



# THE PAINT AND COATINGS INDUSTRY IN THE AGE OF

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**W**hile digitalization may, upon initial reflection, be associated with smartphones, voice-driven home-monitoring and search devices, and advanced Internet-based purchasing systems, in reality, it has begun to pervade all aspects of all activities across all industries. The paint and coatings sector is no exception. While only a few companies have created digitalization strategies and established business groups focused on digitalization, most are addressing digitalization to some degree—to enhance the customer experience (both consumer and B2B), improve manufacturing processes, and/or introduce new business models, including new ways of working that previously were not possible. Those companies that are not actively exploring how to digitalize their operations and leverage new digitalization tools and technologies do so at their peril.

## GENERAL BACKGROUND ON DIGITALIZATION IN THE CHEMICALS SECTOR

In a January 2016 white paper published as part of the Digital Transformation Initiative on the digitalization of the chemistry and advanced materials industry, the World Economic Forum in Collaboration with Accenture noted that this sector is not only an “important enabler of the Fourth Industrial

# DIGITALIZATION

Revolution,” allowing other sectors to “turn ideas and innovations into sophisticated products supporting digitalization,” but is also “being transformed through digitalization.” The researchers identified three “digital themes” that will have a significant impact on the chemistry and advanced materials sector, which includes the paint and coatings industry. The first of these themes includes digitalization of the enterprise, with the Industrial Internet of Things (IIoT), automation, analytics, and artificial intelligence increasing efficiency and productivity, and taking “core operational functions, including R&D, manufacturing, and supply chain, to the next level.” The second involves going “beyond the molecule” with “opportunities to launch new digitally enabled offerings, create outcome-oriented business models, and improve customer interactions.” Lastly, researchers cite collaborative, flexible, and interconnected innovation ecosystems that involve intense collaboration and data sharing along the value chain.

Efficiency, productivity, and safety across the paint and coatings supply chain will be improved, with digitalization driving operational optimization and excellence. With increased R&D productivity through advanced data management and analysis that lead to “insight generation,” digitalization will also drive innovation that will enable the development of novel solutions to major societal challenges, some of which will be addressed by innovative paint and coating technologies. Companies will be able to better

understand their customers’ needs and get better products to market more quickly. New job opportunities and ways of working will be introduced that require effective team building and knowledge management skills—leading to increased training needs. Digital customer interfaces and services will not only complement physical paint and coating products but be as important to being competitive in the marketplace.

## DEFINITIONS OF DIGITALIZATION IN THE PAINTS AND COATINGS INDUSTRY

Given the breadth of potential impacts that digitalization can have on an organization and an entire industry, it is not surprising that a number of different definitions of the term exist. Most agree that it is, in fact, impossible to distill digitalization down to a simple concept. The typical definition focuses on topics such as e-commerce and process automation, according to Adri van der Waals, global marketing manager, DSM Coating Resins. For DSM, he adds that digitalization covers a broad range of transformational changes in the firm’s way of working. “One of our leading principles is that any change, big or small, has to add value to our customers,” he asserts.

Both Covestro and AkzoNobel look at digitalization from three perspectives. Covestro’s three angles include optimizing internal processes, enhancing collaboration with customers, and new business models based upon digital technology,

according to Jim Charron, vice president of Application Development for Coatings, Adhesives & Specialties. AkzoNobel, similarly, considers the operational side, the customer experience side, and the potential to create and implement previously unknown business models, according to director of Innovation Menno van der Zalm. Corinne Avelines, director of Digital and E-commerce with AkzoNobel, adds that there remain numerous questions about what is basic information technology and what is truly digital. “That is why we have formalized these three perspectives into KPIs for which we can measure our successes in creating new revenue streams through innovation and the impact our digitalization activities have on both top line and bottom line performance,” she states.

