

Reengineering construction equipment: from operations focused to customer centric

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Preface

The construction equipment industry is on the brink of profound transformation. The last few years have brought considerable change in almost every OEM¹ domain. The changes have largely been externally driven, and McKinsey & Company² foresees continued change in the years ahead that will have notable impact on how the OEMs operate their business. Some of these industry developments have been ongoing for many years, like the rise of competition from emerging markets, the tightening regulatory requirements, and the gradual growth of rental as the primary customer segment for several machine types. Other changes have emerged more recently, like the weak demand recovery and the advancements in hybrid and telematics and remote monitoring technology. Still other changes, like big-data-driven solutions and driverless machines, are probably right around the corner in the not-so-distant future.

The fact of change is not new in construction equipment. What is unique about this particular moment in the industry's development is that many of these changes are converging and collectively hitting the industry at once. One by one, these trends could make significant dents in the industry and OEMs' daily business. Together they may change the heart of the industry's structure and dynamics – transforming the product offered, the role of the OEM, and the competitive landscape.

Even if all of these changes do not happen in the coming 12 months – or even in the next five to ten years – active (or passive) decisions will be made now that will shape future winners and losers. Big-data-driven solutions and driverless machines may, for example, not be the most critical value generators in the next few years, but these next years may determine who is best positioned to reap that value later on. Disruptive changes may also come faster than the industry anticipates. Management teams at each OEM (established companies and new entrants alike) will need to form their opinions about how to act on each of the trends, as well as the combined effect. Many decisions will be taken later, but in the next years it will be critical for OEMs to set strategic directions and kick-start prioritized initiatives on portfolio and service offering, R&D investments and technological edge, as well as capability building and talent management.

From our work with many OEMs, we understand that most of these trends are not new, as such, to management teams in the industry. Lists of trends and potential trends that may come in the next five to ten years are long and can be sliced and diced in many ways. However, analyzing and taking strategic decisions regarding these trends is a hard task in a fast-moving corporate environment. This report thus aims to:

- Establish a common terminology and systematic overview of the construction equipment industry
- Provide unique insights into what the decision makers of the European construction equipment industry have on their minds and what their plans are for the future
- Shed light on what success will require going forward and what that means for different OEMs

¹ Original equipment manufacturer

² Hereafter referred to as McKinsey

- Give guidance to OEMs and their management teams to sort out what will really matter in the foreseeable future – distinguishing between big and small changes, trends that pose opportunities and those that are threatening, and decisions that require immediate action and those that can wait.

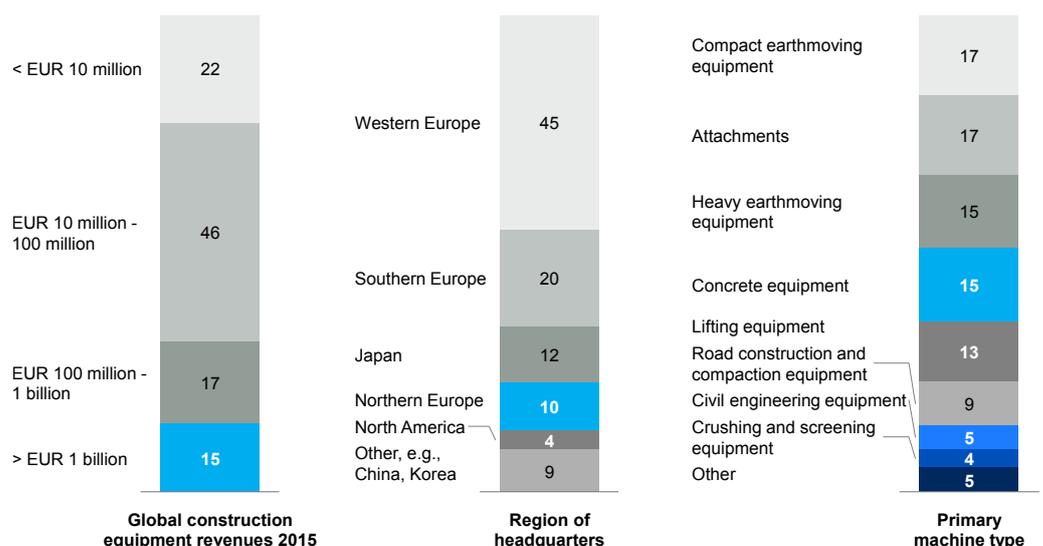
In this report we specifically focus on the outlook for the European construction equipment industry. Although most trends have global impact, the change will likely be accentuated in Europe. The European market has traditionally been highly complex, with a variety of local specifications, and fragmented with OEMs focused on national markets. Consolidation has been ongoing for years as demand and standards are increasingly globalizing, but the European market still remains complex and fragmented when compared to other continents. Furthermore, the demand situation has been challenging for several years due to low construction activity.

The report was prepared by McKinsey’s Advanced Industries Practice and draws on our own extensive research, the experience of our McKinsey colleagues, as well as public data and insights from across the construction equipment industry. At the heart of our research is a survey of OEMs, which was carried out between November 2015 and January 2016, covering 78 OEM groups³ active in Europe⁴. The participants included both large multinationals (headquartered inside and outside of Europe) and smaller local players, ranging from less than EUR 10 million to more than EUR 5 billion in construction-equipment-related revenues, representing most regions of Europe and all primary machinery types (Exhibit 1).

