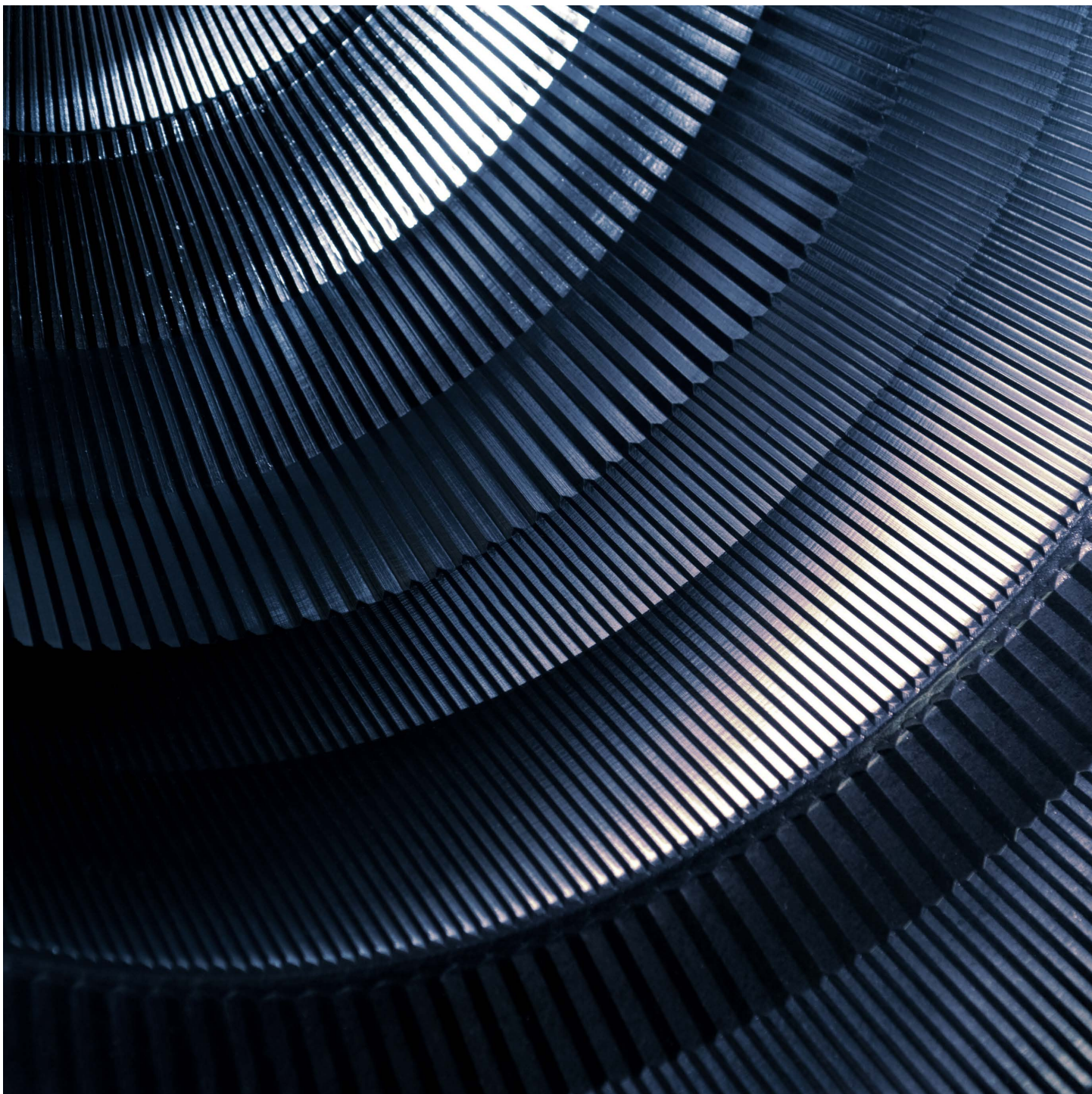




Thinking Outside the Machine

Global Machinery & Equipment Report 2022

BAIN & COMPANY 

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Contents

Foreword & Critical Trends	3
No-Regrets Moves in Machinery: How to Evolve amid Vast Disruption	4
The Hardware Paradox: Machinery Must Expand beyond Machines	7
Strategic Advantages	17
How to Jump-Start a Digital Solutions Future in Machinery	18
Machinery as a Service: A Radical Shift Is Underway	25
Selling Smarter: The Machinery Company's Guide to Commercial Excellence	32
The Great Retooling for Sustainability Is a Huge Opportunity in Machinery	39
Operations Priority No. 1 in Machinery: Sustainable and Resilient Supply Chains	45
Machinery M&A: Reshaping Portfolios and Hunting Growth	52
After Acquiring a Machinery Company, Rethink Your Playbook for Strong Returns	58



Foreword & Critical Trends

No-Regrets Moves in Machinery: How to Evolve amid Vast Disruption	4
The Hardware Paradox: Machinery Must Expand beyond Machines	7



Foreword & Critical Trends

No-Regrets Moves in Machinery: How to Evolve amid Vast Disruption

Machinery and equipment companies are narrowing focus and increasing specialization to defend against dynamic forces.

By Michael Staebe and Thomas Lustgarten



Dear Friends,

We're proud to introduce Bain & Company's first *Global Machinery & Equipment Report*.

The industrial machinery and equipment industry has reached a critical juncture. While the industry has never stood still, it's undergoing the most fundamental evolution seen in years, and these changes will only accelerate over the next decade. Machinery and equipment executives are investing heavily in major transformation initiatives as they face a whirlwind of forces: digitalization and its implications for talent and workforce management; disruptions and reconfigurations of global supply chains; and the push for more sustainable operations and organizations that are more diverse, equitable, inclusive, and socially and environmentally conscious. The exact manifestation, timing, and impact of these trends will likely differ across the machinery industry's various subsectors, creating a lot of uncertainty for management teams. And that uncertainty has only increased with the war in Ukraine inducing a humanitarian crisis that is rattling Europe and the world.

Although the war's impact on the machinery and equipment industry is not yet fully understood, it will likely affect every company in some way, from supply chain disruptions to rising material prices.

We're launching this report to highlight what industrial machinery and equipment players across the world are doing today in response to these dynamic forces, and to unpack the no-regrets moves they can take in the next two to three years to address them. The report's objective is to translate what these big trends mean on a practical level for machinery companies and their leadership teams, with a focus on what we're seeing in the market and how best-in-class companies are approaching individual elements of a much broader transformational agenda.

The traditional industrial conglomerate model is giving way to more focused and specialized businesses.

Undoubtedly, the machinery and equipment company of the future will look much different. The report explores some of the most significant changes underway:

- The traditional industrial conglomerate model is giving way to more focused and specialized businesses. All machinery and equipment companies are reevaluating their business portfolios, pruning in some areas while adding new capabilities and offerings in higher-growth segments, often through M&A. Machinery and equipment has also become one of the most attractive industrial sectors for private equity funds in recent years, delivering significant value.
- In reshaping their portfolios, many machinery companies are revamping their approach to products and services. They will increasingly be anchored in comprehensive solutions (as opposed to single products), with integrated hardware, software, and service offerings. This trend touches each piece of the business and is fundamental to where the industry is heading, so you'll see across the report how this will play out in different ways, including the technology shift and the movement toward advanced service models.
- As their products and services evolve, more machinery and equipment companies will wield sustainability as a commercial differentiator. They have an opportunity to not only improve the sustainability of their own organizations and supply chains, but also to play a critical role in helping customers achieve their sustainability goals.
- More companies will pursue "verticalization," with offerings tailored to their most precious customer segments and solutions frequently codeveloped with customers.
- Consequently, machinery companies are modernizing their go-to-market strategies, making them more systematic and guided by data.

Global Machinery & Equipment Report 2022

In order to pull all of this off, machinery and equipment companies are evolving their organizational models. Many of the leading companies are decentralizing. They're making each business unit more accountable for developing strategy, driving innovation and high performance, and achieving successful outcomes, while headquarters plays more of a lean, supporting role. Many leadership teams are continuously experimenting with more modern, flexible operating models that make their companies more nimble.

We're seeing that many companies have already embarked on this transformation journey and are making progress. We look forward to discussing the report with you, and we're interested in hearing your feedback and observations on the industry's opportunities and challenges that lie ahead.

**Michael Staebe**

Leader of Bain's Global Machinery
& Equipment practice

**Thomas Lustgarten**

Leader of Bain's Global Advanced
Manufacturing & Services practice



Foreword & Critical Trends

The Hardware Paradox: Machinery Must Expand beyond Machines

The accelerating threat of hardware commoditization is pushing machinery companies to invest in software and automation, sector-specific solutions, and new business models.

By Oliver Straehle, Adrien Bron, and Dave Crabbe

At a Glance

- ▶ Growing competition and slowing device-centric innovation have made it more challenging for machinery and equipment companies to succeed based on machine performance alone.
- ▶ Companies that are further ahead in the transition from equipment businesses to integrated solutions businesses have delivered higher total shareholder returns over the past three years.
- ▶ The next decade's winners will experiment aggressively in the ecosystem outside of their machinery.

Leadership teams at industrial machinery and equipment manufacturers are increasingly aware that winning over the next decade will depend largely on how well their companies adapt to one thing: the potential commoditization of their machines and equipment. It's the most significant business threat keeping these executives awake at night, but it could also be one of their biggest growth opportunities.

Despite huge research and development investments in hardware and the technology embedded in it, the traditional emphasis on “smarter, faster, cheaper” industrial machines no longer guarantees

success. Growing competition and slowing device-centric innovation have made it more challenging to maintain profitable growth and to differentiate the business based on machine performance alone. Now, their competitive advantage increasingly resides outside the machine, in three key areas:

- software and automation capabilities that allow a machine to interoperate with other equipment;
- the business solutions developed around the machine, based on the machinery provider's application and process expertise, often tailored to customers' needs; and
- the way the company monetizes it all.

As a result, the hardware's share of the company's value creation is shrinking. In the industrial automation sector, where this shift is well underway, we expect hardware to decrease from approximately 31% of the company's profit today, on average, to 23% by the end of the decade. The rest of the profit will come from software, services, and solution offerings that bundle equipment with software and services. The majority of equipment will be sold as part of bundled solutions. The rest of the machinery industry is likely to follow the same pattern.

Companies that have already begun adapting their businesses have benefited. Among the top machinery companies worldwide, those with a more mature portfolio of solutions combining hardware, software, and services have significantly outperformed their competitors. The average annualized total shareholder return (TSR) among the leaders from 2019 through 2021 was 32%, compared with 4% among the laggards, according to Bain & Company analysis (see *Figure 1*). (See the end of the chapter for details about the methodology.)

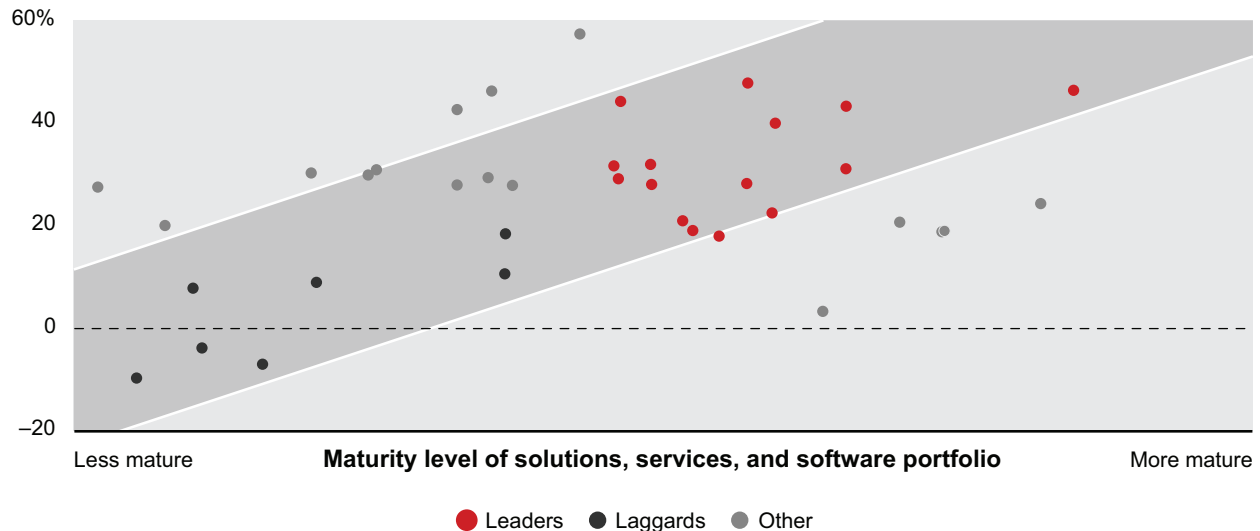
Among the top machinery companies worldwide, those with a more mature portfolio of solutions combining hardware, software, and services have significantly outperformed their competitors.

These trends are accelerating. Machinery companies are under increasing pressure from their customers, investors, and other stakeholders to make strides in the sustainability, safety, and traceability of their supply chain operations, among other shifting dynamics. Investing in digital tools and solutions-focused business models can help across all these areas.

Nevertheless, moving from an equipment business to a solutions business can be tricky. It carries financial risk, brings execution challenges, and requires new capabilities. But many machinery executives recognize it also has huge upside, with the potential to tap into a faster-growing profit pool, capture higher margins, and increase sales.

Figure 1: Machinery companies with more mature solutions businesses have delivered higher returns to shareholders

Total shareholder return (Jan 2019–Dec 2021, annualized value)



Notes: Includes top 38 global machinery companies based on last 12 months' revenue and for which total shareholder return data was available; total shareholder return from Jan. 1, 2019, to Dec. 31, 2021; maturity level based on Bain assessment of the breadth and quality of the company's portfolio of solutions, services, and software offerings, and its relative share of IT and analytics employees
Sources: Capital IQ; Aura; LinkedIn; Bain analysis

The emerging winners of this transformation are already thinking beyond their machines. They're developing a deeper understanding of how their products fit into customers' processes, and they're finding new and creative ways to deliver value as part of a larger ecosystem. To take full advantage of this opportunity, these machinery leaders are evolving their businesses on three fronts.

1. Software and automation

Industrial machines are growing more sophisticated, shifting their value center further up the technology stack.

Take industrial robots. Three decades ago, their value came from their mechanical elements and controls. The addition of sensors and more advanced software made features such as pattern recognition and trajectory corrections possible, increasing robots' "intelligence." A little over a decade ago, the industry achieved a step change in collaboration capabilities, introducing robots that could more safely work alongside humans on the factory floor and enable workers to more easily teach robots new skills without having to write software code. More recently, industrial robots have become more mobile. The acquisitions of ASTI's Mobile Robotics Group by ABB in 2021 and Mobile Industrial Robots (MiR) by Teradyne in 2018 are emblematic of this trend.

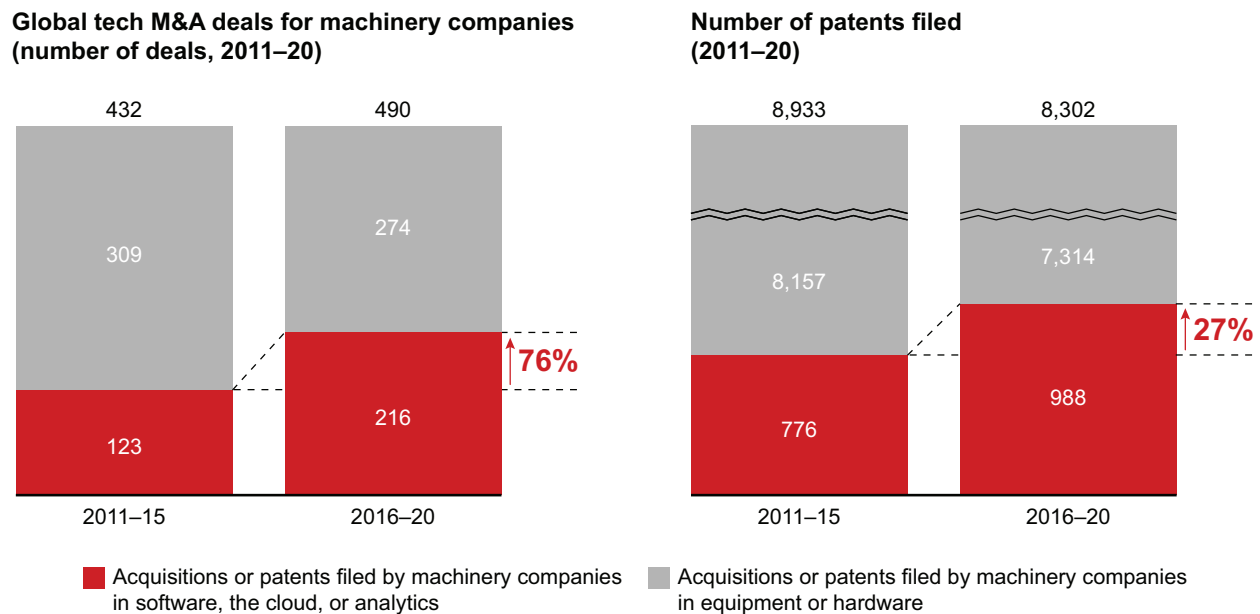
Now, leading robotics companies are spending as much time focused on the software and systems that live outside of the robots as they are on the tech inside. For example, they're investing in software to optimize the movements of an entire fleet of autonomous mobile robots working in harmony across a factory floor. Many are also ensuring their software can easily integrate with customers' other software tools, from warehouse management platforms to enterprise resource planning systems.

