, the Modicon M262 helps end users avoid the issue of having one congested network that negatively impacts performance of their machine. This is an example of IT/OT convergence and is one of the ways the Modicon M262 provides significant business value.

More about Modicon M262 controller

"Connected devices alone are not enough to accomplish true digital transformation. You need to develop a seamless ecosystem of humans and machines, performing optimized, end-to-end processes."

-Cyril Perducat, EVP Schneider Electric

The new digital load management system that drives productivity and enables new business models

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**TeSys
Island**

Fully digitized load management system saves on design, wiring and commissioning time

A pioneering approach to machine design and configuration based on an intuitive digital experience

Motor starter selection and configuration has always been a labor-intensive task. To address this challenge, a revolutionary new solution that simplifies motor starter selection, installation, configuration and maintenance.

TeSys island is one modular system, consisting of motor starters (up to 80 amps), and digital or analog I/O modules connected to each other, mounted onto a din rail. With only one connection to the field bus, the device accommodates up to 20 modules. No auxiliary wiring is needed. The intelligence resides within the bus coupler module

which acts as the brains of the complete island.

As the first fully digital and object-oriented load management system, TeSys island is Industry 4.0 compliant, and presents a simpler and more reliable way to manage machine loads, based on data insights.

TeSys island is fully integrated into EcoStruxure for Machine Builders. Thanks to its Industry 4.0 capabilities, it can be easily integrated into 3rd party automation solutions with open communications via all main industrial fieldbuses.

TeSys island's digital footprint eliminates the need for auxiliary wiring and reduces the need for I/O modules, making it 40% faster to integrate and reducing installation costs by 30% compared with traditional solutions.

How TeSys avatars support complete machine builder life cycles as digital objects

TeSys Avatars support selection, configuration, and commissioning processes as well as end user operation and maintenance tasks

Machine builders save time when selecting and configuring their motor starter solutions with digitized tools. TeSys island introduces the concept of TeSys avatars, a revolutionary new way to unlock the potential of Industry 4.0.

TeSys avatars are digital objects with integrated pre-programmed functions that free up machine builders from having to write line by line code. Once an application or function-based avatar is selected, the system ensures the right integration into the system, the connection to the bus coupler, and optional I/O modules. The pre-defined functionality can be adopted to the application needs via intuitive
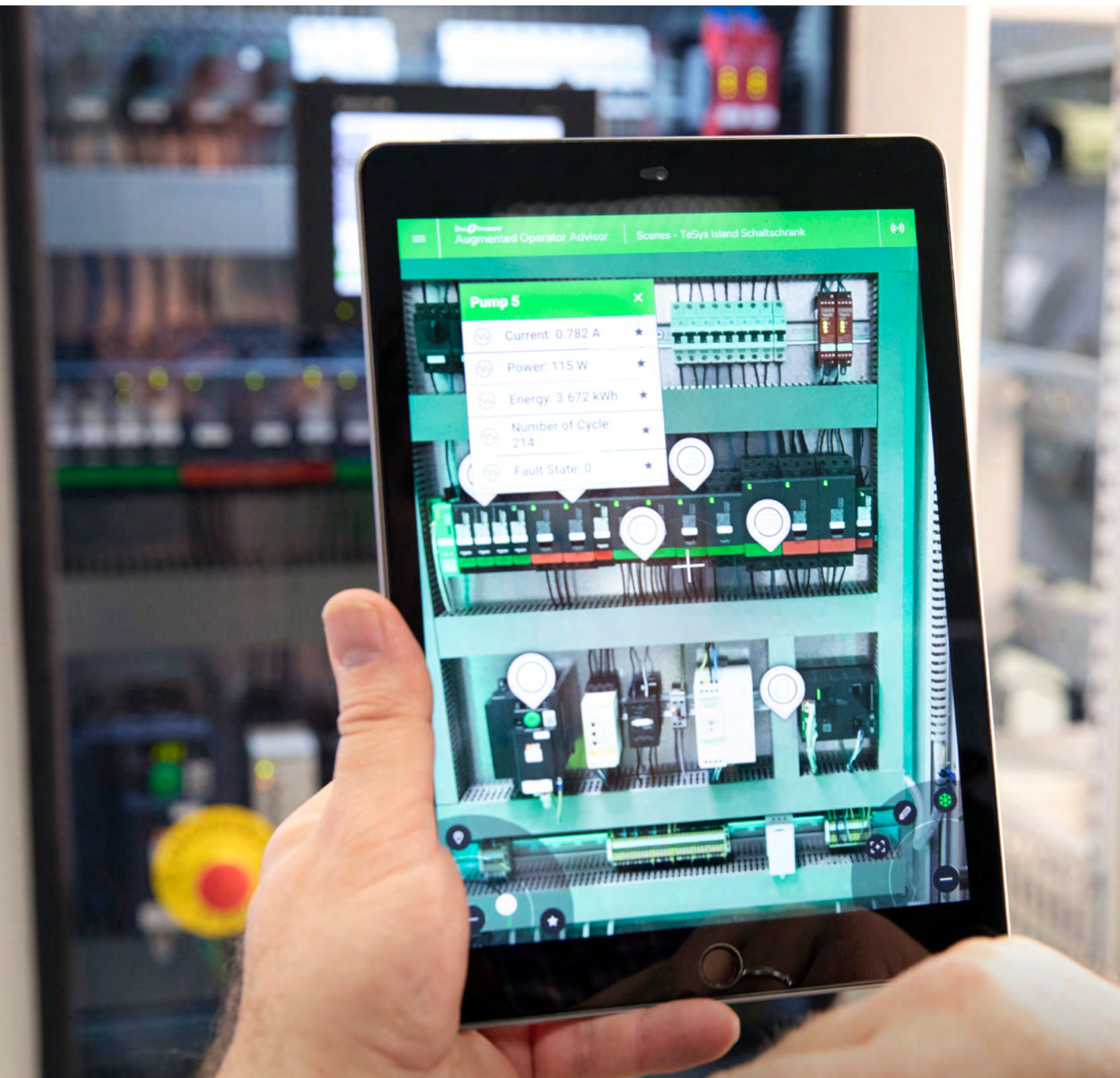