Exhibit 1

The survey participants represent the diverse mix of OEMs that is characteristic of the industry in Europe

OEMs participating in the survey
Percent



SOURCE: European construction equipment survey 2015 - 16

³ In addition, a handful suppliers and country organizations of OEMs were surveyed, which overall had largely the same responses as the OEM groups

⁴ Defined as European Union, Norway, Switzerland, Russia, and Turkey

Research results and outcomes of the survey have been interpreted and analyzed in discussions and interviews with more than 30 experienced industry experts. The experts include McKinsey professionals who serve many of the leading OEMs of the industry; current and former industry senior executives from OEMs of many sizes, geographies, and machinery portfolios; and independent industry experts and consultants. A core expert panel of industry executives convened regularly during the analysis of the research and the writing of the report to review and pressure-test findings.

Finally, we would like to note that the survey and parts of the fact reviews were conducted together with the European industry association CECE.⁵ We are very grateful for CECE's support and valuable insights regarding the state and outlook of the industry.

⁵ Committee for European Construction Equipment

The highlights

Construction equipment is a large and complex industry with a wide diversity of machines and OEMs. In McKinsey's classification, there are more than 100 machine types that are all involved in construction activities, yet often have few things in common when it comes to functionality, technologies, customers, or manufacturers. Machines covered under the umbrella

Construction equipment is a low-volume, high-complexity industry.

range from compact excavators to tower cranes, from crushers to tunnel boring machines, and from rollers to truck mixers and many more. With some exceptions, e.g., heavy excavators, heavy wheel loaders, and compact excavators, most machines are produced in low volumes, making construction equipment a low-volume, high-complexity industry.

In Europe, the construction equipment industry is large and vital to the economy, turning over a total of EUR 35 to 40 billion and directly employing about 150,000 people.⁶ Also including suppliers, dealers, and service workshops, experts estimate the total people employed directly and indirectly in the industry may be up to twice as many. The OEM landscape is highly fragmented with myriad small and medium-sized companies, as well as a handful of large multi-billion euro players. In total, there are 340 to 370 machinery OEM groups active in Europe, operating under more than 500 brands. In addition to the machinery OEM groups, there are more than 100 companies actively manufacturing non-hydraulic attachments.⁷ Even though almost 75% of the machinery OEMs active in Europe turn over less than EUR 100 million, they are highly international with more than 40% of their sales in other continents, mainly in North America, the Middle East, and Asia.

The construction equipment industry is currently in the midst of considerable change. Among

The OEM landscape is highly fragmented with myriad small and medium-sized companies, as well as a handful of large multi-billion euro players.

other things, demand has been highly volatile and is currently weak, customer landscape and expectations on the OEMs are changing, new and potentially revolutionary technologies (e.g., electrification, big data) are coming, and competitors from emerging markets are getting stronger.

Across the board, OEMs active in Europe are optimistic about the next five years. They expect their own revenues to grow at 5 to 6% annually and margins to improve by 2 percentage points by 2020. This positive outlook for the medium term is generally shared by industry experts; however, they are more conservative about the next one to two years and, hence, also more modest about the total growth and margin prospects until 2020. The high growth expectations are largely driven by the industry recovering after the demand slump in recent years.

There are two primary trends that European OEMs highlight as value-creating opportunities for the

Two primary trends are highlighted by European OEMs as value-creating opportunities – demand from markets outside of Europe and the increasing importance of aftermarket service.

next five years – demand from markets outside of Europe and the increasing importance of aftermarket service. Asian, Middle

⁶ Excluding temporary employees

⁷ A further approximately 1,000 companies, mainly foundries and metal workshops, also produce non-hydraulic attachments occasionally on special order, but not as a core routine product

Eastern, and African markets are expected to continually have the highest growth prospects, and aftermarket may allow margin boosts in developed markets. Essential for succeeding in capturing the potentials in both emerging markets and aftermarket is that European OEMs offer differentiated products, services, and solutions. European OEMs see emerging market competition as a key threat and will, in most cases, not be able to compete with them on price. Differentiation requires deep understanding of customers' business and a leading technology position, both with the actual machines as well as within the ecosystem around the equipment.

When European OEMs describe their most successful peers in recent years, they emphasize excellence in operational scale and low-cost production and sourcing as the key capabilities behind their success. The construction equipment industry has traditionally been heavily engineering focused, with the manufacturing factors of scale and cost further prioritized as international competition has intensified. Looking forward, OEMs point to a drastic shift in

The most important success criteria of the future are perceived to be a deep understanding of how customers create value and being on the technological forefront.

relative priorities. The most important success criteria of the future are perceived to be a deep understanding of how customers create value and being on the techno-

logical forefront. This goes hand in hand with the foreign market and aftermarket opportunities, and while these opportunities are by no means new, there is a clear shift in mindset and focus of OEMs regarding how to go after them. A drastic shift from an operations-focused to a customer-centric perspective!

That this shift is happening right now is the result of several converging trends in the industry on both the OEM and customer side. The two parties, as well as dealers in-between, are drawn together, for example, as machine data reaches a pivotal point for OEMs to support customers on operations. Increasing machine complexity, which requires deeper expertise, and customers' growing focus on their core, including increased outsourcing of maintenance and repair, also bring OEMs, dealers, and customers closer together.

