Sources of Innovation in the Paint and Coatings Industry

By Cynthia Challenger, CoatingsTech Contributing Writer

Innovation is fundamental to the paint and coatings industry. The breadth and depth of technologies available on the market today reduces the key role innovation plays. It also reduces the value that owners need to drive innovation are driven.

Sources of Innovation, according to Einar Hansen of corporate innovation with Accenture, are both internal and external.

"It is important for all functions within the organization to think about (or design) ways to find insights to the market that could ultimately lead to breakthrough technology developments," he says.

Mark Coward, technical leader for paints and coatings in Clariant's Industrial and Consumer Specialties Business Unit, quotes science fiction author Arthur C. Clarke: "The only limit to the usefulness of the idea is the limit of the brain." Coward adds that the only way to discover the limits of the brain is by going beyond the limits of the brain.

"The key role innovation plays is to provide a good idea on the market needs and the potential impact of legislation, which it turns into a useable short- and long-term strategy, according to Ciaran Murphy, senior technical lead with Bunzl." Coating Company. "In recent years, we have focused on building a robust relationship with our customers, understanding the evolution of changing environmental and chemical regulations, and collaboration with our supplier chain to enable the critical insight and technology needed to stay competitive and profitable," Murphy explains.

"In addition to the technical results, customer input is critical. Statistical analysis and insights obtained at conferences and trade shows also play a role," Murphy adds. "These insights make our product development and production development even more effective. When we hear insights from our customers, we can make informed decisions."

The Sherwin-Williams Coatings Company also works closely with its customers in identifying their issues and turning these insights into practical solutions. "We listen to our customers," says Marketing Manager Matt Ryan. "The bigger picture of how to innovate comes from our customers," Ryan adds. "They talk about their challenges and we help them address those challenges."

"We use a combination of data and insights from our customers to address their needs," Ryan explains. "We provide insights and solutions that are specific to their needs."

The specific market sources of innovation may lie dramatically on the other side of the world and the nature of the products involved, says Eric Tintari, global marketing director for Sherwin-Williams. "Innovation is a product, a process, or a service," he says. "It is important to not only think about the end result but also the process and how it can be improved."
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Innovation is fundamental to the paint and coatings industry. The speed and depth of technological developments on the market today reduce the key role innovation plays. It also reduces the viability of sources from which the new ideas needed to drive innovation are drawn.

Sources of innovation, according to Lillian Turner, head of corporate innovation at Abbott, are constant and thought to be:

- Ideas from within the organization. They offer a way to find innovative solutions that can potentially break through technology developments, as says.
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Conventional sources of innovation include academic research, intellectual property development, and market analysis. However, innovation is becoming increasingly important and researchers are increasingly exploring the vast number of potential applications and possibilities.

The specific market sources of innovation may include dramatic changes in the market, such as regulations. For example, a report by the World Economic Forum says that in the next five years, regulations will be the most important source of innovation. This is because regulations are intended to protect the industry and consumers. However, regulations can also be a barrier to innovation. They may limit the use of new materials and technologies, which can slow down the development of new products. Therefore, companies must carefully consider the impact of regulations on their innovation strategy.

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“Water-based coatings have almost completely supplanted solvent-based formulations, leading to a decrease in their environmental impact without sacrificing product performance,” says BVK’s Burge. He states that regulations related to the elimination of perfluorocarbon containing materials or CBST (carboxylation, methylation, styrene, and titanium) specialties are, meanwhile, likely to lead to significant innovations in the paints and inks sector.

Regulatory shifts, label requirements, and supply constraints have created the need for more innovation in raw materials as formulators seek new solutions, says Julie Vaught Bierge, global business development director, industrial specialties, for Emerald Kalama Chemical. “At the same time, consumers are unwilling to compromise on performance and economy,” Bierge adds. “Manufacturers are challenged to fulfill all of these needs at once, and much of the recent innovation in the industry is looking to bridge these gaps. The regulatory environment is also becoming more complex with more globally linked supply chains as the industry considers,” according to Dumin.