Covestro believes that of the three perspectives, the most potential for the paint and coatings industry lies in developing new business models to better serve customers through the value chain. Evonik also sees digitalization as fostering meaningful interactions with customers and elevating the customer experience in a new way, according to Oliver Kröhl, vice president, Strategic Business Development for the Business Line Coating Additives. “How a B2B company delivers value is as important as what value the company delivers. Customer centricity is key, and digitalization is an important enabler to simplify the way customers can interact with our experts globally and leverage our formulation expertise,” he observes.



## WHY DIGITALIZATION FOR PAINTS AND COATINGS?

Consumers today now turn to digital interfaces first when looking for a product or a service. “The engagement of consumers with digitalization and e-commerce in the paint industry is stronger than ever and will only increase,” asserts Jonathan Sullivan, digital business officer and global director of Digital Experience & Commerce with PPG. “While the majority of consumers just are not ready to buy paint online yet, a great deal of paint project research takes place online during the inspiration phase. Digital commerce and the use of advanced online tools for color and product selection continue to play an increasingly important role in the architectural coatings industry. The process of finding inspiration, conducting research, and finding painting resources is becoming more convenient as digital technologies become more intuitive and advanced. Digitalization also plays a role for professionals in the paint industry, helping to connect them with customers and run their businesses more efficiently,” he explains.

As a raw material supplier, Covestro has fewer interfaces than a direct-to-consumer company. However, B2B companies are still human-to-human, and Charron notes that the company’s

partners have come to expect the same level of interactive, individualized, and insight-driven digital interfaces that they experience in their private lives.

Looking deeper into AkzoNobel’s three perspectives or dimensions, Avelines notes that the business imperatives become fairly obvious. “There is business urgency for any company in any industry to digitalize and somehow reinvent its business models,” she says. AkzoNobel began its digitalization journey by exploring its application to customer-facing activities and how digital technologies can be used to solve customer problems and enhance customer service. “Retailers have been challenged because consumers are buying more online; while paint purchases still mostly take place in the store (only approximately three percent of sales in the home decoration market occur online), that situation is changing rapidly due in part to the growth of e-commerce channels, changes in culture, and the ability to provide better service,” Avelines adds.

It is also important to recognize that the performance coatings business tends to be commoditized, according to van der Zaaij. “It is challenging to continue to differentiate on a product performance level. Digitalization enables the harnessing of both internal and external data—and hence knowledge—in a way that goes beyond the paint product itself and allows manufacturers to manage their assets and support customers more effectively than they have been able to do using only their own knowledge,” he comments. Van der Waals agrees: “Our world is changing rapidly and this provides new opportunities for our industry. For instance, on a topic like ‘big data,’ there is so much more data available today as well as computational capacity to process data that it is easier than ever to use bigger datasets in a smart way to gain insights or take critical decisions.”

Overall, notes Kröhl, digitalization must deliver value for customers and enables them to be more successful in their end markets. “Data-driven understanding of requirements and trends will reduce time-to-market and increase efficiency gains based on improved E2E planning,” he states.

Providing that value can be achieved in different ways, and all aspects of the

paint and coatings industry are and will continue to be impacted by digitalization, from manufacturing to sourcing to marketing to retail operations. “Digitalization opportunities go beyond and across functional areas, and digitalization actually helps companies to think and act more from a customer journey perspective,” van der Waals comments. He notes that DSM uses customer value as a guiding principle to decide what and how to change, which requires all functions to work together. “The question,” adds Avelines, “is not which areas but when, and the answer comes down to the maturity of the technology and the business activities and the strength of the imperative to digitalize, innovate, and change.”

The greatest urgency today is on the retail side and, thus, with marketing and customer service, particularly in the coatings business. The drivers range from reducing costs in terms of resources and the effort needed to service customers to improving the customer experience. “As always,” asserts Kröhl, “it is about the customer experience and less about distinct functions. We strive to connect all business and management processes to better serve our customers; here we consider all customer touchpoints. A better understanding of trends will, of course, also affect the development and manufacturing of new, innovative products and service offerings. The exploitation of information generated in the manufacturing space by means of connected devices and production equipment will push the boundaries in quality management, R&D, and applied technology. At the same time, digital technologies could connect all market players along the value chain. Paint and coating manufacturers as well as their raw material and additive suppliers could optimize business processes and related business models to the needs of their customers,” he explains.