This shift is acknowledged and unanimously applauded by industry experts as a critical step forward towards securing long-term prosperity of the construction equipment OEMs in Europe. McKinsey's experience in supporting thousands of companies on change journeys year after

This mindset change is essential, yet there are significant challenges ahead when it comes to putting these new attitudes into practice.

year affirms the idea that this mindset change is essential but also suggests

that there are significant challenges ahead when it comes to putting these new attitudes into practice. Gaining deep customer insights and staying at the technology forefront requires OEMs to:

1. Collaborate closely with dealers to gain access to and deliver on customer insights
2. Raise R&D investments and make highly selective investments to keep up to speed with accelerating technological development
3. Develop refined customer-performance-related offerings

4. Modularize their portfolios to retain scale benefits while differentiating the offering
5. Build new capabilities and rebalance governance from operations to customers
6. Strengthen agility and action orientation in corporate processes.

The diversity of the industry means that the shift will be of varying degrees of importance and imply different actions to different OEM types, which is also reflected in the survey results about future success criteria. For large global OEMs, operationalizing the machine data into customer offerings and aligning their dealers will be top priorities. For small global niche OEMs and locally/regionally focused OEMs, it will be essential to carefully review what R&D investments to make and where to partner to stay relevant, leveraging unique, ongoing customer insights. For OEMs in more commoditized machine segments, the possibilities to differentiate and customize are fewer, whereby scale and cost will likely remain most important in the years to come.

Construction equipment in Europe is about to transform with many potentially disruptive changes coming faster than anticipated, but there is a healthy optimism from industry players about what lies ahead. OEMs see opportunities for both growth and margin increase and are clear on the shift in mindset and focus required to be successful with these. The shift from an operations-focused to a customer-centric perspective is a major step in the right direction. This shift now needs to be translated into strategic choices, concrete actions, and visible changes in the daily business. By acting urgently and decisively, construction equipment OEMs in Europe have great prospects in the years to come.





I. The starting point

In an effort to shed light on the sector's status quo and key characteristics, this chapter presents an organizing and stocktaking approach to the construction equipment industry in Europe. The resulting overview serves as a backdrop for understanding why and how the industry can be expected to change.



1.1 Systematic overview of the construction equipment industry

Compared to other automotive and machinery industries, McKinsey designates construction equipment as “low volume, high complexity.” The breadth of machine types that can be included under the umbrella is massive, both in just sheer number of machine types, but also in the variety of sizes, technologies, and usages areas. These differences are also reflected in the characteristics of the particular OEMs’ business, the trends that affect it, and its success factors. Given the wide variability within the industry, it is important to establish a common understanding, terminology, and clarity on the covered scope before analyzing and interpreting the OEMs’ perspectives and outlook. For this report we have leveraged McKinsey’s standard definition and categorization of construction equipment (Exhibit 2).

Exhibit 2

McKinsey’s standard definition and categorization of construction equipment

Heavy earthmoving equipment		Dump truck and scraper	Articulated dump truck, rigid dump truck, motor scraper
		Dozer and grader	Crawler dozer, wheeled dozer, motor grader
		Loader	Crawler loader, wheeled loader, backhoe loader
		Excavator	Crawler excavator, wheeled excavator
Compact earthmoving equipment		Excavator	Compact excavator
		Dumper	Wheel dumper, track dumper
		Loader	Wheeled loader, skid-steer loader
Road construction and compaction equipment		Asphalt construction	Road paver, material feeder, screed, roller, slipform paver
		Asphalt mixing plant	Batch plant, continuous plant, cold mix plant
		Light compaction	Rammer, vibratory plate, roller
		Cold milling, stabilizing, recycling	Cold milling machine, cold recycler and soil stabilizer, binding agent spreader, hot recycler

Crushing and screening equipment		Crushing	Stationary crusher (jaw, cone, gyratory, HS, VS impactor), mobile crusher, aggregate plant
		Screening	Stationary screen (stratification, free-fall, roller), mobile screens, aggregate plant
Concrete equipment		Concrete pump	Truck-mounted, stationary, truck-mixer concrete pump combination
		Truck mixer	Standard truck mixer, semi-trailer mixer
		Placing/distribution system	Stationary system, tower system
		Batching plant	Horizontal mixing plant, mixing tower
Civil engineering equipment		Tunneling	Tunnel boring machine, partial-face excavation, auger boring, etc.
		Pipe and cable laying	Pipe layer, trencher
		Piling	Piling rig (vibrohammer, impact driving system, soil mixing system, etc.)
		Surface drilling	Rotary drill rig, surface top hammer, etc.
Lifting equipment		Crane	Tower crane, mobile crane
		Hoist	Rope hoist, material hoist, personnel and material hoist, transport and work platform
		RTL	Masted, telescopic RTL
		Aerial work platform	Scissor lift, cherry picker/boom lift
Attachments		Non-hydraulic attachments	Bucket, blade, ripper, fork, bit, etc.
		Hydraulic attachments	Auger, grapple, demolition tools, breaker and hammer, etc.

Construction equipment covers the mobile (and selected fixed) machines for infrastructure, energy/industry, real estate and other construction within eight primary segments, more than 25 categories, and a total of more than 100 machine types. The machine types can, in turn, be broken down further by weight class and configuration. The eight segments are primarily based on application (e.g., earthmoving, lifting, quarrying), and the categories are based on technology. Attachments are singled out as a separate segment due to their distinct technologies and manufacturers, although the tools may be carried by many of the other machine categories. The primary segments are:

- Heavy earthmoving equipment, such as excavators and loaders
- Compact earthmoving equipment, such as compact excavators and skid steer loaders
- Road construction and compaction equipment, such as pavers and rollers
- Crushing and screening equipment, such as crushers and screens
- Concrete equipment,⁸ such as pumps and mixers
- Civil engineering equipment, such as drill rigs and piling rigs
- Lifting equipment, such as tower cranes and RTLTs⁹
- Attachments, both hydraulic, such as hammers, and non-hydraulic, such as buckets.