Machinery companies' mergers and acquisitions and R&D investments underscore this growing emphasis on software and automation. M&A focused on software, cloud technologies, or data analytics made up 44% of all machinery deals from 2016 through 2020, up from about 28% during the previous five years. Machinery companies' patent applications in these technology areas increased 27% during that same period (see *Figure 2*).

All the while, industrial robots' mechanical parts have largely become commodities that most manufacturers now buy off the shelf from other vendors. Chinese manufacturers, for example, can more rapidly develop competing, lower-cost hardware.

Where is this all headed? Further advances will continue to spur more intelligent manufacturing execution systems capable of fully controlling and guiding networks of machines across entire factories. Then even the most advanced robot becomes just another piece of equipment, a simple endpoint in the "edge" automation language that governs computing close to the machines (as opposed to in the cloud).

Figure 2: Machinery companies' M&A and R&D investments in software, the cloud, and analytics are rising



Notes: M&A data includes all machinery companies; patent data includes top 50 global machinery companies based on last 12 months' revenue and patents filed with at least two offices
 Sources: Dealogic; Quid; Bain analysis

The takeaway is that even the most technologically advanced machines aren't safe from disruption. There's always an automation layer above where direct competitors, automation players, or disruptive start-ups could swoop in with an innovative solution. The question all machinery executives are wrestling with isn't whether their company should move up the technology stack, but rather how much of the stack they need to control in order to win. For now, the evolving hierarchy of factory automation remains up for grabs. Industrial software and other tech companies are well positioned, but there are plenty of opportunities for machinery manufacturers and even component makers.

The question all machinery executives are wrestling with isn't whether their company should move up the technology stack, but rather how much of the stack they need to control in order to win.

To climb the automation ladder, the most effective machinery companies will expand each of their products' range of capabilities so they not only can integrate with but actually lead the other pieces of equipment in their section of a factory. Conveyors could become material handling solutions, pumps become flow solutions, and air conditioners become indoor climate solutions, if the equipment makers manage to establish themselves at the system automation layer. For those solutions to become more than marketing buzzwords, leading machinery companies recognize they must not only transform their product offerings, but also their software capabilities and go-to-market strategies.

2. Verticalization

Advances in software and automation at the system and plant level are enabling machinery companies to meet growing customer demand for more specialized solutions that better serve increasingly diverse machinery operating conditions and requirements across various industries. This is pushing many manufacturers to develop solutions tailored to specific industries, or "verticals." Historically, machinery makers have either sold direct or partnered with distributors and system integrators to bring their products to market, in many cases with minimal variation across customer segments. A chiller was a chiller; you made it, packed it, and shipped it. If a company shifts to providing cooling solutions, those will necessarily have to be different in supermarkets vs. semiconductor clean rooms, for example.

Companies traditionally might gravitate toward a product-led approach, looking for machines in their existing product catalog that satisfy the customer's vertical-specific requirements. But that doesn't go far enough. The leading companies recognize that the most effective approach to verticalization starts with better understanding customers' needs and then creating custom solutions to serve them. This tends to strengthen relationships and customer loyalty, and it often helps the machinery

company identify new selling opportunities. Those that don't pursue verticalization put their products at greater risk of becoming commodities.

Siemens understood this early and has built a leading plant automation and equipment business geared toward the pharmaceutical industry. It systematically expanded beyond its SIMATIC controllers through acquisitions of pharma-focused software and technology companies, including Elan Software Systems in 2009 and Camstar Systems in 2014. To scale up its expertise in the target vertical, Siemens also hired pharmaceutical engineers and leaders from the pharma industry. Its pharma plant automation group has helped Siemens' Digital Industries business unit grow to €16.5 billion (\$19.1 billion) in annual revenue in 2021, with a profit margin of about 20%.

As machinery companies create more vertical-specific solutions, more local system integration capabilities will have to be added. But it's not feasible to build local scale everywhere, not even through partnerships. The most successful industrial companies have retracted from entire industry verticals to home in on a narrower set of markets in which they can excel. For example, Honeywell spun off its smart home business Resideo to focus its building technology activities on commercial and industrial facilities. We expect more machinery companies to build repeatability and scale in a small number of strategic verticals, thereby avoiding the trap of becoming a conglomerate of local engineering firms themselves.

Making this verticalization work effectively implies a significant shift in machinery companies' operating models to become more local, cross-functional, and agile.

Making this verticalization work effectively implies a significant shift in machinery companies' operating models to become more local, cross-functional, and agile. In order to strengthen their local system integration capabilities, machinery companies will have to find the talent in today's heavily fragmented and underdeveloped pool of system integrators. Many machinery companies will also need to become more customer-centric, developing solutions by working backward from customers' needs. This isn't an easy thing to do. It takes a combination of the right talent and tools, and, for many machinery businesses, a meaningful cultural shift to become "customer obsessed."

3. New business models

The more software and technology that industrial companies add to their machines, the more their business models will become like the software industry's. The traditional approach of selling equipment or services, potentially as a bundled package, is giving way to "X-as-a-service" models (where X can be equipment, machinery, or a related offering) and other advanced service agreements. These can come in different forms, including ones that pay machinery companies based on customer usage or on outcomes, where payment is conditional upon the machinery or solution meeting certain performance metrics. Nevertheless, despite notable exceptions, few machinery manufacturers have established successful advanced service models. Connectivity, analytics, and integration of machinery and equipment at a higher automation level are making the opportunity more real and relevant for their customers.

Stretching this to its most extreme conclusion, a manufacturer of equipment that processes and packages drinks would no longer be paid for each piece of equipment sold, but rather would receive a share of each drink purchase at the supermarket. The reality is few outcome-based pricing and sales models will be that extreme in the short term, but these types of agreements will become more widespread over the next decade, deployed in gradual steps. Outcome-based and other advanced service models are expected to grow to 30% of machinery companies' total services revenue by 2024, triple the share in 2019, according to Bain survey data.

The speed and adoption of advanced service models will vary by industry and type of machinery. A good starting point for machinery executives is to consider which of their customers' suppliers are best positioned to help the machinery company increase customers' productivity and would make ideal partners.

Take the market for "sustainability as a service" as one example of the growth of such business models. These offerings help companies improve their energy efficiency and renewable energy sourcing, either through single solutions for a specific domain or integrated solutions that combine hardware, software, services, advising, and financing. For example, in the most advanced case, an owner of a commercial building or factory might pay an integrated solution provider a share of the energy and CO₂ savings achieved across the whole facility; a single solution might focus on energy performance of one building element, such as the HVAC system. A roughly \$80 billion global market in 2020, sustainability as a service will grow 17% per year through 2030, our analysis projects, with integrated solutions constituting a majority of the market.

The speed and adoption of advanced service models will vary by industry and type of machinery. A good starting point for machinery executives is to consider which of their customers' suppliers are best positioned to help the machinery company increase customers' productivity and would make ideal partners. This assessment will point toward the most attractive market segments and value creation levers for machinery executives to focus their business model transformation. Effective companies will identify the most promising solutions first and develop the technology next.

Going beyond the machine

Machinery and equipment executives understand that embracing the “beyond the machine” mindset means a commitment to revamping their companies' technology, go-to-market capabilities, and business models. While pilot projects are common and can be relatively low risk, leading firms recognize that scaling them up requires transforming their organizations and forging deeper partnerships, including with firms previously viewed as competitors. Meanwhile, technology and engineering talent shortages, the rapid maturation of lower-cost competition, and other challenges are only growing more acute. The winners over the next decade will experiment aggressively in the ecosystem outside of their machinery, pushing their boundaries within that ecosystem in order to discover and develop defensible competitive advantages and new depths to their customer relationships. Others will struggle to maintain their differentiation and reduce costs rapidly enough to keep up.

Machinery and equipment executives understand that embracing the “beyond the machine” mindset means a commitment to revamping their companies' technology, go-to-market capabilities, and business models.

Many machinery and equipment companies have already started on this journey. Most already feel behind. In this report, we outline the priorities and key actions that executives can take across their businesses in order to lead the next era.

More on methodology

We assessed the maturity level of machinery companies' portfolios of solutions, services, and software on a scale of 0 to 10, with the following factors given equal weight in each company's score:

- *Breadth and quality of the company's global service offerings*
- *Breadth and quality of the company's global solutions and software offerings*
- *Share of the company's workforce in IT and analytics*

The workforce assessment was based on data from LinkedIn and Bain's Aura talent platform. A higher number of IT and analytics employees increased the company's score.

The breadth and quality of company offerings were assessed based on available information and our experience working with machinery and equipment companies around the world. The score considered solutions, services, and software businesses' share of each company's total revenue; the attractiveness of these offerings for customers, such as whether they help clients save money, improve outcomes, or achieve a better sustainability rating; the comprehensiveness of the offerings; and whether the offerings are capable of serving customers worldwide or have a local or regional scope.



Strategic Advantages

How to Jump-Start a Digital Solutions Future in Machinery	18
Machinery as a Service: A Radical Shift Is Underway	25
Selling Smarter: The Machinery Company's Guide to Commercial Excellence	32
The Great Retooling for Sustainability Is a Huge Opportunity in Machinery.....	39
Operations Priority No. 1 in Machinery: Sustainable and Resilient Supply Chains.....	45
Machinery M&A: Reshaping Portfolios and Hunting Growth.....	52
After Acquiring a Machinery Company, Rethink Your Playbook for Strong Returns.....	58



Strategic Advantages

How to Jump-Start a Digital Solutions Future in Machinery

Five actions can ease the transition to a digital solutions model and ignite growth for machinery and equipment companies.

By Michael Schertler, Neil Malik, and Maximilian Lanig

At a Glance

- ▶ The digital transformations underway at many industrial machinery and equipment companies are paving the road for them to transition from a product-centric business model to a solutions-centric model. This shift to digital-enabled solutions provides an opportunity to tap into a faster-growing profit pool with higher margins.
- ▶ However, it's a difficult transition, and few machinery companies have successfully executed a technology transformation.
- ▶ Five priority actions can give machinery leadership teams an edge as they invest in new digital solutions businesses.

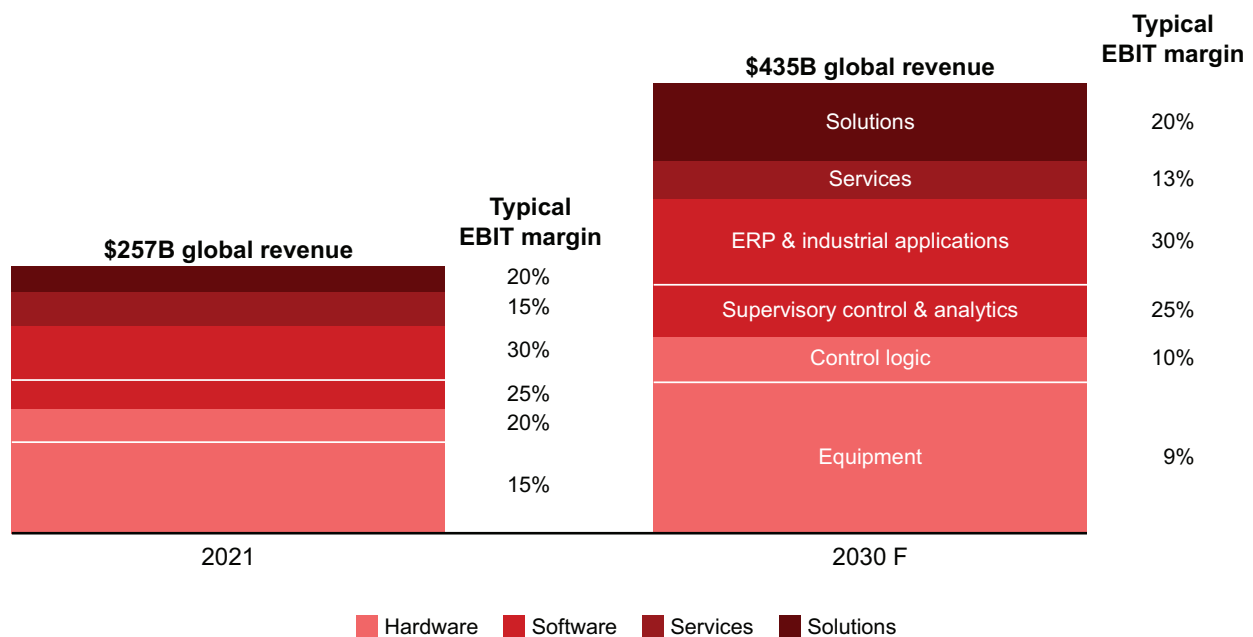
Manufacturers of industrial machinery and equipment have many reasons to pursue digital transformations. The potential to redefine how products are created, made, sold, and serviced is profound. Within plants and factories, new digital capabilities are increasingly at the heart of virtually every process and activity, leading to enormous gains in efficiency and productivity. This industrial digitalization movement has been underway for a while, and there's still huge growth potential that remains untapped.

For industrial machinery companies, however, the power of digital to change virtually every aspect of the business acquires an added dimension: the ability to support a shift from a product-centric business model to a solutions-centric model. By combining hardware, software, and services into a tightly integrated, tailored solution that meets a broader range of customer needs, companies can tap into a faster-growing profit pool, achieve higher margins, and turbocharge their sales. In many cases, they have an opportunity to enter markets with growth rates several times the size of their current portfolio, depending on the segment. For one food and beverage equipment maker in the early stages of this transition, adopting a digital-enabled solutions model has unlocked the opportunity to create a business with at least quadruple the annual revenue and more than double the profit margin of its traditional equipment business.

Indeed, across the industry, solutions are poised to deliver significant value on par with the business lift that industrials' aftermarket services have provided over the past three-plus decades. In the industrial automation sector, where the shift to solutions has been underway for several years, solutions are the fastest-growing part of the business and will be an increasingly significant revenue generator in the coming years (see *Figure 1*).

This shift is already happening, and for good reason. As competition intensifies and machinery-driven innovation slows, maintaining profitable growth in a product-centric model is becoming increasingly difficult. A solutions model, however—particularly one with a strong digital/technology

Figure 1: In the industrial automation sector, solutions businesses will be a key contributor to revenue growth over the next decade



Notes: EBIT percentages are approximate; ERP is enterprise resource planning
Sources: Industry interviews; Credit Suisse; Bain analysis

underpinning—can propel machinery companies past their competitors, boosting growth and creating stronger bonds with customers as the companies understand and meet more of their needs.

Across the industry, solutions are poised to deliver significant value on par with the business lift that industrials' aftermarket services have provided over the past three-plus decades.

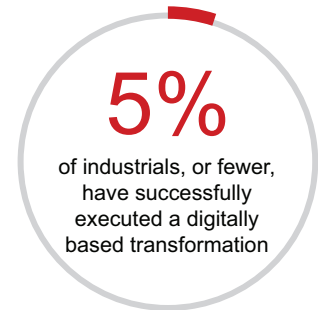
But, as in other industries, these potential gains are attracting new competitors that often enter the industrial space horizontally, using their expertise in software, cloud and web services, or other advantages. That creates a sense of urgency that's motivating the leaders of many machinery companies to move toward a solutions model, or risk missing a critical window. Our report explores this crucial trend toward solutions through multiple lenses. In this chapter, we'll unpack the sector's technology shift and how a focus on digital solutions can ensure that machinery companies make the right moves and achieve full value from this new, digitally powered revenue model.

The threat of complacency

Machinery company leaders acknowledge that a solutions focus presents an opportunity to catalyze growth (not to mention defend against competitive disruption), but most have been slow to act. There are two primary reasons. First, the pace of digital transformation—and the extent of the operational and organizational changes it has generated—can feel gradual, which creates a sense that there's time to catch up. Second, most companies have made at least some digital or technology investments which, although often incremental, foster a misleading sense of momentum.