“Technology ‘push’ to the market have been more common and frequent, because a constraint in one of these areas could become a new demand at another location at scale. In addition, with end-users having more concentrated power in most markets, the need for dedicated market research and customized customer or market solutions have resulted,” he says. The “push” to “market pull” approaches can also in part be attributed to the fact that today’s consumers and global marketers are agnostic about the products that enable those outcomes, Bhattacharya explains. In addition, the sources of information that drive product development have become more global in nature and speedier, partly because of the faster sourcing of raw materials around the world to create products that can be sold in the US and China. The globalization of coatings has driven the world of research and development to create more universal coatings that can be produced in the region where they are needed. Furthermore, the expectation of customers for new and integrated solutions—rather than only products—stimulates the industry to think beyond products to services, new delivery modes, new functionality, and/or inspiration, van Dongen says.

The R&D development that has pro- foundly impacted the R&D approach to today’s paint industry is the concept of 3D printing, says Joseph Hong, president and chief technology officer, 3D Systems. “Search engines have also evolved to become powerful for finding new materials that aren’t being commonly used in paints and coatings, and the COVID-19 pandemic has accelerated these trends,” he says.

Watson sees artificial intelligence as an important new tool for predicting future demands. “With so many queries and data solutions all layered in digital infrastructure, algorithms can base potential formulations on statistics rather than human inference,” he explains.

Digitalization and analytics in various aspects of business are becoming increasingly important for providing insights on where companies can go with new or existing solutions into new markets. Lanier agrees. “With this information we now have a more customized and detailed level of insight into how and where our products are being used that previously wasn’t possible,” he says. In fact, if interpreted properly, the available data is extremely crucial to understand customer needs, while also bringing digital platforms to a new level important for understanding of behavior of people’s behaviors and thinking, according to van Dongen. “Social media plays a role in driving new trends and it’s importance is increasing. When it comes to digital platforms, it’s a relatively new way to understand what potential customers are thinking,” he says. “As platforms are able to be transferred to online panels, which have several advantages and are also discussed. This is especially interesting source of information to understand what customers expect in the future and in the customer journey.”

Access to social media also provides the opportunity for companies to improve their online presence, manufacturers data collection, and selective intelligence, while online market research creates the opportunity to reach consumers that would not necessarily be available in other ways. With the increased availability and accessibility of data that is now available, companies are able to target customers in all new ways. Customers are getting more of their buying information from what they read and hear about. The relevance and credibility of new ideas and products are increasing. As digital content and communications have rapidly evolved in recent years, so have consumers’ drives for increased access to information. As digital content and communications have rapidly evolved in recent years, so have consumers’ drives for increased access to information. As digital content and communications have rapidly evolved in recent years, so have consumers’ drives for increased access to information.

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"Water-based coatings have almost completely supplanted solvent-based formulations, leading to a decrease in environmental impact and a lower requirement for labor. As a result, the U.S. leads the world in environmental sustainability, according to the National Paint and Coatings Association (NPCA).

In addition, the industry is also looking at new ways to reduce emissions and improve the environmental footprint of their products. One example is the use of water-based coatings, which emit fewer volatile organic compounds (VOCs) than their solvent-based counterparts. This reduces the amount of air pollution and greenhouse gas emissions associated with the production and use of coatings.

Another source of innovation is the development of new technologies that allow for more efficient and sustainable production methods. For instance, the use of solar power in manufacturing processes can significantly reduce energy consumption and carbon emissions. Additionally, advances in nanotechnology have enabled the creation of coatings with superior performance properties, such as improved durability and resistance to wear and tear.

Finally, the industry is also focused on developing coatings that can help solve some of the world's most pressing problems, such as climate change and pollution. For example, new coatings are being developed that can absorb carbon dioxide, helping to mitigate the effects of climate change. Additionally, coatings that can break down pollutants and reduce the environmental impact of industrial processes are also being developed.
focus on research and innovation, leading to many industry firsts," she says. At PPG, innovation is seen as a team sport. The company leverages its more than 4,500 technical experts at more than 100 R&D facilities in more than 40 countries. “The diversity of expertise, experience and ideas truly drives the innovation engine at PPG,” Feng says. "We couldn’t innovate to the scale that we do without each and every one of our technical experts who work alongside our customers every day.”