There are many possible ways to draw the line between what is included in construction equipment and not, as well as how to segment the machines. In some definitions, cranes or concrete equipment would not be included and, likewise, other equipment types could potentially be added to this list, e.g., compressors, generators, off-road trucks, and even handheld power tools.

Even blurrier are the boundaries between construction equipment and neighboring industries, particularly mining equipment, agricultural equipment, forestry equipment, material handling (e.g., ports, warehouses), waste management equipment, and municipal equipment (e.g., tool carriers, street sweeping). Construction equipment, by McKinsey's and this report's definition, is designed to be directly engaged in construction (or demolition) activities; however, in practice, that same machine may be used for many another purposes. The most common overlaps with other industries are (Exhibit 3):

⁸ Cement plants and equipment for production of pre-fabricated concrete is not included

⁹ Rough terrain lift truck

The construction equipment industry overlaps with other industries in several dimensions



¹ For example recycling and municipal

SOURCE: Expert interviews

- Same machine used for a different application, e.g., dump trucks, crushers, and drill rigs used in construction/quarrying as well as in mining, or wheel loaders used in construction and recycling
- Same or similar technology and parts used for different applications, e.g., undercarriages used by crawler excavators and harvesters (forestry), or masts and forks used by a masted RTLT and a forklift. Consequently, OEMs of machines for different industries share suppliers, e.g., for engines
- Same OEM manufacturing machines for several industries, e.g., agricultural tractors and harvesters as well as construction equipment
- Same dealers selling and servicing multiple equipment types, e.g., municipal machines sold together with construction equipment.

What is more, the industry shows three characteristics:

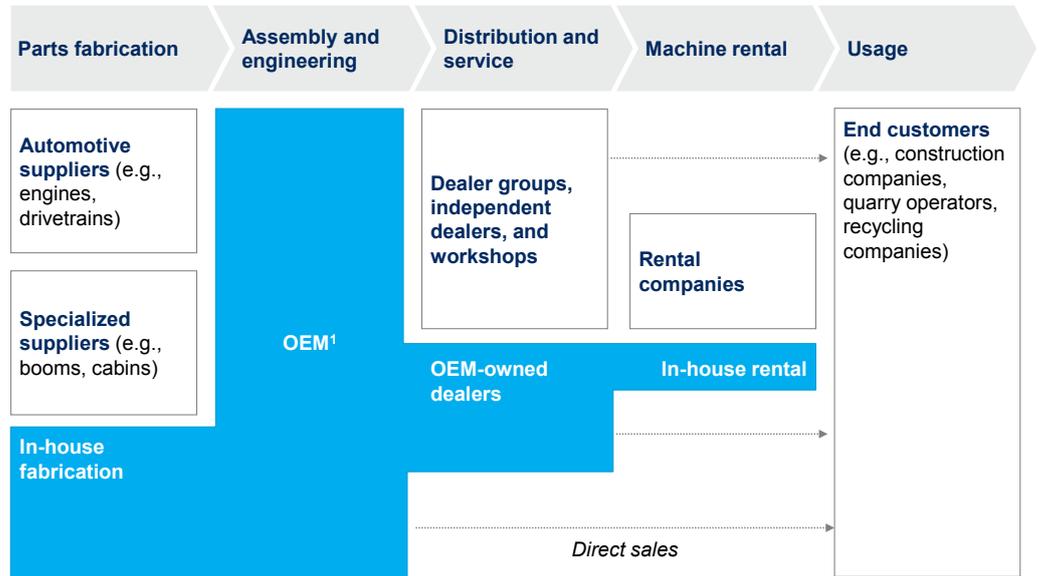
High complexity. Besides engaging in construction activities, the machines classified as construction equipment are a heterogeneous group with major differences in design, size, and components across the category. There are few commonalities in functionality, design, technology, or parts shared between the segments or even between the machines in the same category. Production of more than one machine category on the same line is possible but uncommon.

Low volume. A select few machine types are produced in the hundreds of thousands annually, but the majority are made in much lower volumes. The primary high-runners are crawler excavators, heavy wheel loaders, and compact excavators that jointly represent well more than 50% of the volume and revenues of the industry. On the other end are machine types produced in the hundreds or tens annually, such as trenchers, milling machines, and motor scrapers. At the far bottom is highly specialized equipment like tunnel boring machines. The industry's higher-volume machines are generally more commoditized with higher competition, including from emerging market OEMs. However, even the high-runners' volumes are moderate relative to the tens of millions of cars and commercial vehicles produced annually.

OEMs as ecosystem players. OEMs traditionally have their core in developing and manufacturing the equipment, regardless of which automotive or machinery industry we talk about. In the construction equipment industry, however, OEMs are often active in other areas as well. Commonly, OEMs are also involved in the engineering and fabrication of key components and sub-assemblies (e.g., engines and cabs). Many have an ownership stake in dealerships and sometimes also operate rental businesses. Despite the potential overlap, McKinsey has defined a simplified five-step construction equipment value chain and a handful of primary company types directly mapped to these steps: parts fabrication, assembly and engineering, distribution and service, machine rental, and usage (Exhibit 4).