Yet, when you consider that fewer than 5% of companies across machinery and other industrial sectors have successfully executed a technologically or digitally based transformation, it's clear that many management teams are underestimating the difficulty of moving to a digitally driven solutions model. They may also be underestimating the potential; digital can not only prove transformative in reducing costs and improving core processes but can—and often should—be a source of significant additional revenue. Industrials that put more effort into digital, in fact, are four times more likely to outperform the competition, while two out of three digital laggards perform worse than the competition, according to a 2019 Bain survey of 205 industrial companies.

Management teams underestimate the difficulty of moving to a digitally driven solutions model



As they pursue a digital transformation with the goal of moving toward a solutions-centric model, senior leaders should be prepared to address five strategic and operational challenges.

Key challenges

- ▶ Changing life-cycle economics: Revenue streams will shift from one-off sales to recurring payments, so a company's life-cycle economics will become more complex.
- ▶ Balance sheet transformation: Products that were once sold outright can now remain on the manufacturer's balance sheet, e.g., through equipment-as-a-service (EaaS) models, which changes the manufacturer's risk profile and financing requirements significantly.
- ▶ New operating model requirements: To successfully develop and sell solutions, rather than products, companies will need to rethink their operating models, removing organizational barriers that often hamper such transitions.
- ▶ Faster innovation cycles: Industrial products typically have multiyear innovation cycles, but solutions are often updated every 6 to 12 months, a much faster pace of development that many companies may struggle with.
- ▶ Ecosystem requirements: Solutions, by their very nature, integrate much more deeply into a customer's processes, and may require an ecosystem of partners to facilitate deployment and interoperability.

Pilot projects can help machinery companies achieve a level of risk-free learning on some of those challenges. But creating a fully scaled solutions business is a multiyear journey that starts with strategic and competitive positioning and extends through the design of the tech stack, ownership of control points, curation of a partner ecosystem, enhancements to the operating model and talent pool, and the need to invest in and fund organic development and possible M&A moves.

The solution to solutions

That may sound daunting, but many leaders of machinery companies know they have much to gain by embracing the solutions model. And, they may have little choice but to move forward, given that both their direct competitors and companies in adjacent spaces are all eyeing this promising opportunity.

Here are five priority actions that leadership and management teams in the machinery and equipment sector can address now to help their companies gain a winning edge:

1. Assess the profit pool and potential competitors

Industry profit pools have experienced a paradigm shift, spurred by two factors:

- Downward margin pressure on traditional products and services due to decreasing technological differentiation and increasing competition from low-cost players, enabled by at-scale globalized supply chains.
- Emergence of tech-enabled products and services that better meet customers' needs and so command higher margins.

As a result, a small but growing profit pool for high-margin digital solutions is attracting many new players. As traditional market boundaries blur and barriers to entry become lower, suppliers and even customers become potential competitors.

2. Formulate a clear vision and ambition

As opposed to traditional market-entry strategies—where companies size the market, assume a certain attainable market share, and identify a business opportunity to go after—digital solutions businesses require a more strategic approach to setting a vision and ambition. This is a greenfield opportunity to create and monetize new markets, which requires companies to define their unique play and derive the resulting opportunity from that. The required investment will scale with the breadth of use cases and the extent of integration across whatever stack a company pursues in its solutions business. Given that most companies have scarce resources, the most effective leaders will pursue those solutions businesses where they have a clear strategic fit.

One global food processing company saw an opportunity to help its customers reduce their factories' annual operating costs by as much as one-third with digital solutions. By digitalizing operations, such as using remote sensors to more closely monitor machine performance, customers can improve maintenance and reduce machine downtime—the biggest contributor to their operating costs. The company gets paid based on its equipment meeting certain performance goals. If executed to its full potential, the company projects its new digital solutions business could generate hundreds of millions of dollars in annual revenue from its existing equipment customers alone.

3. Define winning solutions for the right customer segments

Machinery and equipment executives increasingly recognize that in order to succeed in digital solutions, they'll need to define leadership differently. In hardware, winning is about product leadership because a majority of a company's cost is in the product itself. That puts a focus on scale, to reduce product costs and reinvest savings in better products. In a solutions model that includes software and services, high-gross margins make product cost less of a concern. Instead, the priority becomes investing in customer acquisition and retention. The most successful companies excel at customer segmentation, develop digital solutions for the customer segments they can win, and maximize customer value over the long term.

Machinery and equipment executives increasingly recognize that in order to succeed in digital solutions, they'll need to define leadership differently.

Hilti, a Liechtenstein-based maker of power tools, fastening systems, and other construction and manufacturing products, chose to market its digital offerings toward midsize construction contractors. Digital tools are increasing productivity in the construction industry, but midsize contractors have yet to adopt them at scale. Hilti acquired construction technology company Fieldwire, based in San Francisco, last year to expand its capabilities in this area. Fieldwire's software helps contractors coordinate construction crews in the field; the company says its product improves trade productivity by more than 12% on average.

4. Create a development and delivery game plan

Once the company has defined its target segments and solutions, the next step is to assemble them along the technology stack. As the value propositions of machinery hardware increasingly blur with integrated software offerings, this stack will likely include elements that don't exist in the company's current portfolio. That necessitates make vs. acquire vs. partner decisions. Some solution elements will be control points with huge potential for monetization and will be handled firmly in-house, while other elements can be made better or cheaper by others. The most effective companies take an ecosystem mindset, rather than thinking in terms of a linear value chain with customers and suppliers. Similarly, companies are reevaluating operations from R&D to sales, because a solutions business entails much shorter development life cycles and a much more consultative selling model.

Rather than an organic, incremental approach, some machinery companies have chosen to acquire software solution companies and create separate business units focused on the new digital-enabled

revenue model. For example, Hitachi, the Japan-based industrial conglomerate, last year acquired GlobalLogic, a US-based digital engineering services firm, for \$9.6 billion, a deal aimed in part at bolstering Hitachi's digital solutions business, Lumada.

5. Manage the solutions business along different metrics and risks

Entering the solutions space requires a clear strategic and financial roadmap and the right key performance indicators, which may change over time. Early on, for example, EBITDA margin isn't as meaningful as customer unit contribution or customer churn. Risk is another critical consideration. Digital solutions businesses often have new business models (e.g., performance- or outcome-based payoffs) that create a risk profile for the business that needs to be professionally managed. And, while investors and shareholders are typically happy to hear about a company's expansion into solutions, they may not fully understand the time and investment required to make it succeed. Leading companies are as clear as possible about the investments and time frame needed to see material returns.

The stakes are high. At a time when a traditional focus on products is under increasing pressure, machinery leadership teams recognize that harnessing the power of digital to launch and scale new solutions businesses provides a huge growth opportunity. They also recognize that, in this age of digitalization, the success or failure of their efforts on this front could determine the legacy they leave behind.



Strategic Advantages

Machinery as a Service: A Radical Shift Is Underway

Leaders are rolling out advanced services—and preparing for the shift to integrated digital solutions.

By Pascal Roth, Karl Stempel, Oliver Straehle, and Helen Liu

At a Glance

- ▶ By 2030, companies will sell most equipment as part of bundled solutions.
- ▶ Tech-savvy competitors are using their data expertise to compete for a share of the global plant monitoring and optimization market.
- ▶ To win in services and solutions, OEMs now need to collaborate more closely with their customers.

Machinery companies face a tectonic shift. Industry 4.0 technologies are reshaping the business from one built around machines to one focused on services and integrated solutions. In some sectors, individual companies already generate more than 50% of revenues and 100% of profits with services. That trend is accelerating and will become the norm across the industry over the next few years. By 2030, companies will sell most equipment as part of bundled solutions including software and services, reducing hardware's share of total profits.

Tech-savvy rivals are taking advantage of that disruptive opportunity and moving into the market with services based on connectivity and enhanced data. Leading cloud solutions providers are targeting

segments of the machinery profit pool with solutions such as global plant monitoring and optimization, leveraging their data expertise and an Internet of Things platform. The country undergoing the fastest shift is China, where tech start-ups and other insurgents are introducing a new generation of innovative service offerings.

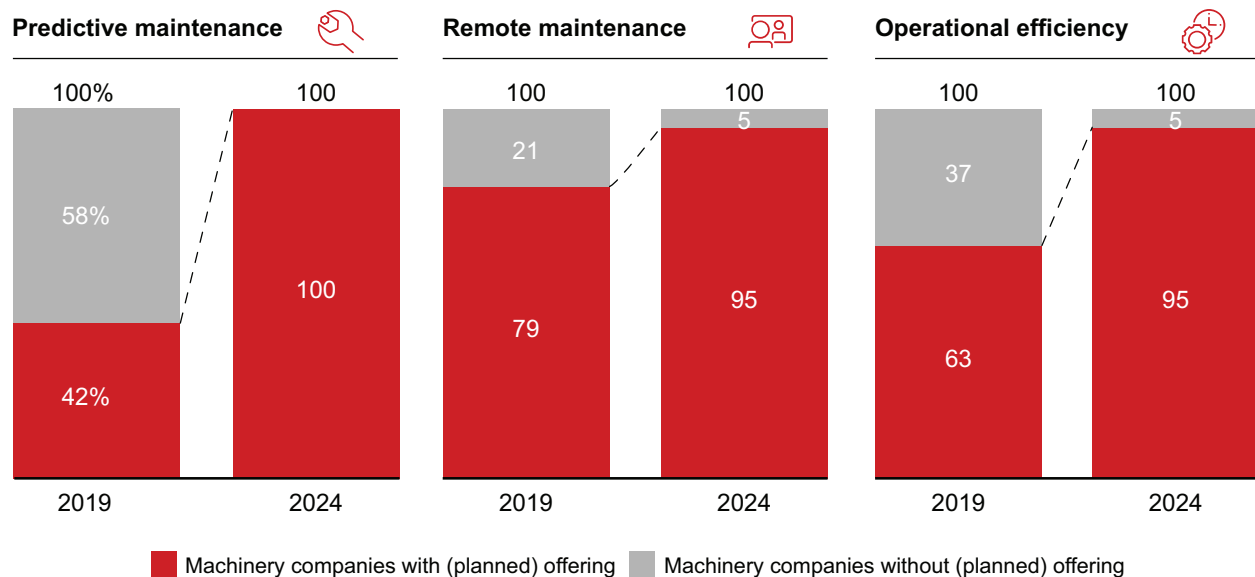
To defend their turf, leading original equipment manufacturers (OEMs) are increasing investments in digital technologies and accelerating their rollout of advanced services. And they are snapping up software companies to improve their offerings. More than 40% of acquisitions executed by machinery OEMs have distinct capabilities in software or cloud technology (up from less than 20% 10 years ago).

Building on a deep knowledge base and decades of experience, OEMs are redefining traditional machinery service as *strategic care* and designing new services that help customers perform better throughout the full life cycle of the installed machinery base. Of the OEMs we surveyed, 100% say they plan to offer predictive maintenance by 2024. Ninety-five percent of OEMs say they will provide remote maintenance, and 95% will offer operational efficiency services (see Figure 1).

As these services go mainstream, the shift toward integrated solutions will accelerate, particularly for solutions tailored to increasing production efficiency, improving financial performance, and supporting sustainability goals. Our report examines this critical trend toward solutions from two perspectives—the technology shift and the transformation of service offerings. Although most services

Figure 1: Advanced services are becoming a core offering for machinery companies

Share of surveyed companies planning to offer the following services



Sources: Bain analysis; Bain & Company 2019 Service Circle Survey (n=22)

are destined to be integrated into solutions, they remain today an integral part of the company's portfolio—and a key to profitability. For most companies, that means redoubling the strategic focus on advanced services while laying the groundwork for a digital solutions future.

New priorities

To win in services and solutions, OEMs now need to collaborate more closely with their customers. Advanced service contracts, for example, are broader in scope and may cover a full production line, all the equipment at a given site, multiple plants, or even an entire fleet. Importantly, they rely on data and analytics to improve machine function and process performance. The most effective equipment makers compile data and insights from their installed base and use the information to build innovative service solutions. For comparison, imagine how data and analytics have transformed marketing, allowing consumer goods companies to tailor their campaigns precisely to customer tastes and preferences.

Companies leading the shift to advanced services and solutions understand that equipment and service are no longer two separate businesses but are deeply interconnected. Think about how smart, data-based solutions such as traceability or energy management can help customers meet their sustainability goals. A company that can prove that the steel it uses is green, for example, will have a powerful competitive edge in the coming decade as consumers, investors, and governments push for ever more stringent ESG standards.

However, new performance-based business models involve taking risk and managing risk. In these contracts, OEMs guarantee an agreed level of output or quality based on a predefined set of performance indicators that are then reported in real time. Leadership teams will need to move up the learning curve gradually to gain experience with specific use cases, especially on pricing new solutions.

Fast-moving market

As global machinery companies rethink services, they are transforming the rules of the game, focusing on customer performance, data-driven services, and the digitizing of the service experience. And nowhere is that shift happening faster than in China.

China's rapidly evolving market is a window on how powerful incumbents and nimble start-ups are reinventing services.

China's rapidly evolving market is a window on how powerful incumbents and nimble start-ups are reinventing services. Chinese machinery companies and digital challengers started innovating in services a decade ago to spur growth as equipment sales slowed. The market is now a vibrant test

bed for a future service- and solutions-based industry. Eager to get a firsthand view of that paradigm, a leading US equipment maker recently teamed up with a large Chinese tech company to experiment in the country's fast-moving services market and share risk.

One Chinese OEM that has reinvented its service offering is heavy equipment maker XCMG. The company's Internet platform, which provides services such as machine analysis, average working time analysis, equipment utilization data, and connected plants, has generated massive growth since its launch eight years ago. At the end of 2021 it connected more than 460,000 machines. XCMG says its services give companies a competitive edge: greater efficiency and faster decision making based on data.

While OEMs invest in new technologies, agile Chinese start-ups have started selling low-cost equipment service solutions on cloud-based platforms. The cloud service Machine Commander, offered by the Chinese start-up Zeaho, is one example. Providing real-time monitoring of construction sites to improve equipment efficiency, it has 135,000 units of equipment connected to its cloud-based platform—after just seven years.

Other cloud-based platforms in China offer value-added services in fleet and facility management. One harnesses artificial intelligence and machine learning to route large field force teams of 1,000 or more to the next job in real time, dramatically improving their efficiency.

Four key steps

The lesson OEMs are drawing from China is clear: The opportunity in advanced services is huge, and there's no time to lose. For many companies, advanced services may still feel like a leap into the unknown, but leadership teams that delay investing in digital technologies risk ceding a share of their service business to nimbler rivals. In our experience, four key steps can help OEMs reshape their business for a new era, move closer to their customers, and win in an increasingly competitive market:

1. Digitize and connect the installed base

Invest in connected equipment and cloud-based platforms to create a valuable trove of information about customers and their equipment. Digital tools allow most regular customer support to be managed remotely, reducing costs involved in servicing the installed base and dramatically improving the overall efficiency.

Digital portals also provide customers access to vital operating data, enhancing the OEM-customer relationship and collaboration. Sensors embedded in connected equipment can help OEMs anticipate machinery failures before they happen and offer customers a quantum leap in preventive maintenance. And, as many leaders know, upgrading and connecting the existing installed base is a growing business.

2. Develop digital service solutions

Harness data to derive insights and design more innovative service models, including optimal service schedules and offerings tailored to customers' needs. One category of next-generation solutions

links fees to operational performance. Equipment makers, for example, can offer to guarantee the uptime or output of their machinery.

Services designed as solutions can be a win-win scenario for equipment makers and their customers. While improving efficiency and reliability for clients, performance-based contracts increase an OEM's competitive edge, boost service revenue, and grow its share of the service profit pool. Remote monitoring and predictive maintenance are familiar examples. Other uses include pattern-recognition algorithms that can crawl through thousands of hand-typed reports about machinery breakdowns. The insights gleaned help service teams better manage equipment under contract and develop standard upgrades that can be sold throughout the installed base of customers.

3. Sell equipment as a service

To tailor services to customers' needs, leading OEMs are developing subscription-based business models. Take the case of Atlas Copco, a global maker of compressors that also sells compressed air as a service. For customers, the shift to a machinery-as-service contract eliminates machinery downtime and ensures an uninterrupted supply with minimum investment. For Atlas Copco, the new contracts also offer benefits, minimizing unnecessary customer maintenance visits and securing aftermarket sales and service over a long period with one customer interaction. Importantly, the data and experience gathered from a worldwide base of connected equipment can be used to further enhance products.