A recent study of the innovation process at Shepherd Color Company highlighted the importance of having researchers with different styles. Certain technologies and projects benefit from certain research styles. For example, in some cases, a focus on details is essential, while in others, consideration of a wide range of possibilities and other potential avenues for exploration is needed. Raw materials aren’t often interchangeable, why should researchers be?" Ryan asks.

AkzoNobel, with its Paint the Future (PTF) initiative launched in 2019, has reached out to external partners to stimulate and accelerate innovation through collaboration. Paint the Future, according to Klaus Kruthof, AkzoNobel’s chief technology officer, offers a low-barrier entry into the company for “solution suppliers” with technologies or solutions that otherwise would have remained unknown to the company and the industry. The selected projects are brought to market quickly, providing a win-win for both partners. The first initiatives targeted “start-up scale-ups” and now the program has been extended to raw material suppliers and university and student researchers. “This platform not only offers valuable connections to external parties but also allows us to tap into the brainpower of our employees, enabling us to deliver on our innovative strategy and bring our customers solutions beyond expectation and imagination," Kruthof says. Arakawa’s R&D incubator, meanwhile, focuses on innovation to address six key macro trends or pillars: biosourced materials, water management, light weighting, innovating for sustainable construction, electronic materials, and new energies. “By focusing on these pillars, we recognize the importance of sustainable solutions and their interconnectedness with the future of our businesses,” Duma says. Wu adds that innovation requires knowledge, ingenuity, and focus, which the R&D incubator and cross-business unit collaboration provide. “With this extensive corporate network of subject matter experts supporting purposeful and systematic innovations in these six strategic sectors, technology development and new business growth are significantly accelerated,” she asserts. Emerald’s innovation process, referred to as COMPASS, allows the company to be strategic in its approach and identify the most valuable areas for research, according to Biegel. The company has cross-functional business development teams dedicated to continuous innovation for market-focused solutions. “These teams identify trends, unique opportunities, build close industry relationships, and work with R&D to develop new materials and demonstrate value in-use,” she explains. As a result, Biegel says, Emerald has expanded into new applications in urethane and polysulfide systems and presented some of its current work in coatings additives at ACS Virtual. Meanwhile at鞍。ic, specific work streams have been created to assess societal shifts in specific coating applications and to determine where these shifts could create opportunities to invent new solutions, for example, related to mobility and sustainability megatrends, according to Lazzer. “We are spending more time thinking in a technology-agnostic manner about global megatrends and how they will impact markets that we serve today and the new markets that will emerge as a result," he explains. Such an approach allows our experts to remain agile and continuously search for solutions and new ways of working. We firmly believe that both avenues are necessary pathways to a strong innovation pipeline," Kruthof says that informal sources and opportunities that once again circle back to the expertise and creativity of the people doing the research continue to be very important for innovation. “It has been true in history and it is still true today: an unexpected reaction, a failed experiment or otherwise a sharp observation by a technician can create a spark leading to something new in the world. This is the fun part of science, and paints and coatings are certainly not excluded. Such potential breakthroughs help us continue to surprise our customers with ground-breaking innovations.”

Drivers, all of which encompass sustainability: productivity (customer and internal processes), asset protection (increased durability), surface enhancement (color, effect, texture, activation), and environmental protection (elimination of VOCs, materials of concern, etc.). PPG monitors and develops innovations around five megatrends: safety and security, environment, asset protection, energy and cost, and comfort and leisure. As part of this approach, the company leverages best practices in new product development from each of its businesses and applies these learnings to other business segments, according to Feng. "Because PPG manufactures coatings across a wide range of diverse industries, we're able to use an approach we call 'search and reappraise' to quickly identify existing technologies across our footprint and use them to solve unmet needs in different applications," Feng says. The company also has an on-site presence at customer facilities, and he believes these intimate relationships allow the gathering of real-time feedback so PPG can quickly adjust existing technologies or develop new technologies to meet evolving needs.

A combination of structured and unstructured approaches is important, says Feng. PPG uses more structured, proven approaches to R&D, but also encourages its teams to “fail fast.” In other words, try, fail, learn from the failure, move on and try something different,” she explains. “This approach allows our experts to remain agile and continuously search for solutions and new ways of working. We firmly believe that both avenues are necessary pathways to a strong innovation pipeline.”

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