For instance, combining decades of data on how products and technologies can be used in various paint and coatings applications with machine learning and artificial intelligence can help companies more quickly find solutions for their markets and customers, according to Charron. Covestro is also analyzing customer data and processes using in-house developed algorithms



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to enhance their products or manufacturing processes by optimizing existing Covestro products or developing new solutions. "In addition, we are able to interface with customers in ways we have not before with new digital tools to enhance the customer journey. We are creating a suite of digital tools as part of a fully integrated digital communication site. Customers will be able to tap into insights we have gained from our decades' worth of R&D data in an intuitive interface that allows them to more quickly find coatings formulations that meet their needs," Charron adds. The supply chain is also strongly impacted by digitalization. For instance, Covestro is implementing new ways for customers to order materials, access inventory, and streamline transactions.

### AN EXPANDING AND EVOLVING DIGITALIZATION TOOLBOX

There is a broad set of tools and technologies being employed to achieve digitalization within the paint and coatings industry. Automation technologies, data analytics and collaboration systems, virtual and augmented reality capabilities—the list is endless.

Some of the most important tools for Evonik are those that enable data and knowledge management along and across both internal functions and external networks—and thus allow prospectively the use of cognitive solutions to gain new insights, according to Kröhl. Similarly, DSM looks for tools that facilitate smart ways to combine systems that use internal product, customer, market, and manufacturing data. "The key is to get the basics right and make company data available," van der Waals asserts.



He agrees that tools and techniques that allow companies to work with data and find information in huge amounts of data in a structured way are currently having the biggest impact, with increasing options becoming available. "These tools help companies extract value from data," he says.

In addition, different technologies and tools will need to be implemented in different ways depending on the function, according to Charron. For instance, Covestro utilizes artificial intelligence (AI) differently in its R&D development processes than when working with customers to optimize their process, or when finding the best supply chains to serve various markets.

Collaboration is leading to further development of all these digitalization tools, including AI systems. Through collaborations, Covestro is finding that while artificial intelligence promises to efficiently generate deep, new insights into large sets of data, it still requires guidance and knowledge to be effective. "You still need to build in an understanding of chemistry and physics. And the output is only as good as the input—even the best AI needs high-quality data to generate insightful models, and in some cases our most valuable assets are the decades of data that we've developed and stored," Charron remarks. DSM is tapping into small innovative companies that use publicly available information sources in a way that was impossible five years ago. "Marketing automation and product development are getting totally new spins nowadays," he says.

Access to so many different technologies and platforms presents some issues, however. "The real complexity is in the interconnection of those platforms and technologies. First, it is essential to have capabilities that provide the ability to address customer problems or requests—whatever their touchpoints might be, such as websites, digital magazines, color evaluation apps—even email. Then, it is essential to have these tools/technologies interconnected and smart so the customer experiences a seamless journey whenever and wherever they access the information," says Avelines. She adds that it is also important to build flexibility into technological architecture because digitalization tools and technologies are evolving very rapidly and choices made today may be obsolete in three years or perhaps just six months. "Individual modules or applications within a system must be able to change without impacting the overall, interconnected ecosystem," she states.

### NOT SIMPLE, BUT ESSENTIAL

The rapid evolution of digitalization tools and technologies is, in fact, one of the main challenges companies face when developing and implementing a digitalization strategy. "Companies must deal with a rapidly developing field with lots of innovation and start-up companies. Figuring out the right solutions for their needs out of the many solutions available can be an overwhelming task," Charron observes.