Service relationships built on improving customer productivity increase loyalty and encourage deeper and more lasting customer relationships.

Service relationships built on improving customer productivity increase loyalty and encourage deeper and more lasting customer relationships. One global leader in plant engineering used its trove of data and analytics to continuously improve a customer's shop floor results by forecasting maintenance requirements and alerting workers to changes in quality. Digital tools tracking the data of on-site machinery were able to forecast that a machine would break down before it happened. That won respect from the customer's management team—and generated a long-term contract.

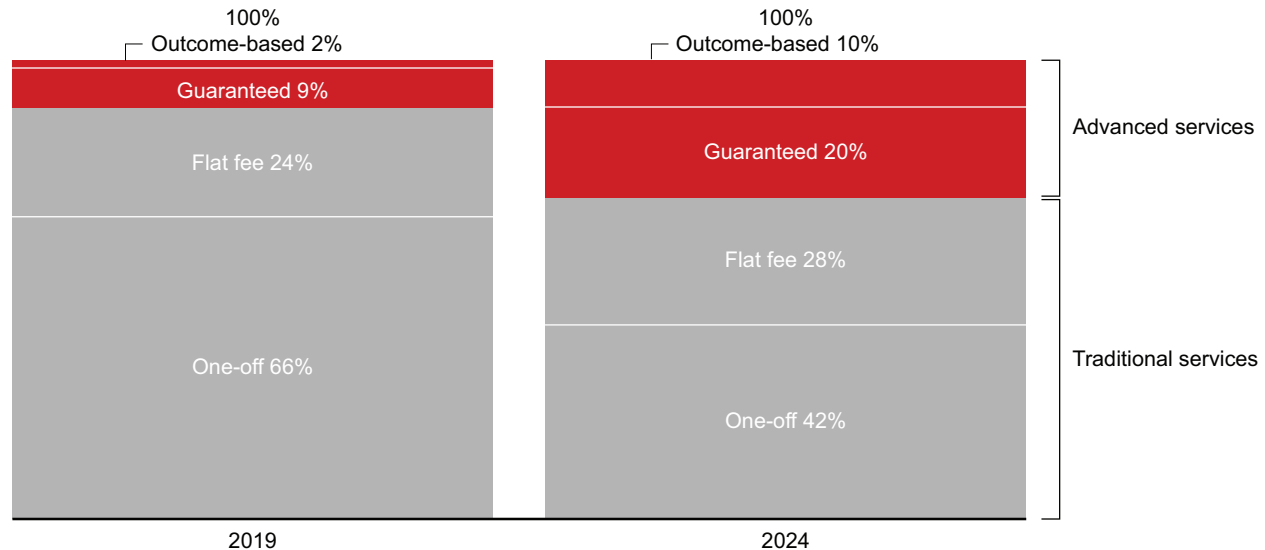
4. Share the risk

Rising cost pressure has made traditional pricing models based on billed man-hours less attractive for customers. Increasingly, customers want solutions that minimize their risk and provide more

Figure 2: Machinery companies expect advanced services to produce 30% of their service revenue by 2024

Increasing share of contracts based on outcomes or guaranteed pricing

Share of service revenue



Source: Bain & Company 2019 Service Circle Survey (n=22)

predictability, including outcome-based offerings. New technologies such as big data and machine learning are bridging that divide.

Outcome-based services, for example, can reduce customer risk while increasing service revenues and profit. Instead of fixing equipment when it breaks down for a flat fee, the companies offering these services ask for a percentage of the guaranteed output. Similarly, contracts can focus on reducing energy use or boosting equipment efficiency. Bain research shows that the share of contracts based on outcomes or guaranteed pricing is likely to rise to 30% by 2024, up from 11% in 2019 (see Figure 2).

One global engineering firm that builds and maintains industrial plants overcame slow service revenue growth by incorporating outcome-based offerings into its service portfolio. Data collected from its installed base helped the company identify important ways to improve plant efficiency. That paved the way for service contracts that guarantee an improvement in operating efficiency and pay the engineering firm a percentage of the savings (for example, from the reduction in energy consumption). The outcome-based offerings triggered significant growth in service revenue and profitability.

Workforce implications

As leading companies lay the foundations for a solutions-based portfolio, they are making critical changes to organizational roles and responsibilities. They recognize that advanced services and

solutions have profound implications on talent and workforce management. The service team of the future, for example, will need expertise in analytics and remote management. OEMs will also need new skills and capabilities to design advanced services—and manage the risk of performance-based contracts.

Frontline workers are bearing the brunt of the change as industrial services go digital. Our research shows 46% of technicians at industrial companies find their tools and technology difficult to use. The data highlights the challenge ahead. Companies that don't think early about what a new era of digital solutions means for workforce management risk lagging the competition.

Winners in the coming decade will make talent a top priority and ensure marketing, sales, and technical teams have the skills and resources they need for the critical transition ahead. Companies launching advanced services and digital solutions are taking a new approach to hiring, development, and retraining. In the field, they are supporting local service teams with digital tools and remote input. At the same time, they are giving service teams the IT and analytics skills to work with digital tools and manage a digitized installed base remotely. That means rethinking the service location footprint, recruiting pools, and career tracks. Finally, they are increasing collaboration and rotations between the service business and new equipment business.

As service innovations and new business models spread quickly across global markets, the next few years will be critical for machinery companies to build their competitive edge in a changing market. OEMs that move quickly now to innovate in services that will help customers increase the lifetime value of their equipment will be well positioned to defend and grow their market share. Success will depend just as much on managing the organizational change and talent needed for a new era.



Strategic Advantages

Selling Smarter: The Machinery Company's Guide to Commercial Excellence

Even the best machines don't sell themselves. Here's how their makers can grow faster, even in tough markets.

By Tamara Lewis, Magnus Burling, Lars Dingemann, and Anders Persson

At a Glance

- ▶ The best sales organizations keep track of not just what their customers buy, but how much they could be buying, using tools that map the full landscape of opportunities.
- ▶ In addition, they align salesforce resources with the most promising sources of growth, using virtual and remote techniques where appropriate to boost individual coverage at strategically important accounts.
- ▶ In their compensation and performance management structures, top performers also embed the right metrics into the right oversight and coaching cadence.

Leaders of industrial machinery companies increasingly recognize that it's no longer enough to have the best products and engineering teams. To win, they must strengthen a capability that hasn't traditionally been one of their calling cards: commercial excellence.

That evolution is needed partly to keep up with investors' organic growth expectations. Most machinery companies operate in mature industries, so sales teams need to outperform rivals if they are to generate the organic sales gains that in turn support attractive stock market valuations.

There's also an opportunity to capitalize on shifting customer needs. Customers increasingly want integrated solutions, and many machinery companies are duly packaging industrial hardware, software, and services into tailored offerings. But integrated solutions are more complex to sell than traditional products. A salesforce accustomed to single-product transactions may not yet have mastered the intricacies of all the components that need explanation in an integrated offering.

For these reasons, machinery companies have much to gain from revitalizing their go-to-market strategies by embedding commercial excellence—the design and delivery of commercial best practices enabled by the disciplined execution of a systematic, data-driven view of the market's full potential.

The good news is that executive teams can take specific, concrete steps to embed commercial excellence into sales strategies, operations, and culture. Leading sector players are already focusing on three things: mapping the full landscape of sales opportunities, aligning resources with the most promising sources of growth, and embedding the right performance metrics into the right oversight and coaching cadence.

Mapping the full landscape of sales opportunities

The best sales organizations keep track of not only how much their customers and prospects buy, but how much they *could* be buying. One tool for doing this is a MoneyMapSM that expands on the traditional, top-down snapshot of market share by incorporating bottom-up data on total customer spending across a given category—and what share of that addressable spending is currently used to purchase your products and services (*see Figure 1*).

Building up a customer-by-customer, prospect-by-prospect view of the full opportunity and the current share of wallet in this way enables machinery companies to understand precisely where and how sales can be boosted. It also helps executive teams prioritize opportunities.

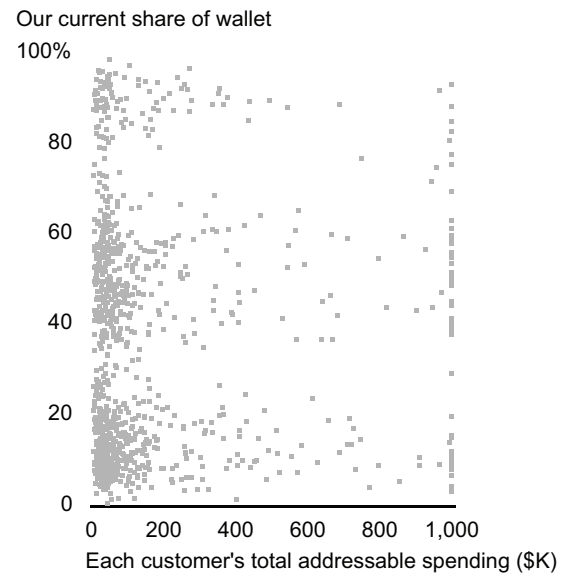
Money mapping often reveals opportunities well beyond what sales leaders had previously supposed. In some cases, more high-value growth opportunities will reside at current customers, rather than new prospects. For instance, one diversified tool and machinery manufacturer discovered that about 65% of the potential upside revealed by mapping lay with existing customers, vs. 35% at new customers (*see Figure 2*).

Figure 1: A MoneyMap can reveal sales opportunities missed by a traditional top-down view of market share

From a macro view of market share ...

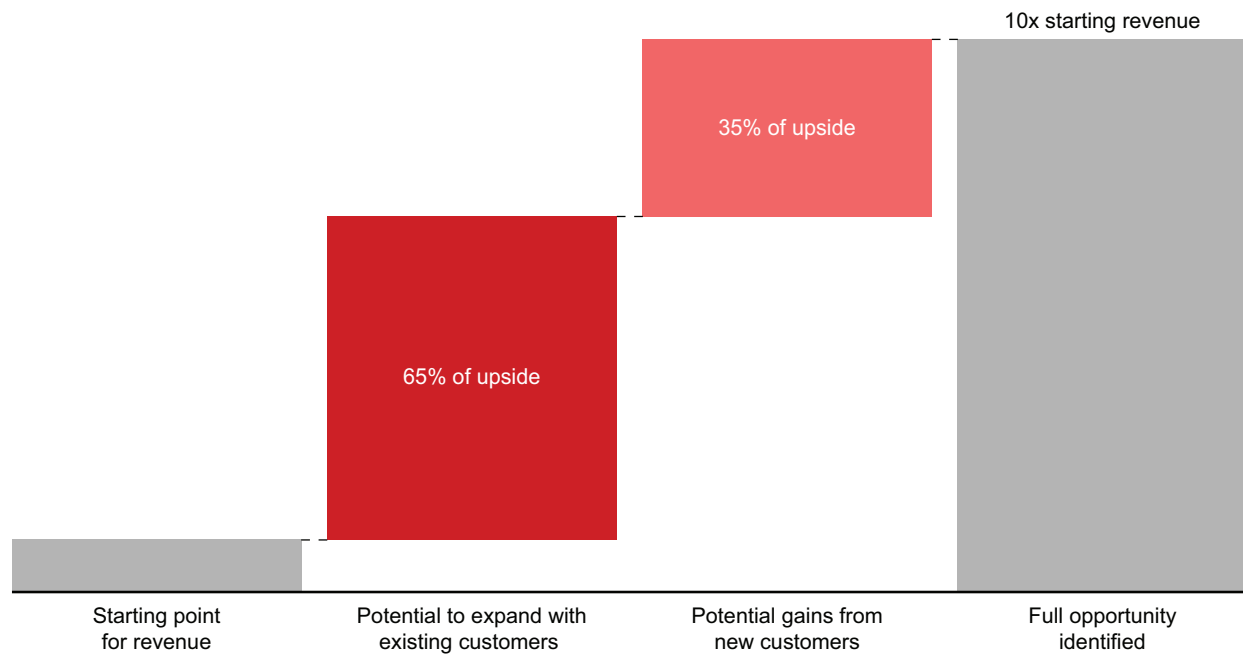


... to a bottom-up view of the company's share of each customer's spending



Source: Bain & Company

Figure 2: How money mapping identified the potential for big revenue increases, particularly with existing customers, at one machinery company



Source: Bain & Company

When mapping, it's important to keep in mind variations in buying patterns, factoring in both lumpy capital expenditure and regular spending on repairing and replacing equipment. It's also vital to accommodate fluctuations across the portfolio of products and services, giving managers a clear understanding of the interplay of recurring service revenues and one-off product purchases, for instance. That nuanced clarity is crucial for the efficient allocation of sales resources. For one thing, it ensures that machinery companies don't neglect big medium-term sales opportunities at customers or prospects that might be going through a short-term lull in spending.

Aligning resources with the most promising sources of growth

Equipped with a data-driven understanding of what a customer could be buying, a machinery company can prioritize targets based on its current competitive position at that account and the full upside potential. This segmentation then informs a coverage model that aligns sales resources with opportunity value, making the most of the salesforce's time.

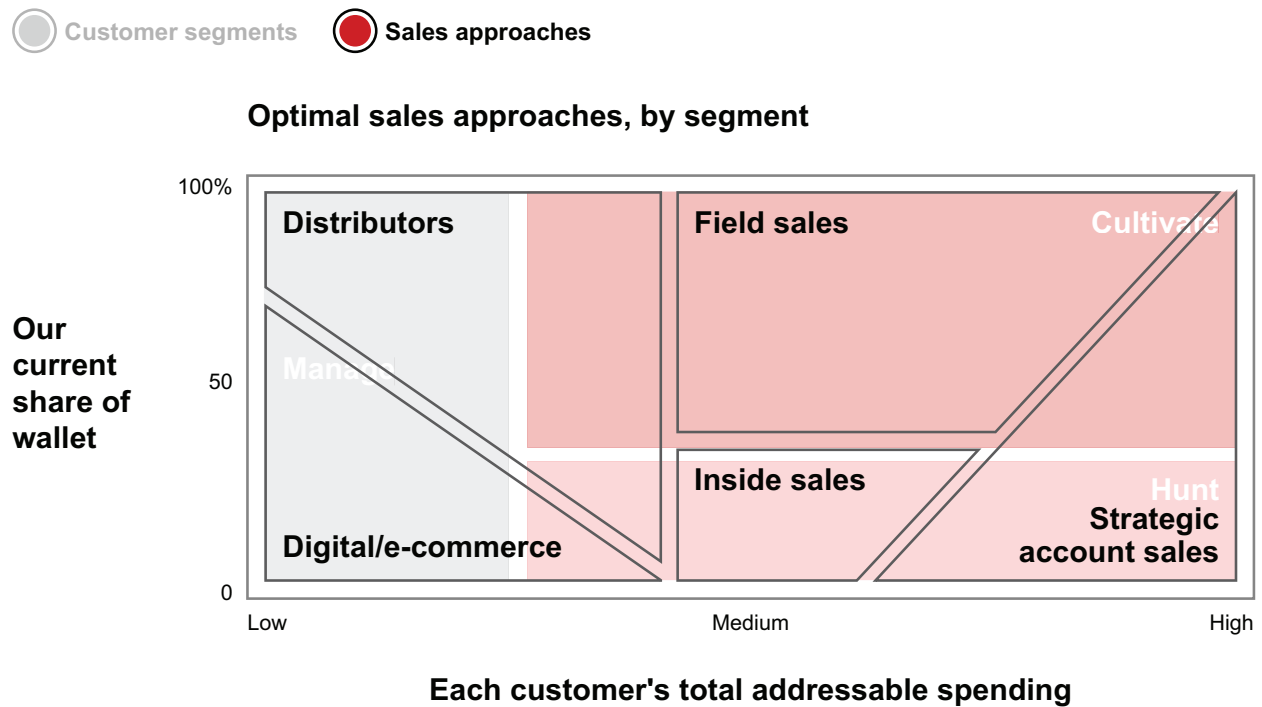
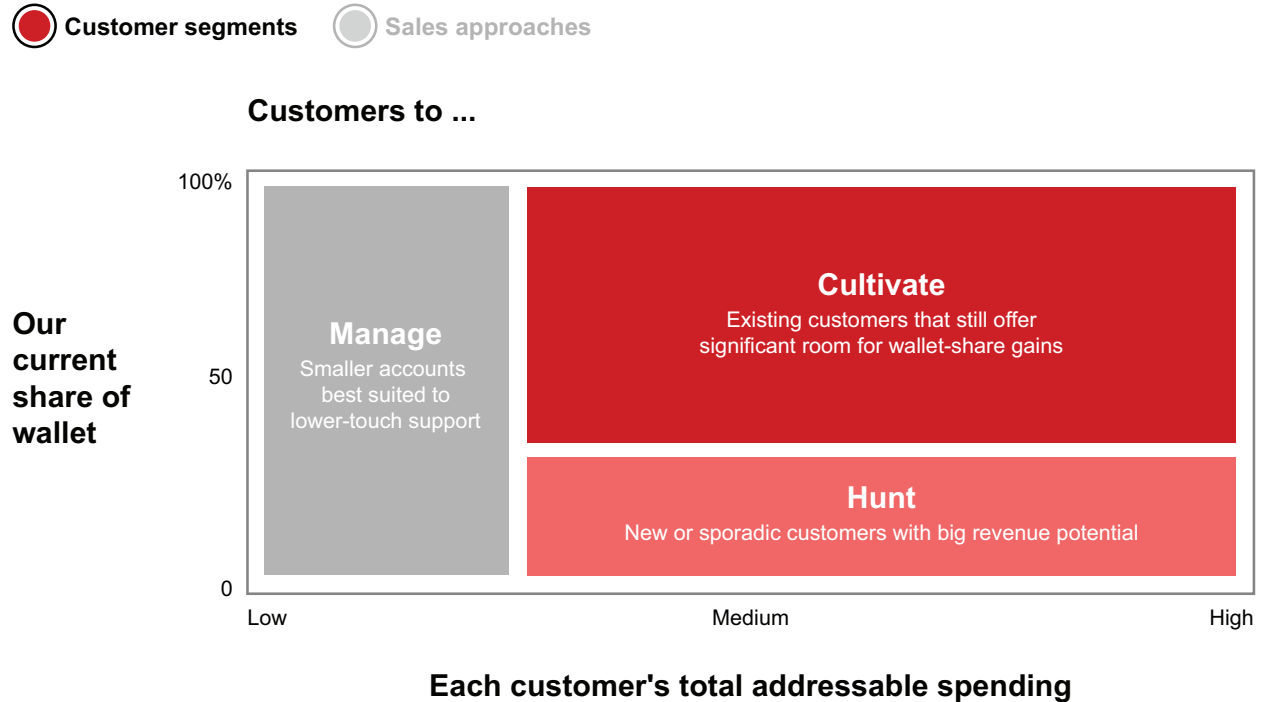
One proven approach to this twin task begins with segmenting customers into those you need to manage, cultivate, and hunt, based on the potential revenue upside they offer (see *Figure 3*). "Manage" customers tend to be smaller accounts that aren't likely to grow significantly in value. Many machinery companies will know firsthand how easy it is for sales teams to devote disproportionate time to their needs. "Cultivate" customers are those who already buy from you, yet still have some meaningful room to buy more, even though you are already accounting for a substantial chunk—and often the majority—of their spending in this product or service area. "Hunt" customers are new or sporadic customers that offer big revenue growth potential, in large part because they represent fresh territory for your sales team.