The construction equipment value chain has 5 primary steps, with OEMs active in 1 or several

SCHEMATIC AND SIMPLIFIED



1 In rare cases, OEMs also operate the machines (as users), e.g., as sometimes is the case for piling equipment and trenching machines

SOURCE: Expert interviews

- **Parts fabrication.** The fabrication of components and sub-assemblies is often partially done by the OEMs, as certain key components (e.g., cabs, frames, engines) are a key differentiating aspect of some OEMs versus competitors. However, the engineering can obviously be done by the OEM while actual fabrication is outsourced. The majority of parts (typically the less “strategic,” including everything from nuts and bolts to hydraulic hoses and tires, but in many cases also engines, frames, etc.) are sourced externally from a mix of small dedicated construction equipment suppliers to larger companies that supply OEMs across automotive and machinery industries.
- **Assembly and engineering.** The OEM typically assembles the equipment, although the task can be outsourced. In construction equipment it is not unheard of that OEMs cooperate on assembly for lower-volume machines to secure financially viable scale. In practice, one OEM can assemble machines for another OEM on its line, or a single OEM could source identical machines and rebrand and repaint them.
- **Distribution and service.** For most of the higher-volume machine types (e.g., heavy and compact earthmoving equipment, RTLs, hoists), the equipment is sold to the users through dealer networks. For large fleet sales and for more customized machines (e.g., crushers, tunneling, batching plants), the OEM is often in direct contact with the end customer. Attachments may also be sold via the machinery OEM and then, in turn, to dealers.

OEMs commonly work with several dealer groups, as those are focused on certain geographies. The ownership model and geographical structure of dealers varies greatly between OEMs. Some dealer groups are wholly owned by OEMs, and others are fully independent. Some dealer groups are narrowly focused on one region within a country,

whereas other dealer groups span several countries. Some dealers have exclusivity agreements with OEMs, and others are competing. Some dealer groups are large companies with hundreds of outlets, and others operate as local “mom and pop” businesses. Besides the sale of new equipment, dealers often have a significant business in repair and maintenance of machines (including supplying parts from the OEM or independent suppliers) and resell of used machines.

- **Machine rental.** A high share of certain types of machines – particularly compact earthmoving, lifting, and parts of heavy earthmoving equipment – are owned by rental companies. The rental market is well established in North America and Europe, particularly in Western Europe, (e.g., UK, France, and Northern Europe). The rental market is steadily growing as users (e.g., construction companies) seek to benefit from higher machine utilization, offload their balance sheets, and focus on their core business. There are several larger regional rental companies and many local ones. Several OEMs and dealers also operate their own rental business.
- **Usage.** Since construction equipment is used for such a variety of applications, there is a wide range of end users. These include construction contractors (general contractors and sub-contractors), quarry operators, recycling companies, and many more. Most end users are small companies that own, lease, or rent machines. In rare cases, OEMs also operate the machines, e.g., as sometimes is the case for piling equipment and trenching machines.

The value chain can be extended on both ends, e.g., with raw material supply and used machines. Furthermore, leasing and financing could be singled out as a separate step and is driven by the OEMs and/or separate financing providers. Aftermarket – i.e., parts, services (e.g., repair and maintenance), and solutions (e.g., uptime or output contracts) to the active machine population – could possibly also have been a sixth step, although it is largely included in distribution and service. Aftermarket is an important profit generator for OEMs, with a multiple times higher EBIT margin than new equipment sales. OEMs mainly sell parts, while dealers offer services and solutions. For the average OEM in Europe, aftermarket only makes up 15 to 20% of revenues.¹⁰ Additional aftermarket revenues are generated by independent dealer groups and suppliers. However, for most machine types, there are also many companies competing with OEMs and dealers in the aftermarket space, such as local and unauthorized machinery workshops offering repairs and independent spare parts manufacturers.

¹⁰ European construction equipment survey 2015 - 16

1.2 Key facts and figures of the construction equipment industry in Europe

In Europe, construction equipment is a large industry with numerous OEMs active, all the way from large multi-national players to global niche players and local OEMs with one- or two-digit production volumes. Furthermore, there is a wide network of suppliers, dealers, rental companies, etc. Most of these active companies are originally from Europe, but many OEMs from North America and Asia have production and sales operations in Europe.

There is no official and reliable data on how many OEMs are actually active today in Europe (defined here as European Union, Switzerland, Norway, Russia, and Turkey unless otherwise mentioned). Based on a unique scanning and assessment of machinery companies¹¹ in each of the countries, McKinsey has identified that there are roughly 340 to 370 machinery OEM groups operating in Europe today. With “machinery OEM” we mean manufacturers of construction equipment machines, including hydraulic attachments but excluding other attachments. In addition, there are more than 1,000 companies in Europe, mainly metal workshops and foundries, capable of producing non-hydraulic attachments. Of these, roughly 100 primarily focus on attachments, while the remaining do occasional special orders. With “OEM groups” we mean corporate groups, i.e., not legal entities (e.g., country organizations) or brands. Historically, Europe had an even higher number of OEM groups, which over the last 20 years has declined as companies have merged into larger groups or gone out of business. Experts emphasize that many of these OEMs relied on local/national demands and have hence been affected by increasingly globalized markets standards. While most OEM groups operate under one, or sometimes two or three brands, there are some that have more than ten brands in their portfolio from previous acquisitions. These brands often operate as stand-alone companies. The total number of machine brands offered in Europe is estimated to be more than 500.