Driving digitalization also means that from an internal perspective significant changes must take place on many different levels, and the level of change required is very often underestimated. “Our way of working is different, the technologies we are using are different, and our employees need to collaborate in different ways with very different people. In fact, digitalization involves an entirely different approach and requires that change be driven throughout the entire organization and not just for the team that is responsible for implementing the strategy. IT, finance, human resources, marketing, procurement, manufacturing—all activities are impacted, so the digital strategy must incorporate a strong change agenda as well,” states Avclines.

Indeed, digitalization involves much more than technology—it is a transformation that occurs on all levels, according to van der Zalm. The difficulties presented by the tools and systems are relatively easy to manage, agrees van der Waals. “However, you need to be really determined to create a digital mindset with people and stop doing it the usual way. As a result, the change management aspects are the biggest challenge, yet they bring the biggest benefits if you get that done in the proper way,” he says. Even more than a change process in technology, Henrik

Tahn, chief digital officer for Evonik, further emphasizes that the changes are greater for employees and business cultures. “Being successful in the future and on the digital path forward means to involve, convince, and motivate our customers, colleagues, experts, and stakeholders in the future industry structure, which we do not know yet. To focus on the cultural aspect is more important than focusing on pure mechanics such as processes, algorithms, and cloud solutions. In the end, digitalization is also a matter of trust,” he comments.

Challenging as the move to digitalization might be, it is essential for success in the future. “Digital technologies are creating possibilities that never existed before. That presents opportunities for existing players in the paint and coatings industry to grow and create added value for their customers, but also opens the door for the entry of disruptive competitors that have never participated in the market before,” van der Zalm says. Following the path to digitalization is therefore necessary to remain competitive. Van der Waals is even more emphatic. “Digitalization is not optional. The future is here today. Many people still believe the decision-making process of a customer buying paint starts when calling a sales representative, but, in reality, research

indicates that 70% of the decision-making is done even before a paint supplier is contacted,” he explains. Charron feels the same way: “Digitalization is simply becoming the way things get done in business. Given the great potential of big data and artificial intelligence, paint and coatings companies must innovate digitally to stay relevant.”

As usual, it all comes down to meeting the needs and expectations of the customer. “Digitalization is impacting almost all value chains and business models of almost all industries. Assuming that customers of the paint and coatings industry, such as automotive and furniture manufacturers, in the future will have to meet their specific customer requirements even faster/more efficiently, digitalization is a prerequisite to better connect with the supply network (ecosystem) and thus be a more agile supplier,” concludes Tahn.

## ACTIVITIES ACROSS THE VALUE CHAIN

### Coatings Manufacturers

AkzoNobel’s digitalization strategy is focused on achieving both top line and bottom line growth through implementation of digitalization solutions in areas

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that make sense, according to van der Zaaij. Marketing and sales are furthest along, with e-commerce solutions that are fully digitalized. More data is being captured across the supply chain and value is also beginning to be captured through implementation of digitalization solutions for manufacturing. Examples of specific solutions include the Visualizer app, which makes it possible for purchases of decorative paints and coatings to see how a repainted room will look. The company has also achieved improved performance on the shop floor through implementation of an SAP Overall Equipment Effectiveness solution, which provides digital connectivity through the use of wireless digital handheld devices for tracking and monitoring equipment availability, performance, and quality.

In the marine coatings area, AkzoNobel offers Intertrac Vision, a big data service that helps shipping firms select the best anti-biofouling coating for a given ship based on analysis of billions of data points. Jotun, meanwhile, is using DNV GL's Veracity platform to access and share both external and internal data. Having early access to estimated arrival times at port has made it possible for the company to optimize its stock and delivery planning. Previously, Jotun developed the Hull Performance Solutions (HPS) system in which high-frequency sensor data from on-board vessels is used to track and guarantee the resistance of hull coatings to biofouling.