The next step is to rigorously align salesforce resources with the most promising sources of growth identified by the segmentation process. The goal is to maximize the time spent on two things: deepening the most valuable customer relationships and cultivating the prospects that offer the biggest gains. To stay focused on these twin imperatives, reps serving the most promising accounts will need the right tools, systems, and support—otherwise they'll get diverted from frontline tasks and get sucked into low-impact back-office work.

At lower-priority customers, resourcing will need to match the available opportunity. Even if in-person sales may not be entirely replaced, that adjustment will in many cases entail increasing the use of virtual and remote sales contact, including a greater reliance on self-serve platforms and inside sales techniques. That's particularly important for "manage" customers that aren't cost-effective to serve with a more bespoke and face-to-face relationship. Automation can sometimes be increased at lower spending "cultivate" accounts, too, although it's crucial to emphasize the benefits that digital tools can bring to customer workflows when making such a transition.

The type of transaction can also determine whether it makes sense to switch to a less personalized approach. Less-complex sales in general can be supported by self-serve channels, freeing up field

Figure 3: Sales support can be optimized by segmenting customers into those you need to manage, cultivate, and hunt, based on size of revenue opportunity



Source: Bain & Company

sales teams to focus on higher-value opportunities. Some product-quality issues can also be handled by virtual specialists, releasing face-to-face specialists for tasks that are revenue generating (it's worth mentioning that virtual specialists are also an economical way to support field sales in complex sales plays).

The rewards for effective channel optimization can be substantial as resources are diverted to serving the most strategically important accounts with outstanding individual coverage. One heavy machinery OEM, for example, found that virtual sales techniques required about half the time of face-to-face selling, by reducing the need for travel and meeting preparation, for instance. The overall effect was to liberate up to 20% of the sales team's working week—time that could be used to pursue high-value opportunities.

Embedding the right performance metrics into the right oversight and coaching cadence

Executing these strategies depends on the sales professionals on the ground, so it's essential to motivate them through thoughtful compensation structures and rigorous performance management. The machinery companies that do this best ensure that their compensation plans reward success on companywide, as well as individual, metrics to align sales professionals' personal interests with business growth. Their carefully chosen metrics and performance targets also reinforce the strategic decisions already taken in the segmentation process, rather than creating perverse incentives to pull in another direction.

Choosing the right metrics is only part of the answer, of course: Management of the sales team and the sales pipeline also needs to be highly disciplined and at the right cadence.

In practice, that might mean focusing on measures, such as absolute gross margin growth, that ensure reps are balancing the size and profitability of their accounts. In the case of “manage” accounts, compensation could even be partly tied to the salesperson's success in keeping most customer contact through virtual or remote channels. What's crucial is that compensation targets are based on an understanding of full customer potential that money mapping helps to highlight, rather than being principally shaped by historical performance.

Choosing the right metrics is only part of the answer, of course: Management of the sales team and the sales pipeline also needs to be highly disciplined and at the right cadence. On one level, that means timely corrective action when a sales rep's performance is lagging expectations. Clarity about

exactly who manages whom is also particularly important, as are regular meetings between managers and reps structured around a formal agenda and predefined discussion topics. A 2020 Bain/Dynata study of 260 US and UK sales reps found that 60% of reps in top-performing sales organizations have weekly one-on-one meetings with their managers, as opposed to 34% at low performers. These dialogues are most effective when the manager uses them to coach reps on how to advance opportunities as well as to monitor the rep's progress against goals. That coaching can go well beyond helpful suggestions on account plans in sales reviews; for instance, it can extend to "ride-alongs" in which managers observe reps in selling situations and identify where to improve.

Beginning a commercial excellence push

The following questions can be a helpful starting point for machinery manufacturers looking to accelerate growth through commercial excellence:

- Which current and prospective customers are spending most or all their money with competitors? What compelling value proposition can you create to win their business?
- Are your sales reps spending their time on the highest-value opportunities? What creative changes to coverage or your route to market could free up sales capacity?
- What would motivate your salesforce to adopt new practices that may differ substantially from the way they're doing things now? How would you know if they're using the right strategies with the right customers?



Strategic Advantages

The Great Retooling for Sustainability Is a Huge Opportunity in Machinery

Helping customers reduce greenhouse gas emissions and achieve net-zero goals will be critical for new growth.

By Torsten Lichtenau, Mattias C. Karlsson, Karl Stremmel, and Emmet Gaffney

At a Glance

- ▶ As in other industries, machinery and equipment makers are changing their operations and supply chains to reduce their greenhouse gas emissions and pursue their net-zero goals.
- ▶ But for this sector, the implications go much deeper. Because every industry is changing, a Great Retooling is underway, representing a major opportunity for machinery and equipment makers.
- ▶ To make the most of it, executives will need to develop a better understanding of how their customers value sustainability and when they would pay a premium for greener products.
- ▶ Many of the opportunities will be found in helping customers improve the sustainability of their own operations, through new technologies, products, and services.

How will the drive to improve sustainability affect machinery and equipment companies?

As in other industries, sustainability has risen to the top of the agenda, and machinery and equipment manufacturers find themselves under more pressure by investors, regulators, customers, and even their own employees to improve their sustainability performance—specifically, by reducing carbon

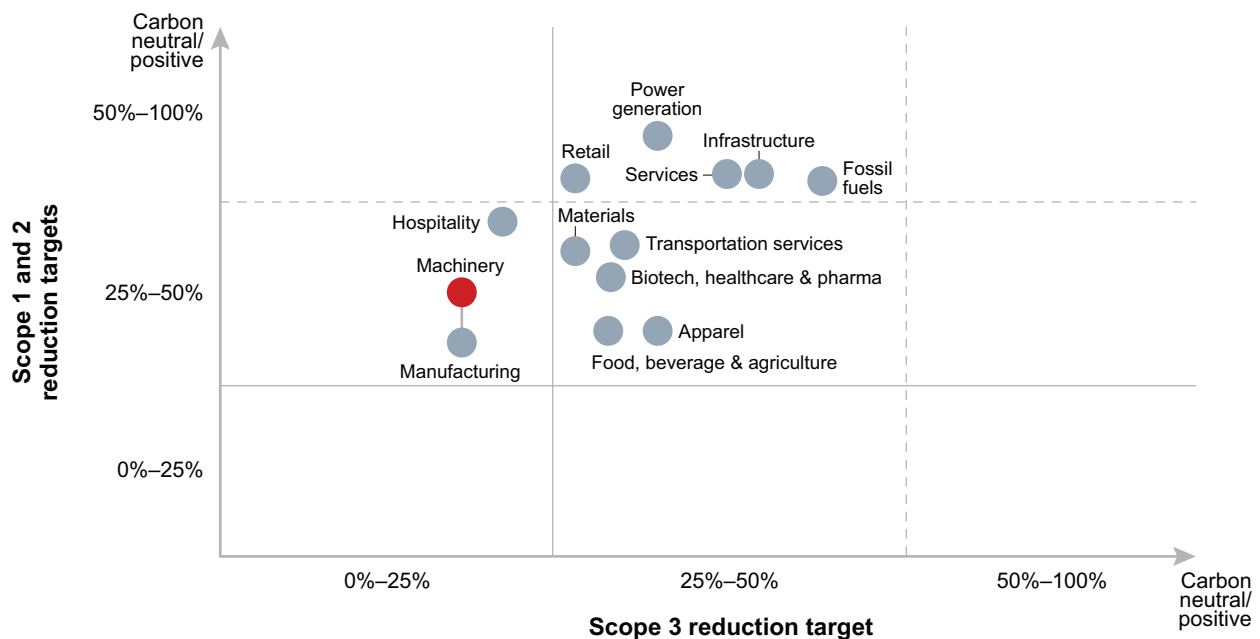
emissions and paying greater attention to the circularity of their products. Making the necessary changes will require new investments, some of which can be recovered by charging premiums for greener products and a range of sustainability services to supply chain partners and customers.

But that's only part of the story for machinery and equipment makers. The broad transformations underway also present an enormous opportunity since the operations of companies across industries will need to become more energy efficient, less wasteful, and tailored to improve the circularity and recyclability of products. A Great Retooling is underway, and the companies that make machinery and equipment are on the front line to provide the tools necessary to effect it.

Leaders demonstrating potential in sustainability

Given the potential and the size of the prize, it may seem surprising that the industry is not yet moving as aggressively as it could to capture the gains inherent in the sustainability trend. While some leaders have set ambitious goals to reduce Scope 1, 2, and 3 emissions and make the most of carbon-reduction opportunities, others are lagging their peers in other sectors (see *Figure 1*). There may be several reasons for this. The sector is less visible than others such as energy, finance, or retail, and so scrutiny by investors and consumers may be lower. In terms of Scope 3 emissions, machinery and equipment makers may be waiting to see what changes are required by their business customers, so they can make changes in their product and service lines. In any case, over time pressure from customers,

Figure 1: Machinery and equipment makers have, on average, been less ambitious than companies in other sectors in their carbon reduction targets



Note: Machinery companies are a subset of 163 companies within the 592 manufacturers that reported emissions reduction goals to the CDP
Sources: CDP; Bain & Company

shareholders, and regulators will compel machinery and equipment makers to raise their game on carbon reduction and other aspects of sustainability. While it's still too early to gauge, the war in Ukraine might also dial up machinery companies' urgency around sustainability initiatives. The rising costs of traditional energy sources and a growing desire for regional energy independence might speed up the transition to renewable energy, but that could get disrupted if the war triggers a global recession—in addition to causing untold human suffering, fear, and panic.

Highlighting the actions of industry leaders can illuminate where change is already possible, and where more work needs to be done.

Reducing Scope 1 and 2 emissions. These are the areas over which companies have the most direct control, the emissions from their own operations (Scope 1) and their energy use (Scope 2). Some machinery and equipment makers are already reporting good progress here. For example, Bosch says it has achieved carbon neutrality across 400 sites since 2020, mostly by improving energy efficiency, sourcing power from renewable sources, and purchasing carbon offsets.

Helping customers reduce emissions. Some companies have focused on Scope 3, supporting their customers in reducing their emissions. Emerson, for example, is providing its valves, instrumentation, and other technologies to support carbon capture utilization and storage (CCUS) processes that reduce carbon dioxide emissions. Emerson's technologies are deployed in the Abu Dhabi National Oil Company's Al Reyadah facility, the first commercial carbon capture facility for the iron and steel industry, and the first commercial scale carbon capture plant in the Middle East. Others are looking up the value chain to ensure their suppliers are transparent about their carbon footprint. Daimler, for example, has asked many of its suppliers to commit to providing carbon-neutral components in the future, as the company pursues a net-zero supply chain (see the Bain Brief "Creating Resilience, Sustainability, and Accountability in Supply Chains").

Improving the circularity of products. Wind turbine manufacturers are acknowledging the risk of decommissioned turbine blades and other materials contributing to landfill volumes by pledging to develop zero-waste manufacturing systems. WindEurope, an industry trade group, has called on the European Commission to ban the landfilling of decommissioned blades. In response, leading turbine makers including Vestas, Siemens Gamesa, and GE-subsidiary LM Wind Power have all pledged to develop recyclable blades in the near or medium term, and zero-waste turbines by 2040. Vestas says that its current turbines are 85% recyclable and that it aims to create a 100% recyclable rotor by 2030.

Targeting new opportunities in decarbonization. The transformation to lower-carbon economies will continue to create outsized opportunities in products and services that help companies reduce their own emissions, everything from wind and solar power generation to battery disassembly and energy assessments. Some industrial companies are expanding their portfolios to include sustainability as a service. Bosch, for example, has launched a climate solutions unit that advises other industrial companies pursuing their own net-zero commitments, focusing on energy efficiency, use of clean power and green electricity, and offsets for remaining CO₂ emissions.

Putting sustainability ambitions into action

Commercial initiatives like this start with a shift in perspective: Rather than viewing decarbonization as a burden of compliance, leaders see it as an opportunity for differentiation. Companies start by assessing their current footprint and capabilities to establish a baseline and then set their ambitions, not only in terms of their own reductions but also in the products and services they want to deliver. Capital markets reward leaders who send clear signals about their own emissions and their plans for creating value and growth from new products and services that support customers' decarbonization journey.

Rather than viewing decarbonization as a burden of compliance, leaders see it as an opportunity for differentiation.

As with any new initiative, choosing the right team leadership and making sure there are measures of accountability are critical. Here, sustainability initiatives often face a unique challenge: the hourglass syndrome. Senior management at the top and new hires below may be enthusiastic about change, but middle management is less convinced. One reason is that these managers are tasked with implementing change and balancing sustainability with competing priorities such as cost and safety. Education can help: While senior managers are confronted with sustainability challenges in their work with external stakeholders, and new talent often arrives with a broad awareness of sustainability issues from their education or roles at other organizations, middle managers may be less familiar with new opportunities, given their focus on current operations. Knowledge sharing across the organization and updating incentives to include measures of sustainability can shrink that gap (see the Bain Brief "Beyond COP26: An Action Plan for CEOs").

In our work with sustainability leaders in machinery and equipment manufacturing, five areas of focus are emerging as essential for reorienting the business and taking the proposition of low-carbon opportunity from dream to reality.

Customer segmentation. Understand which customers derive the greatest value from decarbonization efforts, and segment accordingly to design a differentiated, tailored value proposition. Customers' commitments and obligations around decarbonization will vary, depending on a wide range of pressures, including consumer preferences, investor scrutiny, and regulatory constraints. This will affect how prominently sellers promote sustainable offers. If a traditional approach to customer segmentation considered factors such as industry and regional preferences, sellers will now have to consider a third metric: decarbonization ambition (see *Figure 2*).