All in all, these 340 to 370 OEMs have an estimated revenue in their European construction businesses¹² of EUR 35 billion to 40 billion and employ¹³ roughly 150,000 people, based on McKinsey’s assessment of company reporting and extensive verification with independent industry experts. Beyond those directly employed by the construction OEMs, the construction equipment industry creates jobs in suppliers, dealers, and workshops. Experts estimate that the total employment related to construction equipment is up to 250,000 to 300,000 people in Europe. More than 20% of the OEMs are relatively small companies not turning over more than EUR 10 million in their construction equipment business, and almost 75% of the OEMs have revenues below EUR 100 million. On the other end, there are several OEMs that turn over more than EUR 1 billion in their construction equipment business. The smaller companies tend to be either regional specialists, e.g., offering a product tailored to the local market, or global niche players. Consequently, a high share of machine production and revenues are concentrated with a relatively small group of larger OEMs. However, crucial for understanding the construction equipment industry and its dynamics is that, in both local and niche markets, small OEMs often successfully compete with their larger peers (Exhibit 5, 6).

¹¹ Companies classified within broader “machinery” segments have been individually reviewed and assessed for if they are construction equipment OEMs. Companies owned more than 50% by another OEM have not been counted separately. The figures have been confirmed with industry experts

¹² Revenues of construction-equipment-related business (i.e., not others active in the same company such as manufacturing of other machines and vehicles, manufacturing of engines and components for external customers, etc.) and inside Europe (i.e., not including sales in other continents)

¹³ Directly employed and temporary workers of the OEMs in number of heads, not full-time equivalents; excludes independent dealers and suppliers

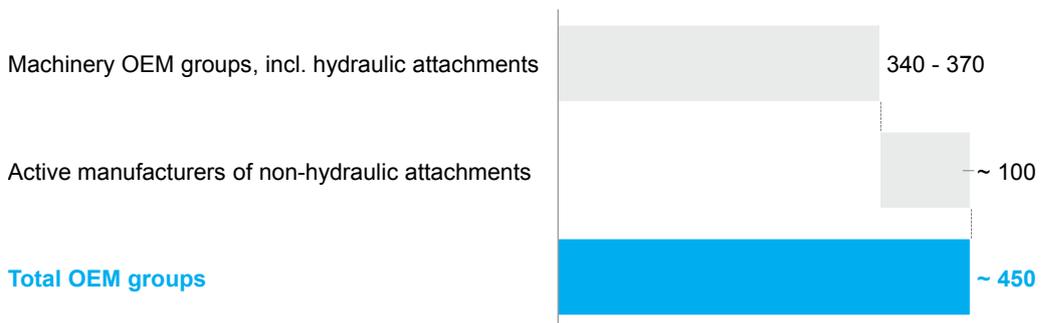
Of the machinery OEM groups active in Europe, less than 10% are headquartered in other continents, mainly Asia and North America, but with plants and/or sales/dealer presence in Europe. Most European OEMs are headquartered in Western¹⁴ and Southern¹⁵ Europe, with Italy, Germany, and France being the countries with more than 50% of the region's OEMs.

Exhibit 5

Size of the European construction equipment industry

ESTIMATES

Number of OEM groups in Europe 2015



Industry revenues inside Europe

EUR 35 - 40 billion

OEM employees in Europe¹

> 150,000

¹ Number of people employed, not full-time equivalents (FTE); excl. temporary employees as well as employees outside the OEM, e.g., in independent dealer groups, suppliers

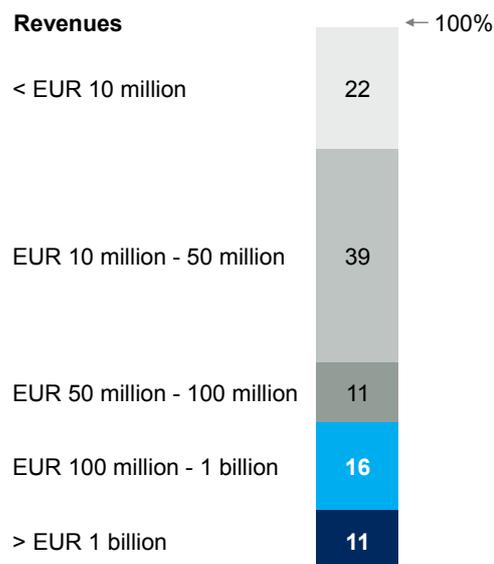
SOURCE: Company and financial databases; company reports and Web pages; expert interviews

Exhibit 6

Most OEMs active in Europe are small

ESTIMATES

No. of machinery OEM groups active in Europe by global construction equipment revenue, percent



SOURCE: Company and financial databases; company reports and Web pages; expert interviews

¹⁴ Austria, Belgium, France, Germany, Ireland, Luxemburg, Netherlands, Switzerland, UK

¹⁵ Bosnia and Herzegovina, Croatia, Cyprus, Greece, Italy, Macedonia, Montenegro, Serbia, Slovenia, Spain, Portugal, Turkey

A considerable share of players also have their headquarters in Northern¹⁶ and Eastern¹⁷ Europe (Exhibit 7). Turkey is often mentioned by independent experts as a country with many OEMs. However, Turkey does have several companies manufacturing construction equipment on contract for other OEMs or producing attachments as occasional orders, which by definition are not counted as OEM groups by McKinsey.

Exhibit 7

Machinery OEM groups in Europe are primarily headquartered in Western and Southern Europe

ESTIMATES

No. of machinery OEM groups active in Europe by headquarters locations, percent



SOURCE: Company and financial databases; company reports and Web pages; expert interviews

European construction equipment OEMs are generally highly international. On average, a European-headquartered OEM earns roughly 40%¹⁸ of its revenues in other continents, mainly North America, the Middle East, and Asia (excluding China, India, Japan, and Korea). Larger companies are generally no more international than medium sized and small ones, as many of the smaller are niche players serving a global market. The European-headquartered OEMs have an average of 85% of their production capacity in Europe; however, about half have no production on other continents (Exhibit I, II in the appendix).