### Raw Material Suppliers

Research & Development is one area in which BASF is taking advantage of the benefits of digitalization. The company has installed a supercomputer at its Ludwigshafen site that offers 1.75 petaflops of computing power. BASF uses the computer for virtual modeling and computer simulation to determine product structures that will exhibit specific sets of properties and to improve the design of experiments, leading to more

efficient R&D efforts. "While supercomputers have been used by industrial companies for decades, Curiosity is the world's largest supercomputer used for industrial chemical research today," says Stephan Schenk, team lead, High Performance Computing & Databases with BASF Germany. "It will offer our researchers computing power like no other company in our industry." A cloud-based platform also makes it easier for researchers across the global organization to access and share ideas and data, which facilitates the development process.

Covestro is pooling its digitalization efforts under the comprehensive Digital@Covestro program and they are linked to financial targets. The company's digital technologies and operating procedures are anchored, according to Charron, on many levels, including production, supply chain, research and development, and at all points of contact

with customers and in developing new business models.

In response to customer needs, for instance, Covestro is developing new digital tools that help formulators shorten the development process and choose the right materials. One example is the digital interface called ITapticMapping™ that allows formulators to freely vary a set of Covestro products in a soft-touch formulation and visualize the interplay among all the properties of the coating, from its rubbery, velvety, or silky sensory characteristics to its physical properties such as scratch resistance and sunscreen resistance. The end result is an individualized formulation that gives the formulator a jumpstart on their development work. Such a tool has been introduced for flexible slabstock foams in the polyurethane market, and there are plans to develop similar tools for other Covestro technologies such as floor coatings.







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Another goal of the company, according to Charron, is to make the design, operations, and maintenance of global production plants more efficient and transparent. Covestro hopes to achieve this goal within the next three years using data integration coupled with new thought processes and operating procedures. For instance, predictive maintenance is to be performed in Covestro plants using mobile devices that deliver real-time data. The company is also working with customers to reduce their production costs through analysis of customer data using algorithms designed for optimization of production conditions.

In early 2018, Covestro will launch a new online platform for efficient purchasing that will enable customers to purchase Covestro materials online at current market prices. There are also plans to market certified basic products and services from co-suppliers to the company's customers' markets via

the new platform. "This solution goes hand-in-hand with our plans for fully integrated digital communication with customers. These new tools will provide customers with effective after-sales support, from the first product idea to ongoing services, above and beyond the digital channels," Charron says.

DSM's strategy is to shape a sustainable coatings future together with its customers and others in the value chain. "Digitalization is crucial, not as a goal in itself, but as a means to improve and create more customer value," states van der Waals.

The business line Coatings Additives of Evonik Resource Efficiency strives to simplify the way it interacts with customers and end markets, according to Hahn. "In essence, it is all about elevating the customer experience by asking what our customers really want. Therefore, to identify and understand the customer journey is currently the key topic. This approach has already changed

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the way we work from a product and technology focus to customer centrality along the way from invention to innovation and delivery," he says. Specific aspects include data management and science along with new types of customer collaboration and use of the latest state-of-the-art R&D equipment such as high throughput equipment (HTE) for formulation testing. In R&D, in particular, the company has identified the first touchpoints in the use of AI and cognitive learning. Digital technologies at Evonik also allow efficiency gains in the entire supply chain network and with regards to administrative processes.

In July 2017, the company announced that it was setting aside Euro 100 million for digitalization and also is entering into strategic partnerships with IBM and the University of Duisburg-Essen (UDE) that will enable Evonik to leverage IBM's cognitive and cloud-based technologies such as blockchain, Internet of Things, and Industry 4.0, as well as Quantum computing. The first phase of the program will involve a pilot project to co-develop a Cognitive Evonik-specific Chemical and Life Science Knowledge Corpus based on data analyzed by IBM Watson Explorer and Watson Knowledge Studio. The partnership with UDE will focus on interactive knowledge transfer and individually tailored training concepts in industrial practice, and look into the benefits of data exchange and digital business partnerships. Separately, Evonik Digital GmbH was founded by the company to develop and advance digitalization ideas with a focus on new products and services. ❖