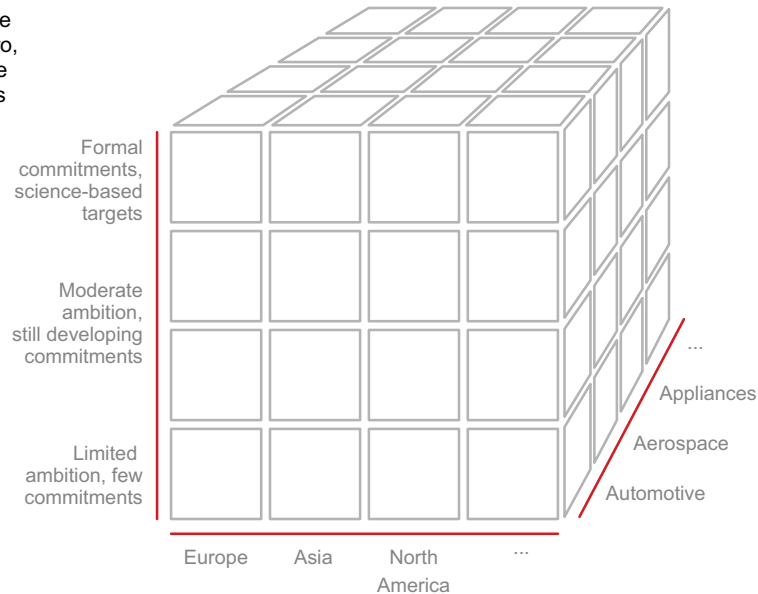
Figure 2: Some customers will place a greater value on sustainable offers, depending on at least three factors

Decarbonization

A customer's ambition, and how far along they are on their journey to net zero, will shape their view of the value of sustainable offers

Geography

Attitudes about sustainability, and government incentives and regulations related to CO₂ emissions, differ by region



Industry

An industry's carbon profile and its ability to shift to alternative sources of energy will help shape views on sustainability

Source: Bain & Company

Identifying the value proposition. Customer segmentation will inform decisions about which customers derive certain benefits from sustainability, either through their own use or by monetizing their investments to their own customers. By integrating this sustainability value proposition with the more traditional customer value proposition, sellers can develop a more comprehensive picture of the real costs and opportunity for customers. Tailoring the offer to different customer segments further strengthens the value proposition. Many companies take shortcuts around this process, but diligence here can deliver insights that translate into a better understanding of customer needs.

Tailored commercial approach. Sales and marketing efforts begin by clearly defining customers' unmet needs and identifying the tangible benefits to their decarbonization efforts. Sales teams will need training to develop new capabilities regarding decarbonization, and existing commercial tools will need to be enhanced to integrate customer decarbonization targets and ability to track progress. Some companies are creating new senior roles tasked with commercializing and monetizing the company's sustainability initiatives.

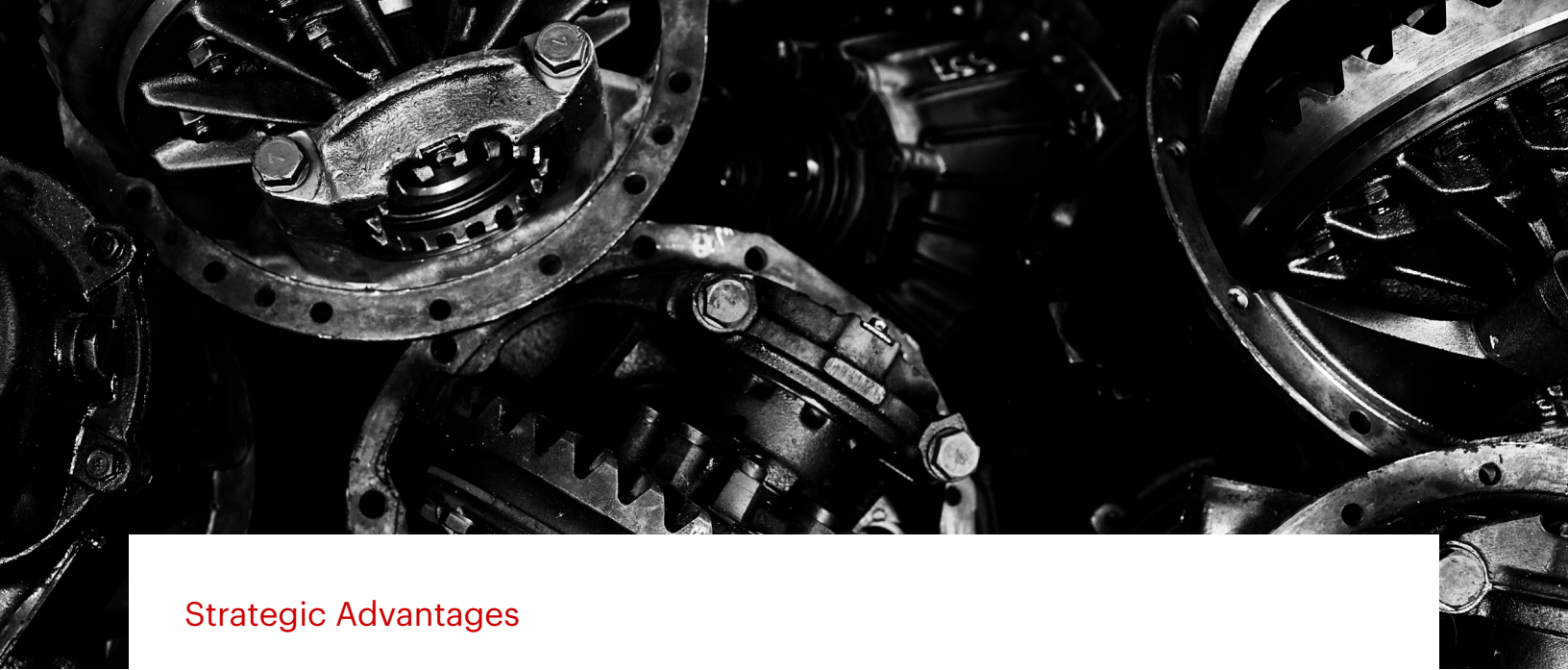
Price optimization. Quantify value delivered to customers to optimize prices for decarbonized products and services to improve margins and market share. In some cases, the trigger for a premium price for a sustainable offering could be consumer preference or regulatory shifts, but the changes may need to happen somewhere else along the value chain. For example, consumers looking for

more efficient appliances might be willing to pay more to the retailer. But the greener product might require a different design and manufacture of components several steps upstream from the appliance manufacturer. Companies will need a broader understanding of the entire value chain, to connect customer value with proper investment.

Develop new products and new business models. Perhaps most importantly, identify opportunities to innovate and build low-carbon offers that meet customers' needs. Engine 2 innovations like these can often be disruptive to the core business, so care will need to be taken to protect existing lines of business while expanding new ones. At the highest level, though, the company's overarching business model should be strengthened to thrive during the wave of decarbonization and beyond, in a lower-carbon economy.

Companies will need a broader understanding of the entire value chain, to connect customer value with proper investment.

The energy transition and the decarbonization journey to net zero are likely to be areas of focus for businesses around the world for many years to come, perhaps for the rest of most executives' careers. Nearly every industrial and manufacturing company will need to rethink their operations, a Great Retooling that represents a large and ongoing opportunity for machinery and equipment makers. Companies that grasp the potential quickly and develop products and services that help customers meet their own decarbonization goals are likely to gain first-mover advantage.



Strategic Advantages

Operations Priority No. 1 in Machinery: Sustainable and Resilient Supply Chains

Building flexible, circular supply chains requires new capabilities.

By Frank Lesmeister, Amit Nagar, and Flavio Monteleone

At a Glance

- ▶ Supply chain executives are shifting investment priorities to reduce disruption and improve sustainability.
- ▶ Digital tools can help manage supply chain risks, improve efficiency, and measure environmental impact and cost in real time.
- ▶ Machinery companies are adding new capabilities, such as supply risk assessments and better network visibility, to bolster sustainability and resilience.

The new era of supply chain volatility has hit machinery and equipment makers especially hard. Over the past two years, a broad range of supply chain disruptions has battered the sector, from material shortages and price fluctuations to suppliers going bankrupt and, more recently, the devastating war in Ukraine.

At the same time, leadership teams are under pressure from consumers, shareholders, and governments to develop more sustainable machinery, trace raw material origins, and make their manufacturing

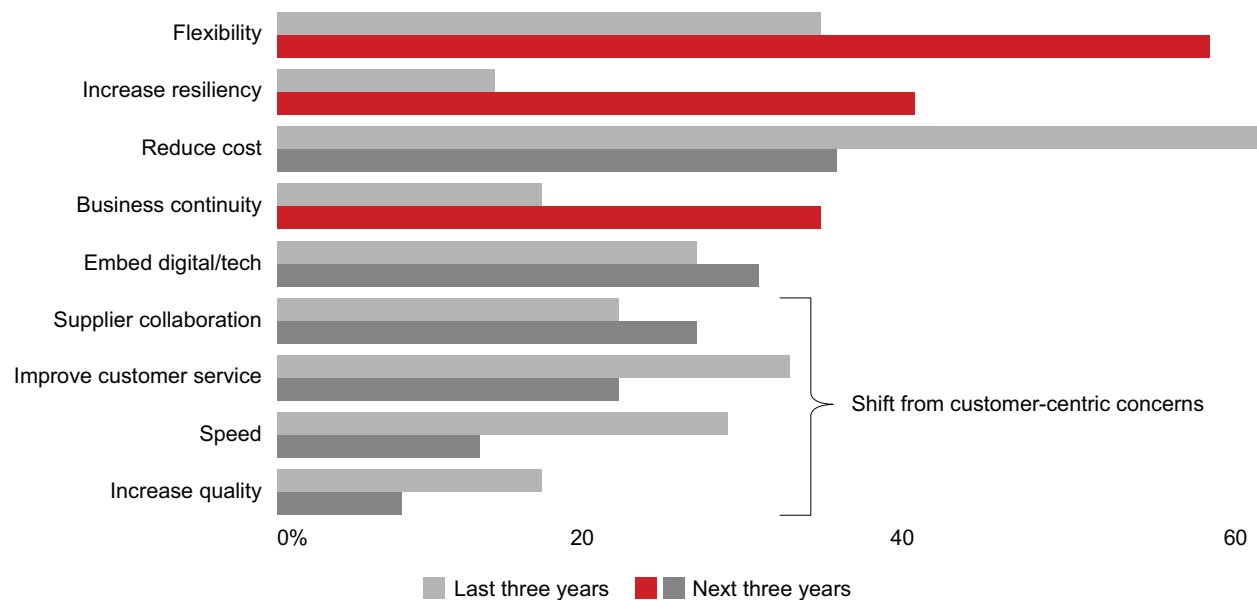
processes transparent. In many countries, environmental regulators are raising the bar on compliance, and companies are being held accountable for not only their own environmental conduct, but that of their suppliers.

The solution to that dual challenge is resilient and sustainable supply chains. Our research shows supply chain executives across all industries started shifting future investments already in mid-2020 to focus on resilience and flexibility as opposed to cost reduction and speed (see *Figure 1*). For example, in response to the Covid-19 pandemic's business disruptions, one technology company identified a series of investments to increase its supply chain resilience and flexibility. These included adding alternative suppliers for critical components and migrating up to 50% of its primary factory's production volume to an additional manufacturing plant. The leadership team estimated these initiatives would cost about 0.5% of the company's annual sales, a modest investment that could pay significant dividends during future supply disruptions.

For machinery and equipment manufacturers, supply chain resilience has become an urgent objective over the last two years. Many were unprepared for rising material prices and supply chain disruptions leading to shortages of parts and components, and that was before the war in Ukraine caused additional global uncertainty and pushed material costs even higher. As a result, leadership teams have only just begun to focus on resilience and flexibility.

Figure 1: Companies are shifting supply chain investments toward resilience and flexibility

Percentage of executives investing in these supply chain capabilities



Source: Bain & Company and Digital Supply Chain Institute Survey, 2020 (n=200)

The benefits are clear. A new generation of digital technologies, including analytics and automation, delivers cost savings and efficiency, but also the transparency needed for greater resilience and sustainability. Advanced analytics, for example, can improve supply chain forecast accuracy by up to 60%. Leading companies have begun wielding predictive tools such as cross-industry supply and demand analytics and supply chain risk scoring to bolster their resilience.

Digital tools also help companies significantly reduce environmental impact and cost. In 2019, Sandvik launched a sustainability assessment tool that measures its worldwide energy use and waste as part of a pledge to reduce energy use in operations by 2.5% a year through 2030. A constant stream of data tracks the company's progress toward creating green and sustainable factories.

But building resilience and sustainability into operations goes far beyond an investment in digital tools. Both objectives increase strategic and operational complexity. Until recently, most companies have managed supply chains as cost centers focused primarily on efficiency. Now, to mitigate more frequent disruptions and address sustainability, leadership teams need to rethink their supply chain priorities. That's one reason why many machinery companies remain stuck in the early stages of transforming their supply chains.

New capabilities

To improve supply chain sustainability and resilience, operations managers must continually assess trade-offs with efficiency in an ever-changing economic landscape. As a result, machinery companies need to develop new capabilities—and quickly. Supply risk assessment, for example, helps ensure an organization dedicates the resources and expertise to track industry-level risks to vital inputs. It includes monitoring global supply and demand dynamics as well as macroeconomic and geopolitical risks. In tandem, resilient organizations continually assess the strategic risks linked to Tier-1 suppliers and their suppliers. Risk experts codify best practice and communicate it throughout the company.

Another key capability is network visibility. Companies with the most transparent supply chains incorporate suppliers and their suppliers in an extended value chain. That involves integrating customers into enterprise resource planning systems and sales and operations processes. Transparency leaders also share long-term strategic and production plans with their suppliers and establish joint product roadmaps. Such collaboration gives companies significantly greater ability to assess the capabilities of their Tier-2 and Tier-3 suppliers. Ultimately, improved visibility not only increases supply chain resilience; it can also help companies track carbon emissions and environmental impact.

Finally, resilient and sustainable supply chains depend on internal collaboration across functions. Leaders redesign the operating model to improve internal cooperation between business units. They ensure that procurement heads and supply chain managers provide regular input to sales, R&D, and strategy teams on supplier choice and sourcing strategies. That helps manage risk and ensure cost reduction efforts don't undercut resilience.

Once these critical capabilities are in place, leading companies focus their investments in three key areas to rapidly bolster resilience and sustainability—prediction, flexibility, and circularity.

Prediction

Digital technology has dramatically improved the ability of companies to predict disruptions, delivery times, customer demand, and prices. Scenario planning, based on data collected from sensors and connected equipment, allows companies to anticipate internal disruptions and implement mitigation plans before supply shortages hit.

Companies with strong predictive capabilities use a predictive risk assessment framework to identify and prioritize supply chain threats across every dimension including those related to commodity shortages, geopolitics, and sustainability issues. The key challenge is making sure the assessment is dynamic, so it flags when a future risk moves from moderate to imminent, for example.

Toyota's efforts over the past decade to improve supply chain transparency, risk assessment, and resilience highlight what machinery companies can learn from other industries. In a major break with its own organizational culture, the company replaced its vaunted just-in-time production system with a hybrid model that includes stockpiling 300 critical components and diversifying the supplier base. It also implemented a “rescue” tracking system for vulnerable components and suppliers and set up teams to monitor and manage supply chain risk. Finally, the company renegotiated contracts to ensure suppliers prioritized Toyota's orders. The company's long-term strategy to improve supply chain predictability and increase resilience has paid big dividends. While not immune to production delays during the recent global semiconductor shortage, Toyota has performed better than many automakers.

Machinery companies also are bolstering their ability to identify supply chain threats before they disrupt production. Following the Fukushima earthquake and nuclear disaster, Daikin, a global maker of air conditioning and refrigeration machinery, invested in analytics software to automatically forecast supply and demand. The tandem between manual forecasting and automated predictions allows both the algorithms and supply chain managers to learn from each other and continually improve supply chain performance. Daikin's digital system has enabled the company to generate one statistical forecast for an entire region instead of relying on multiple local forecasts.

Leadership teams can improve the organization's prediction capabilities by adopting cross-functional ways of working in all areas related to the supply chain, and by creating seamless connections with suppliers. That approach leads to greater transparency and efficient communication across silos. At the same time, leaders ensure the organization has the right talent and expertise to manage supply chain risk. Finally, they create dedicated resiliency teams to oversee inputs, analyze results, and prioritize risks.

While prediction is critical, companies won't always be able to anticipate external shocks. As a result, it's just as important to build the ability to withstand or absorb sudden unexpected disruptions.