As a whole, Europe is a net exporter of construction equipment. In 2013, the value of construction, mining, and quarrying equipment exported by European OEMs¹⁹ totaled EUR 20.2 billion, of which EUR 12 billion to 14 billion is estimated to be construction equipment as defined in this report. Imports to Europe are significantly smaller at EUR 8.5 billion, of which construction equipment is EUR 4.5 billion to 5.0 billion. The main exporting countries in 2013 were Germany (21% of exports) and the UK (12%), while the main importers were Russia (32% of imports) and Turkey (13%). For the total machinery²⁰ industry, European exports only outweigh imports by 10 to 15%, while construction equipment is a clear net exporter with 2.5 to 3 times higher exports than imports. Out of the total machinery exports, construction equipment represents 2 to 3% (Exhibit III in the appendix).

¹⁶ Denmark, Finland, Iceland, Norway, Sweden

¹⁷ Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Russia, Slovakia, Ukraine

¹⁸ European construction equipment survey 2015 - 16

¹⁹ Here defined as EU-28 and Russia, Turkey, Norway, Switzerland

²⁰ Machinery and transport equipment (SITC Rev.4 Code 71 to 77)





II. OEMs' perspectives on the industry

For perspectives on where the industry is heading and what the top priorities are, we have turned to the OEMs themselves. The following insights are drawn from the survey of OEMs active in Europe and from interviews with OEMs and other industry experts specifically conducted for this report.



2.1 The outlook – confidence about the direction

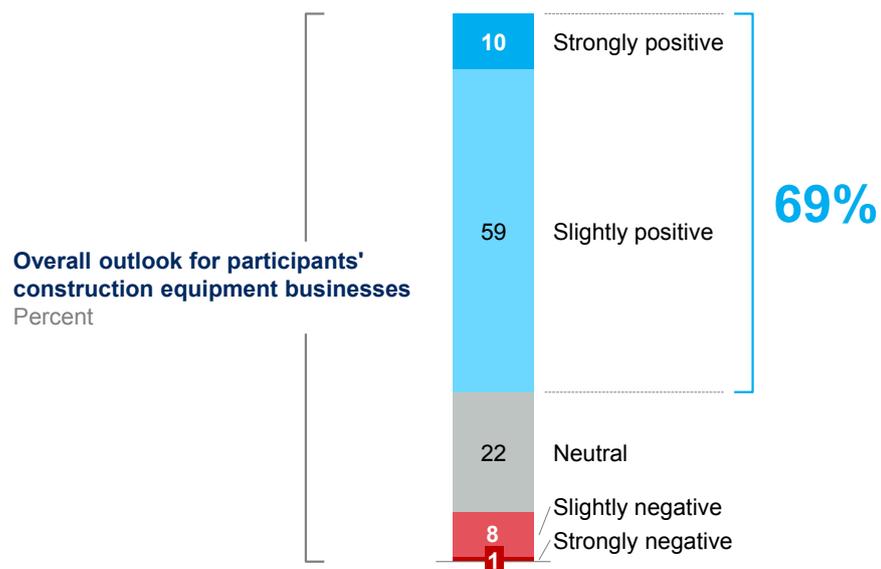
Construction equipment OEMs active in Europe are generally optimistic about the years to come and their own revenue and EBIT margin development until 2020. Two out of three OEMs have a positive or very positive general outlook for their own business. Approximately one fifth of OEMs have a neutral outlook on the future of the industry, while only one out of ten is negative about the industry's prospects in the coming years (Exhibit 8).

The positive outlook is reflected in the expected financials of OEMs. Three out of four anticipate revenue growth in the next five years at an average rate of around 5 to 6%²¹ per annum in their companies. Around one fifth have a neutral outlook, and only 4% believe their revenues will decrease in coming years. OEMs also believe that profitability will increase overall – two out of three expect an average improvement in EBIT margins of around 2%²² over the next five years. One in four OEMs foresees that profitability will remain at its current level, while one in ten anticipates declines in profitability (Exhibit 9).

Past performance seems to affect the future outlook, as OEMs with historically strong performances are, on average, more positive about the future. Those who experienced strong revenue growth between 2012 and 2015 report around 2.5 percentage points higher expected annual growth for the coming years compared to those who saw a recent decrease in revenues by more than 5%. That being said, even those who have had challenging years in the recent past expect growth to reignite in the years to come (Exhibit IV in the appendix).

Exhibit 8

Construction equipment industry is positive about the years to come



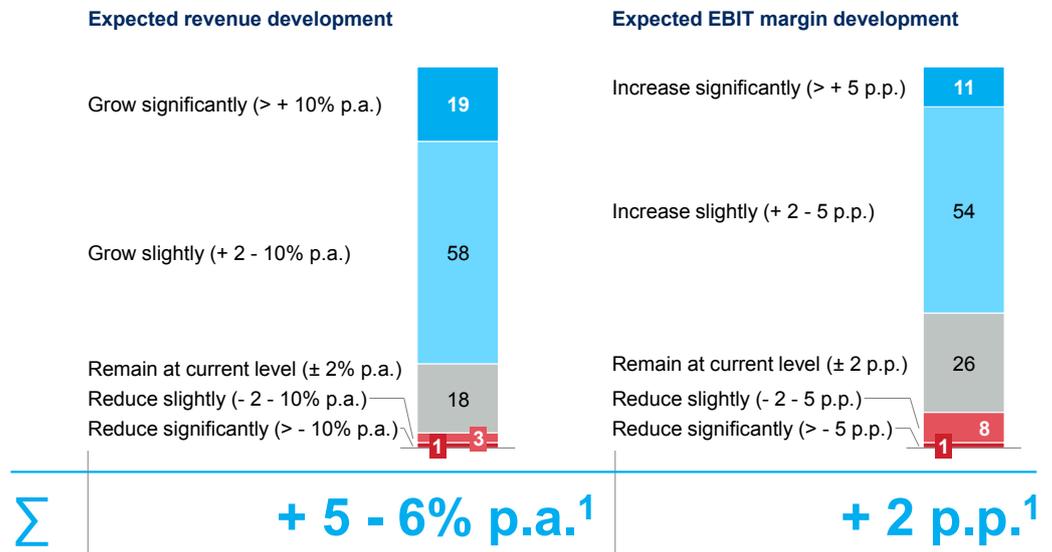
SOURCE: European construction equipment survey 2015 - 16