menu settings. The integration into the PLC program within Schneider Modicon as well as 3rd party PLCs is performed with easy to use function blocks.

TeSys avatars also help to greatly reduce the time to market. Machine builders can reuse what has been configured in an earlier stage of the project.

Individual functions integrated into a TeSys avatar can be tested with the commission function – independent from the presence of a PLC or the PLC program. As a result, function testing is greatly simplified.

> EcoStruxure motor control configurator

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Digitized load management enables new predictive maintenance services revenue

Built-in intelligence with the ability to interpret detailed asset data for increased efficiency enabling new business models

TeSys island offers machine builders a means for better maintaining their machines and for providing new services once machines are installed and operational (base data is gathered from each individual load). As a fully digitized load management system, TeSys island offers machine builders the option to both remotely monitor installed devices and to provide their clients with a cloud-based predictive maintenance service. This allows for the monetization of newly accessible load asset data.

The system sends out warnings before tripping occurs. Such warnings allow recognition of an abnormal state in a motor before a critical state is reached. Preliminary actions can be taken to avoid unplanned downtime.

The integration into EcoStruxure Augmented Operator Advisor and EcoStruxure Machine Advisor can bring operation and maintenance to the next level of productivity.

For end users seeking maximum machine productivity, this type of service is critical.

More about TeSys island

"Transformative technologies, in combination rather than in isolation, will help enterprises address tangible operational challenges and create new business models." – IHS Markit

Final thoughts

Machine Builders, industry stakeholders and technology manufacturers are entering a new era. Industry 4.0 places new demands on all parties and, at the same time, is opening doors to higher productivity, new business growth opportunities, and new service business models.

Schneider Electric is well positioned to support machine builders and manufacturers with digital

transformation by offering expertise in open IIoT-ready architecture platforms such as EcoStruxure for Machine Builders, which link connected hardware and software products such as TeSys island, Modicon M262, and EcoStruxure Machine Advisor to both the cloud and to local edge environments. Together these technologies support machine builders, throughout the machine

lifecycle, by reducing time-to-market by up to 30% through simplified design and engineering, by driving 40% faster commissioning integration, and by generating up to 50% in diagnosis and corrective action time savings.

Find out more about our OEM program

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Machine Expert

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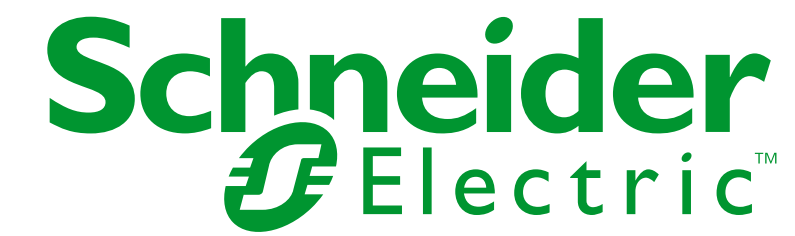Opportunities & challenges

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Full IIoT machine integration with unprecedented efficiency.

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