Companies can prepare for external shocks by building redundancy into the supply chain—double sourcing vital inputs and producing the same product at different facilities. That allows companies to bounce back from disruptions faster than the competition.

Flexibility

Many machinery makers have long customized their product specifications to meet customers' particular needs. That practice has, over time, led to a high degree of product variation, which in turn creates greater supply chain complexity, reduced flexibility, and higher costs. Companies can improve flexibility through changes to product design and manufacturing. Platform concepts that allow machinery companies to share common parts across a portfolio of products—much like automotive platforms for different car models—help streamline the total number of parts and reduce supply chain complexity, enabling companies to react faster. As supply volatility increases, leading manufacturers are moving from a “just-in-time” operations management to a “just-in-case” approach that builds more flexibility into the system. Machinery companies embracing a platform approach to design include Caterpillar, CNH Industrial, Komatsu, AGCO, and Wärtsilä.

As supply volatility increases, leading manufacturers are moving from a “just-in-time” operations management to a “just-in-case” approach that builds more flexibility into the system.

Digital platforms that help manage operations can significantly increase supply chain flexibility by enabling companies to react to changes almost instantly. Schneider Electric's cloud-based Industry 4.0 platform, EcoStruxure Plant Advisor, supports real-time data exchange, tackling the problem of siloed data. The platform acts as the central node that connects a company's factories, equipment, and vehicles, and delivers information across a network of sites globally. Digital connectivity creates smart supply chains that are more agile and more efficient. The platform, which Schneider first designed for its own plants, typically reduces unplanned downtime and input costs and boosts EBIT earnings by 6% to 11%.

Many companies are also reevaluating the degree of vertical integration that makes sense in a more turbulent global economy. In cases of extreme supply volatility, it may no longer make sense to outsource vital inputs. Tesla offers another example from the auto sector with lessons for all manufacturers. The company's decision to invest in modular technology architecture and in-house Agile software development capabilities allowed it to avoid painful production delays triggered by the global semiconductor shortage. When microcontroller units (MCUs) grew scarce, Tesla rapidly developed

and validated 19 new, alternative MCUs, while simultaneously developing firmware for new chips made by new suppliers. In 2021, Tesla outpaced every auto plant in North America in production volume and gained market share.

Circularity

As customers, governments, and investors demand cleaner, more efficient, and sustainable machines, leading OEMs are developing circular supply chains that reduce waste, recycle materials, and make operations more energy efficient. Factory-based changes that support circularity include designing more durable products and machinery that can be adapted for multiple uses.

ABB, for example, has joined an industry-wide forum for Swedish companies to increase the circular flow of materials with a special focus on electrical products. In 2020 it entered a two-year collaboration with Swedish paper and pulp company SCA to improve the efficiency of its equipment by installing smart sensors on all SCA's electric motors. The sensors relay information about each motor's operation and health over a Bluetooth gateway or smartphone to a secure server. ABB is also recycling and replacing older motors with more energy efficient models. And in collaboration with Stena Recycling, the company is working to recycle and reuse all material residues of iron copper aluminum and other raw materials.

Elevator maker Kone has achieved big gains in resource efficiency and the use of sustainable materials. The company now recycles 90% of metals and other materials in its products and 94% of waste is recycled or incinerated. Modernizing its elevators has generated up to 70% in energy savings. The company also has set a goal of zero waste to landfill by 2030. Artificial intelligence, robotics, and green energy were key to optimizing manufacturing material and improving energy efficiency.

Companies can also achieve circularity gains outside the factory. One key step is building traceability into the full value chain. Tracing materials is a prerequisite for feeding them back into the conversion process for reuse, recycling, or remanufacturing. Leading machinery makers are working with suppliers upstream to check the CO₂ balance of raw materials, minimize waste, and improve product sustainability.

John Deere, for example, has engaged EcoVadis to assess the sustainability performance of 400 key logistics and material suppliers in an effort to reduce the environmental impact of its products. The company plans to extend that process to more than 1,000 suppliers (60% of material spending) by the end of fiscal year 2022.

Circular design can also improve a product's sustainability. In the machinery sector, circular design increases the use of reusable, renewable, recycled, or refurbished materials. John Deere has launched life-cycle assessments to measure the environmental footprint of its products and has pledged to recycle 85% of total waste by the end of 2022. The company also is increasing its use of sustainable materials and aims to generate 30% of sales from rebuilt and remanufactured products by the end of

2022. In 2020, for example, John Deere started selling soy-based foam seats for tractors, which it developed in-house.

The global shortage of raw materials and key commodities including rare earths is also increasing pressure on machinery companies to embrace circularity. One option is to reuse materials, reducing production impact on the environment and improving supply chain resilience. Hitachi Construction Machinery Group has begun remanufacturing parts for construction machinery to improve resource efficiency. The group's remanufacturing business, which reworks old parts to have the same performance as a new one, reduces waste by about 2,900 metric tons per year. Automaker Tesla and others are working to bend the cost curve on extracting nickel and cobalt from lithium-ion batteries. And some companies are redesigning products to decrease dependence on certain materials or avoid using them altogether.

Prediction, flexibility, and circularity are vital capabilities in adapting to a more volatile economic landscape. Of course, these are not the only factors that contribute to resilience and sustainability. A shift in the mindset among workers throughout the organization, a governance structure to uphold ethical standards, and other risk policies are important. However, tackling prediction, flexibility, and circularity first will help companies accelerate the shift.

Machinery companies face a step change in operations. The traditional approach to managing networks, which helped companies remain competitive for decades, won't work going forward. Growing global pressure for sustainable products and processes will create an entirely new set of rules for managing operations. To succeed, leadership teams will need a more holistic view of the market, dramatically improved supply chain visibility, and sustainable products and processes.

Machinery companies face a step change in operations. The traditional approach to managing networks, which helped companies remain competitive for decades, won't work going forward.

Companies on the forefront of the shift toward resilient and sustainable supply chains have a head start building competitive advantage in the markets of 2030 and beyond. They will bounce back faster in times of supply disruption and benefit from a tailwind of support from customers, investors, and regulators.



Strategic Advantages

Machinery M&A: Reshaping Portfolios and Hunting Growth

The average deal size continues to rise as companies pursue transformative scale, scope, and capability deals in a low-growth environment.

By Michael Staebe, Clark Herndon, Magnus Konberg, Sachin Kotak, and John Sequeira

At a Glance

- ▶ M&A deal values in the industrial machinery and equipment manufacturing sector have jumped to decade highs during the pandemic, as many companies reshape their portfolios in the face of evolving industry dynamics.
- ▶ Both scale and scope deals remain important levers for companies' portfolio strategies. Many are going after deals that will help them develop crucial capabilities in software, the Internet of Things, artificial intelligence, and connectivity.
- ▶ Divestitures and separations of conglomerates continue, as many leadership teams focus on a narrower set of high-growth core businesses.
- ▶ Our survey of executives found that industrial dealmakers were far more likely than all other execs to rank clear deal and integration theses as the most important aspects of successful scope deals.

Global Machinery & Equipment Report 2022

Industrial machinery and equipment manufacturers have a growing appetite for big deals as they accelerate portfolio reshaping in the face of evolving industry dynamics.

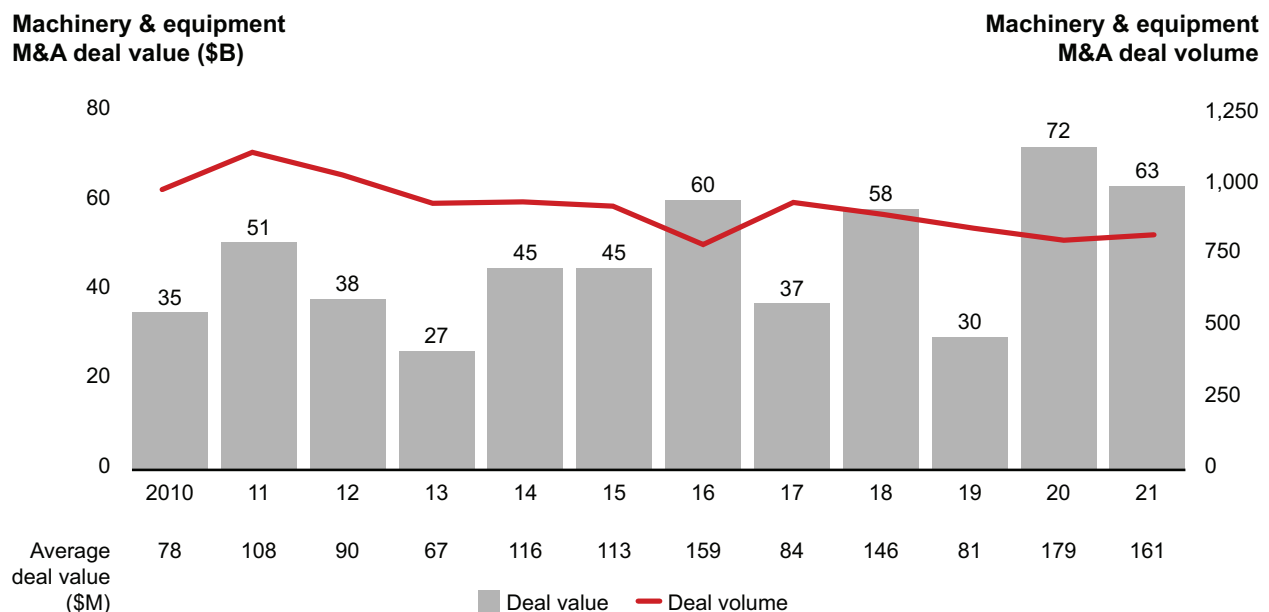
Although the number of merger and acquisition (M&A) deals in the machinery sector has trended downward since 2017, the average deal size has shot up during the pandemic, to \$179 million on average in 2020 and \$161 million in 2021. Last year's \$63 billion global deal value was the sector's second-highest annual total of the past decade, behind only 2020's \$72 billion (see Figure 1).

Market fundamentals suggest why machinery leadership teams are willing to put up bigger and bigger sums for M&A. The underlying market growth is low (GDP-plus), but many leading companies have much higher growth aspirations. Many market leaders have done a good job in past years to build No. 1 and No. 2 positions in their core, and further share gain is increasingly difficult. M&A provides access to higher-growth, more attractive, and strategically important markets.

Balancing the pursuit of leadership in one's core against growth in adjacent markets amplifies the need for machinery companies to maintain a robust and evergreen portfolio strategy.

Dynamic portfolio reshaping is reflected in the balance between scale and scope deals. Notable recent scale deals in the machinery and equipment sector included bearing manufacturer RBC's acquisition of Dodge from ABB and Cargotec's announced merger with Konecranes. Scope and capability deals

Figure 1: Across all M&A deal categories, deal values in the machinery and equipment sector have surged during the pandemic



Notes: Deals catalogued by announcement date; data as of January 12, 2022; average deal value excludes deals for which value was unavailable; deals include corporate M&A (which includes private equity exits), add-ons, special purpose acquisition companies, and venture capital/corporate venture capital
Sources: Dealogic; Bain analysis

continued at a good pace as well. For example, Johnson Controls expanded its building cooling offerings for data center operators with the announced purchase of Silent-Aire, while Alfa Laval bolstered its marine business by buying StormGeo, a weather intelligence and data science solutions company.

Machinery companies leaned in to acquire critical new capabilities around software, the Internet of Things (IoT), artificial intelligence, and connectivity at high valuations. Rockwell Automation's acquisition of cloud-based manufacturing solution provider Plex Systems, Siemens' acquisition of IoT start-up Wattsense, and Hyundai Motor Company's acquisition of Boston Dynamics all point to the ongoing industrial digitalization journey common in this sector. Notably, looking at the broader diversified industrials sector as a whole, targets with attractive capabilities are highly valued; consider that tech assets trade, on average, at 25 times EBITDA with high growth expectations vs. 13 times for targets in the industrial core (and acquirers' own valuation). For example, Hitachi's acquisition of digital engineering and design firm GlobalLogic at \$9.6 billion implies an EBITDA multiple of more than 37 times. Many companies are also taking a portfolio approach to developing these capabilities, through corporate venture capital, joint ventures, and partnerships.

Pure scale is no longer the top success factor in machinery. A growing number of leaders believe that a sharper focus on fewer industry verticals will pave the way to a bright future.

Active portfolio management is also evident in continued divestitures among industrial machinery and equipment companies. Successful companies act as decisively to exit noncore or underperforming businesses as they do to invest behind their growth strategies. These divestitures are often used to fuel deals in more attractive segments and to tailor the company's offerings to specific industries, in pursuit of higher profit margins and a boost in total shareholder return. Although scale deals remain an important part of the landscape, over the past five years things have shifted, and pure scale is no longer the top success factor in the machinery sector. A growing number of leadership teams believe that a sharper focus on fewer industry verticals, with more flexible and customizable solutions, will pave the way to a bright future.

Even the prototypical industrial conglomerates, including General Electric and Siemens, are separating their companies in order to strengthen the focus on their highest-growth core businesses. GE last year announced plans to split itself into three separate entities focused on aviation, healthcare, and energy, respectively. Siemens has also been on this journey for several years. It spun out its medical technology and energy businesses into publicly traded companies in 2018 and 2020, respectively, with Siemens' remaining core largely focused on industrial automation. Any business that doesn't fit into this smaller core is held as a standalone investment asset and ultimately could be put up for

sale. Other conglomerates—including Thyssenkrupp, which is in the process of divesting its mining technologies business—are pursuing similar separation strategies.

Evolving the machinery M&A playbook for scope and capability deals

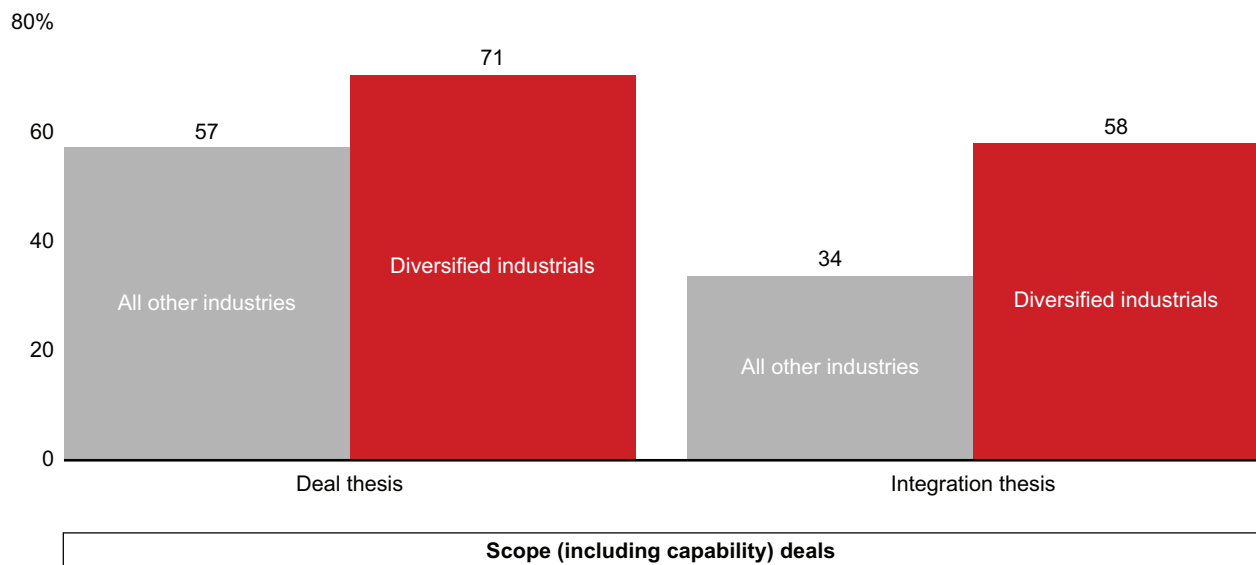
Successful machinery companies, like the rest of the diversified industrials sector, have adapted how they approach M&A to make scope and capability deals as successful as scale deals. In a recent Bain survey of executives, industrial dealmakers were far more likely than all other execs to rank a clear deal thesis and clear integration thesis as the most important aspects of successful scope deals (see Figure 2).

Many machinery companies with a successful M&A track record excel at integrating scale acquisitions and driving cost synergies. What these executives recognize, however, is that scope and capability deals present a new set of challenges. For example, acquirers lack intuitive knowledge on the rules of the game or on key players in these new markets and industry segments. Valuations are higher and the value creation logic is different. Rather than cost reduction, scope deals' success often comes down to revenue synergies through integrated offerings and cross-selling of emergent capabilities and products or services. The integration approach must reflect these unique sources of value and risk that comes from acquiring an adjacent business.

Figure 2: Industrial executives—more than in any other industry—cite clear deal and integration theses as the most important aspects of successful scope M&A

Primary factors in deal success

Respondents



Source: Bain M&A Practitioners Survey, 2022 (n=281)

In addition, many machinery companies are medium-sized businesses, and the fixed costs of doing a deal—including diverting management’s attention from the daily tasks of running the business—can be high. Machinery leaders are under growing pressure for acquisition targets to deliver real value—and fast. So they increasingly want to be very clear about what they acquire and why.

Machinery leaders are under growing pressure for acquisition targets to deliver real value—and fast. So they increasingly want to be very clear about what they acquire and why.

With this in mind, we observe three key adjustments that scale-oriented machinery firms typically make to boost the success of their scope and capability deals.

First, the most successful companies proactively link corporate strategy and the M&A roadmap. Firmly establishing strategic rationale and fully aligning the organization top-to-bottom ahead of a potential scope or capability deal is key. Scale-oriented industrial buyers typically set up a centralized governance model to ensure a strong link between M&A and corporate strategy. Yet the decision clock speed of many industrials becomes a blocker if strategic intent is reevaluated in a short diligence phase. Conviction will be tested in an environment of high valuations and rapid deal processes.

Second, leading companies update the diligence playbook for scope deals, building on all the traditional best practices but increasing emphasis on what matters for scope and capability. They add rigor to revenue synergies diligence to assess customer willingness to pay for new, not-yet-available, innovative offerings, or to validate cross-selling potential. Leaders also recognize that as deals move further afield, internal market and industry expertise will be insufficient, and they build an ecosystem of partners and advisers to support with capabilities and expertise not available in-house. Also, they adjust their diligence processes (including board approval, for example) to accommodate faster decision clocks in less traditional and more competitive markets.

Third, leading companies tailor the integration thesis for each deal. They understand the ambition for how the integration will protect and develop the acquired business while enhancing the existing one. A scope deal predicated on combining product portfolios requires a different focus and roadmap than a capability deal for an innovative technology to embed in existing products. Aligning management teams may require more attention (and intention) to preserve the unique capability of the target company. Leading companies adopt key elements from the value creation plan concept, common within private equity, to set up a merger integration program that accelerates value capture. This often leads to targeted integration and even retaining the acquired company as a separate entity

while also defining the critical few areas of collaboration that are crucial for the deal thesis and value creation plan. Successful companies shift to a mentality of integration by exception rather than by default.

One industrial machinery company adapted its M&A approach when acquiring an attractive but premium-priced asset that offered a foothold in a desirable new line of business. The acquirer had a successful track record of integrating small to medium targets in its core business. When a refresh of corporate strategy called for adjacent moves, however, leadership recognized that a new M&A playbook was needed. During diligence, they used extensive customer research to evaluate both the target's standalone growth and how technology capabilities could enhance the acquirer's core products, building comfort that the deal would lead to both share gains and margin improvements.

Convinced of the full potential, the company had the confidence to make the winning bid. Then, after closing the deal, the leadership team applied a limited integration model that emphasized product development collaboration for the integrated offering while leaving the acquired entity to operate on a standalone basis beyond those critical few areas. As a result, the acquired company continued its rapid growth trajectory while in parallel delivering on the rapid development and time-to-market benefits of the joint offerings that constituted the majority of the synergy case.

Outlook

Looking ahead, we don't expect the momentum to slow for large M&A deals within the industrial machinery and equipment sector, and we believe that trends toward acquiring new capabilities will persist. High valuations are making the deal market more challenging and some companies will decide to sit on the sidelines. Those that want to grow will likely take a more proactive stance, and this will accentuate the need for robust end-to-end management of the M&A value chain. Deals require a clear strategic rationale, well-defined deal and integration theses, modern diligence across cost and revenue synergies, and stringent planning, realization, and follow-through of value creation post-close. Ultimately, machinery companies that execute across these areas can make M&A a key ingredient in a successful transformation agenda over the coming decade.



Strategic Advantages

After Acquiring a Machinery Company, Rethink Your Playbook for Strong Returns

Private equity leaders take a holistic value creation approach to maximize a company's potential.

By Michael Richthammer, Trevor Cotton, and Michael Staebe

At a Glance

- ▶ Machinery and equipment deals outperformed the industrials sector as a whole by 10% over the past 10 years.
- ▶ The enterprise value for machinery and equipment companies nearly doubled over the past decade.
- ▶ Many private equity funds consider ESG and digital transformation to be core elements of a holistic value creation plan.

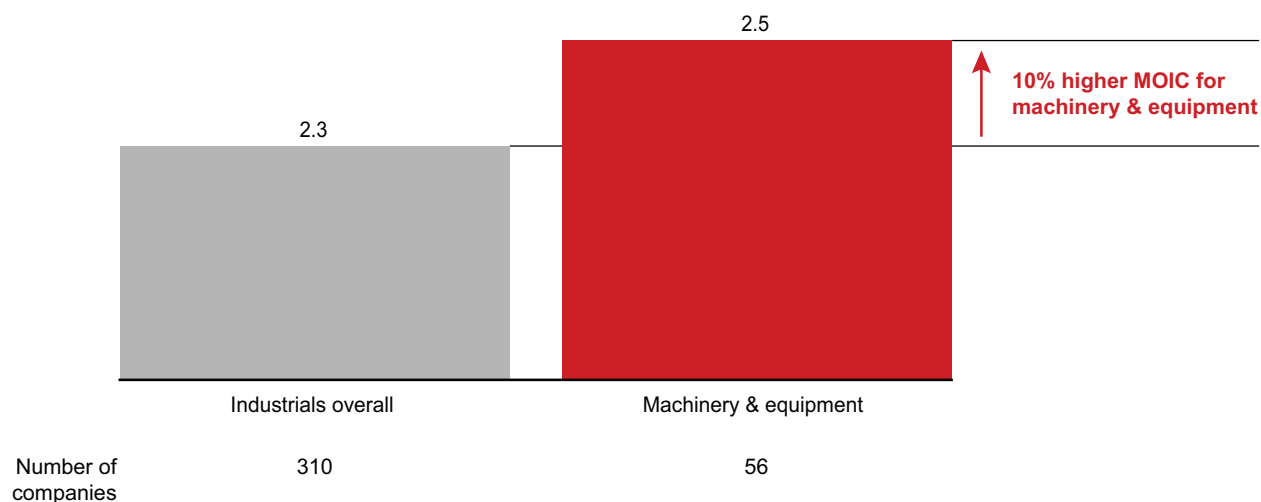
The machinery and equipment sector has been among the most active industrial sectors in global private equity (PE) dealmaking since 2010. Some of the largest industrial deals were in machinery and equipment, including Advent and Cinven's €17.2 billion (\$20.2 billion) purchase of Thyssenkrupp Elevators in 2020.

More important, when it comes to post-acquisition performance, machinery and equipment deals are outperforming those in other industrial sectors. Over the past decade, machinery and equipment

Global Machinery & Equipment Report 2022

Figure 1: Machinery and equipment deals delivered a 2.5x median multiple on invested capital (MOIC) over the past 10 years, outperforming the industrials sector

Median MOIC
(global deals, 2011–21)



Notes: Includes completed industrials deals; chart reflects all deal sizes and buyout and growth strategies; calculations are in dollars; MOIC is the ratio of total distributed capital and remaining unrealized value to total investment; use of DealEdge data outside this context including publication or reprint requires permission of Bain & Company and CEPRES
Source: DealEdge (January 2022)

deals produced a median multiple on invested capital (MOIC) of 2.5. That measure—the ratio of total distributed capital plus unrealized value to total investment cost—was 10% higher for machinery and equipment deals than for the industrials sector as a whole (see *Figure 1*).

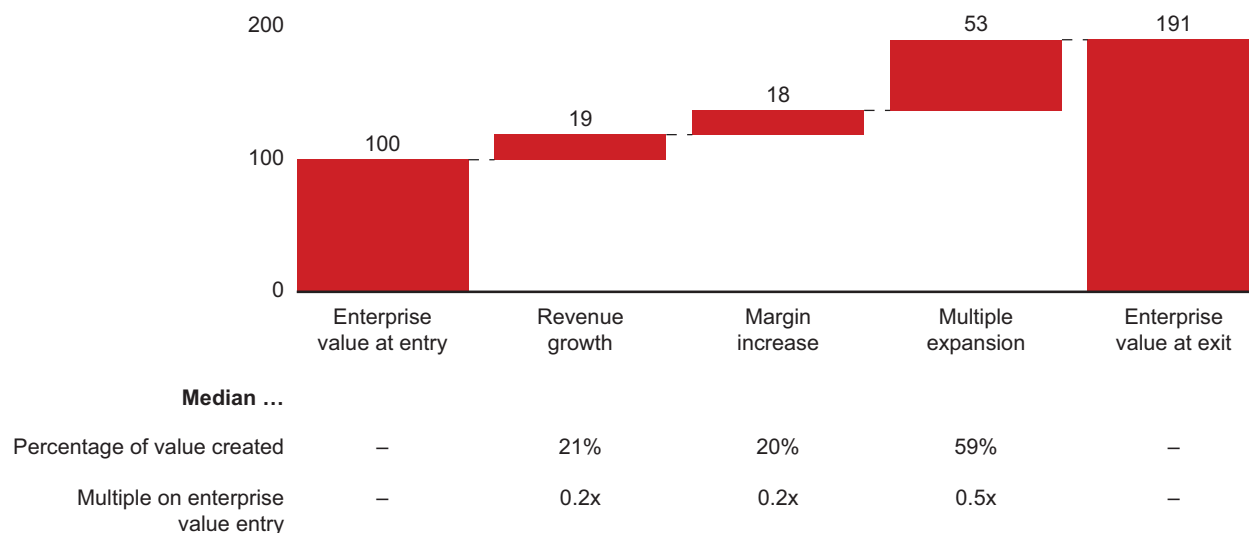
During the same period, the growth in enterprise value for machinery and equipment companies was 1.9 times (see *Figure 2*). Three key factors contributed to the rise: revenue growth, margin increase, and multiple expansion (which is influenced by top-line and margin growth).

In our experience, top-performing funds take a holistic approach to value creation. That means they look far beyond a company's cost structure, including general and administrative (G&A) expenses, procurement, and operations, to tap all areas of potential improvement, including commercial excellence, pricing, service excellence, and mergers and acquisitions (M&A).

Winning PE firms also spot opportunities to reposition traditional businesses and benefit from broad trends that are reshaping markets. Key trends affecting machinery and equipment companies include sustainability and the application of new technologies such as sensors and automation to traditional products and processes.

Figure 2: Three key factors fuel value creation in machinery: revenue growth, margin improvement, and multiple expansion

**Indexed median value creation in machinery companies
(Investment years 2011–21)**



Notes: Includes completed machinery and equipment deals; chart reflects all deal sizes and buyout and growth strategies; calculations are in dollars; use of DealEdge data outside this context including publication or reprint requires permission of Bain & Company and CEPRES
Source: DealEdge (January 2022)

Key interdependencies

Fund managers’ ability to increase a portfolio company’s growth and margins will become more crucial in the years ahead. With multiples near record highs, and economic volatility on the rise, returns for any deal that isn’t supported by business improvement will likely come under pressure.

PE funds that take a holistic approach to value creation are best positioned to deliver robust gains. By integrating strategic and operational assessments, they generate insights and opportunities that a one-dimensional approach cannot. A holistic post-acquisition plan sets up PE investors to succeed by spotting the most viable and realistic path to new value. And in a downturn, when firms can no longer rely on multiple expansion to mask underperformance, that can create an invaluable competitive advantage.

The most successful private equity deals in machinery and equipment over the past decade relied on integrated value creation plans that delivered strong EBITDA growth. From the outset, these leaders built a holistic view of a company’s potential, considering key interdependencies between strategy and operations. Many fund managers still ask, “What level of cost savings can we achieve?” Those that take a holistic approach pose a different question: “How can we sustainably grow the business?”

Consider the example of Triton's successful transformation of Dematic, a supplier of materials-handling systems, software, and services. At the time of its acquisition in 2006, Dematic was a wholly owned subsidiary of Siemens and was losing €100 million (\$126 million) a year. With less than €1 billion (\$1.26 billion) in sales, it lacked sufficient size to compete. Triton's holistic approach to value creation turned the company around and set it on a path to eventually become a global leader in warehouse logistics.

Triton, a PE fund focused on the industrials sector, supported a comprehensive growth and investment plan. While cost-cutting was key to improving profitability, an ambitious growth strategy positioned Dematic to outpace competitors and enter new markets. Importantly, Triton backed Dematic's investment in proprietary warehousing technology. It also supported a strategic acquisition in the US. Capitalizing on a turnaround that boosted Dematic's EBITDA to roughly €100 million (\$127 million), Triton sold the company in 2012 to AEA Investors for an estimated €700 million to €800 million (\$889 million to \$1.02 billion). AEA also took a holistic approach as it turned around Dematic's European operations and positioned the business for the next phase of growth. Four years later, when it sold Dematic in November 2016 for €2.1 billion (\$2.32 billion) to Kion Group, the company's enterprise value had risen to €3.25 billion (\$3.58 billion).

With multiples near record highs, and economic volatility on the rise, returns for any deal that isn't supported by business improvement will likely come under pressure.

Value creation: ESG and digital

In addition to conducting diligence in areas that can create significant value such as operational improvement, G&A, commercial excellence, and pricing, PE investors in machinery and equipment often add diligence modules in environmental, social, and governance (ESG) and digital transformation. They know ESG and digital capabilities are becoming vital to a company's competitiveness. Already, many top-performing funds incorporate ESG and digital assessments into every diligence and value creation plan.

Improving the ESG profile of a company can create value in every industry, including machinery. As a growing number of government authorities and regulators establish minimum ESG requirements, companies that take the ESG lead in their sector are gaining a source of competitive advantage. Seventy percent of global LPs say their organizations' investment policies include an ESG approach, according to a recent survey by Bain and the Institutional Limited Partners Association.

Industrial companies have a wide range of opportunities to improve their ESG performance, especially in sustainability. These include, for example, more environmentally friendly packaging; decarbonization through the use of renewable energies; reduction and recycling of waste; green construction with energy-efficient heating, ventilation, and air-conditioning systems; reduced water use through leak detection and flow metering; and improved occupational health and well-being, through investments in industrial safety equipment. Combining gains in even a few of these areas can improve environmental performance significantly, enhancing a product's brand image and attracting new customers.

Carlyle acquired Flender, a German mechanical drive manufacturer, in 2020 for €2 billion (\$2.41 billion), eyeing the global shift to a more sustainable energy system. Carlyle's deal thesis focused on increasing sales of gears for wind turbines as wind energy becomes more cost competitive and pressure mounts to reduce CO₂ emissions. Carlyle is already benefiting from lower interest rates on sustainability loans that Flender is issuing to finance its growth.

Digital technologies and data have enabled industrials businesses to dramatically grow their service and aftermarket revenue through advanced services and lower costs. One example is investment in predictive analytics that enable predictive maintenance and capacity optimization. Others include remote monitoring of processes and diagnostic information, remote servicing of connected devices, and data acquisition and integration.

Many fund managers still ask, "What level of cost savings can we achieve?" Those that take a holistic approach pose a different question: "How can we sustainably grow the business?"

Take the example of Advent's and Cinven's purchase of Thyssenkrupp's elevator business in 2020. Both funds saw growth potential in the unit's digital platform MAX, a cloud-based real-time monitoring and diagnostic solution for elevators. Thyssenkrupp, which launched MAX in 2015 to predict maintenance issues before they occur, said the service reduces elevator downtime by up to 50%.

The firm's new private equity owners believed in the firm's strong digital capabilities and expanded the MAX service offering to all products, including escalators. They supported a major marketing campaign in the US and pushed to increase market share by offering the MAX service package to hospitals for free. The company also adapted MAX to manage Covid-related elevator capacity limits. Recently renamed TK Elevator, the company reported fiscal 2020–21 sales of €8 billion (\$9.1 billion), up 4%, and EBITDA of 14%, up more than one percentage point.

Top-performing PE funds have recognized that a holistic value creation plan is the most effective path to improving performance at machinery and equipment companies, particularly in a landscape with high valuations. In the coming years, an integrated approach will be increasingly important to PE fund deal theses. Funds that incorporate not only strategy and operations but elements such as ESG and digital will gain an edge generating growth—and attracting new investors. As a holistic approach becomes the norm instead of the exception, funds that have already gained valuable experience integrating multiple elements into one value creation plan will be out in front.

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