²¹ Weighted average of each range; weighted by number of companies, i.e., not by size

²² Weighted average of each range; weighted by number of companies, i.e., not by size

OEMs expect revenue increases of 5 - 6% p.a. and EBIT margin improvements of 2% in the coming 5 years

Percent of respondents



¹ Both EBIT margin and revenue increases have been calculated by assuming an average value for range provided by respondent, e.g., if revenue is reported to remain at current level ± 2, growth rate of 0 is assumed
 SOURCE: European construction equipment survey 2015 - 16

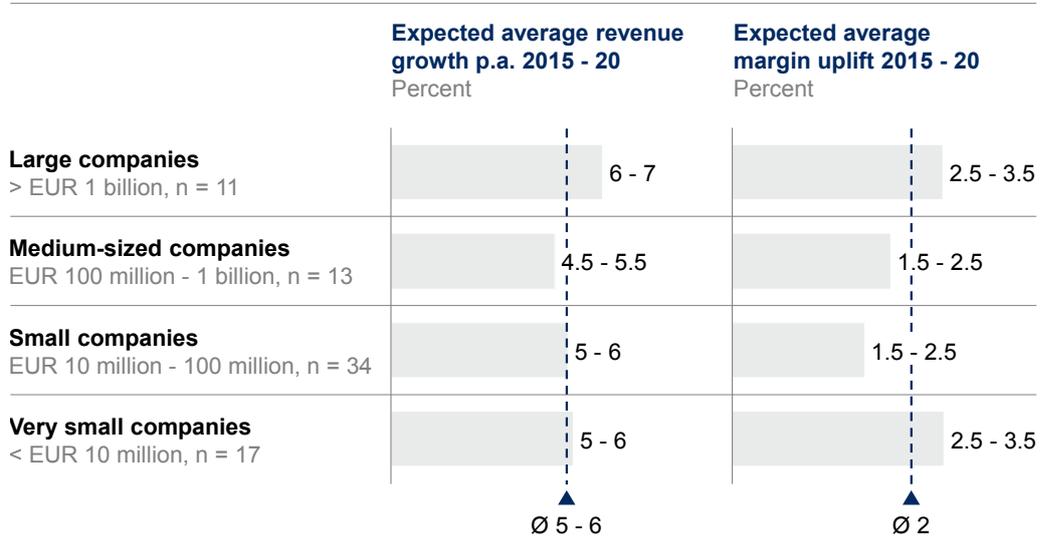
This report does not aim at providing an independent demand forecast; however, the industry experts interviewed generally have a slightly more conservative view, particularly for the next one to two years. Slowdowns in emerging markets were mentioned as the basis for their cautious outlook, as was the sluggish recovery of demand in markets within Europe. Beyond the next one to two years, the experts are more optimistic that infrastructure markets will rebound – especially in emerging markets –, leading to an overall positive trajectory until 2020 but at an average rate below the 5 to 6% per annum projected by OEM representatives. One possible explanation of this deviation is that several signs of slower demand growth appeared after the survey was administered in December 2015 and early January 2016 but before interviews with industry experts were conducted. Another is that the OEMs may refer to their own performance targets, as opposed to an industry-wide goal for growth and margin development.

Even if overstated, the 5 to 6% annual growth rate expectation is a high number. However, the construction equipment industry is in recovery after the demand slump of recent years, and OEMs expect global demand to pick up. Hence, the strong growth expectation should not be interpreted as if the industry were going into an exceptional boom.

Generally, OEMs are positive about the industry’s future, but there are some differences in outlook depending on size. Large companies (more than EUR 1 billion revenue) and very small companies (less than EUR 10 million revenue) are most positive when combining expectations of revenue growth and EBIT margin improvements. On the contrary, the small and, particularly, the medium-sized companies have, on average, a slightly less positive outlook. A possible reason behind this is that the primary trends for the coming years are potentially more favorable for large and niche players, as will be discussed later in the report (Exhibit 10).

Large companies have a more positive outlook overall

Outlook for next 5 years by company size



SOURCE: European construction equipment survey 2015 - 16

While OEMs from all regions are positive, there are some differences. Northern European OEMs are the most optimistic with revenue growth expectations 2 percentage points above average and an EBIT improvement projection 0.5 to 1.5% higher. Southern European OEMs follow closely behind, with expected growth at 6 to 7% per annum and a somewhat higher margin upside. The strong outlook for Southern European OEMs is likely driven by the local suppressed demand of recent years, resulting in a backlog of infrastructure projects. Industry experts point out that the outlook varies even more considerably country by country within the region (Exhibit V in the appendix).

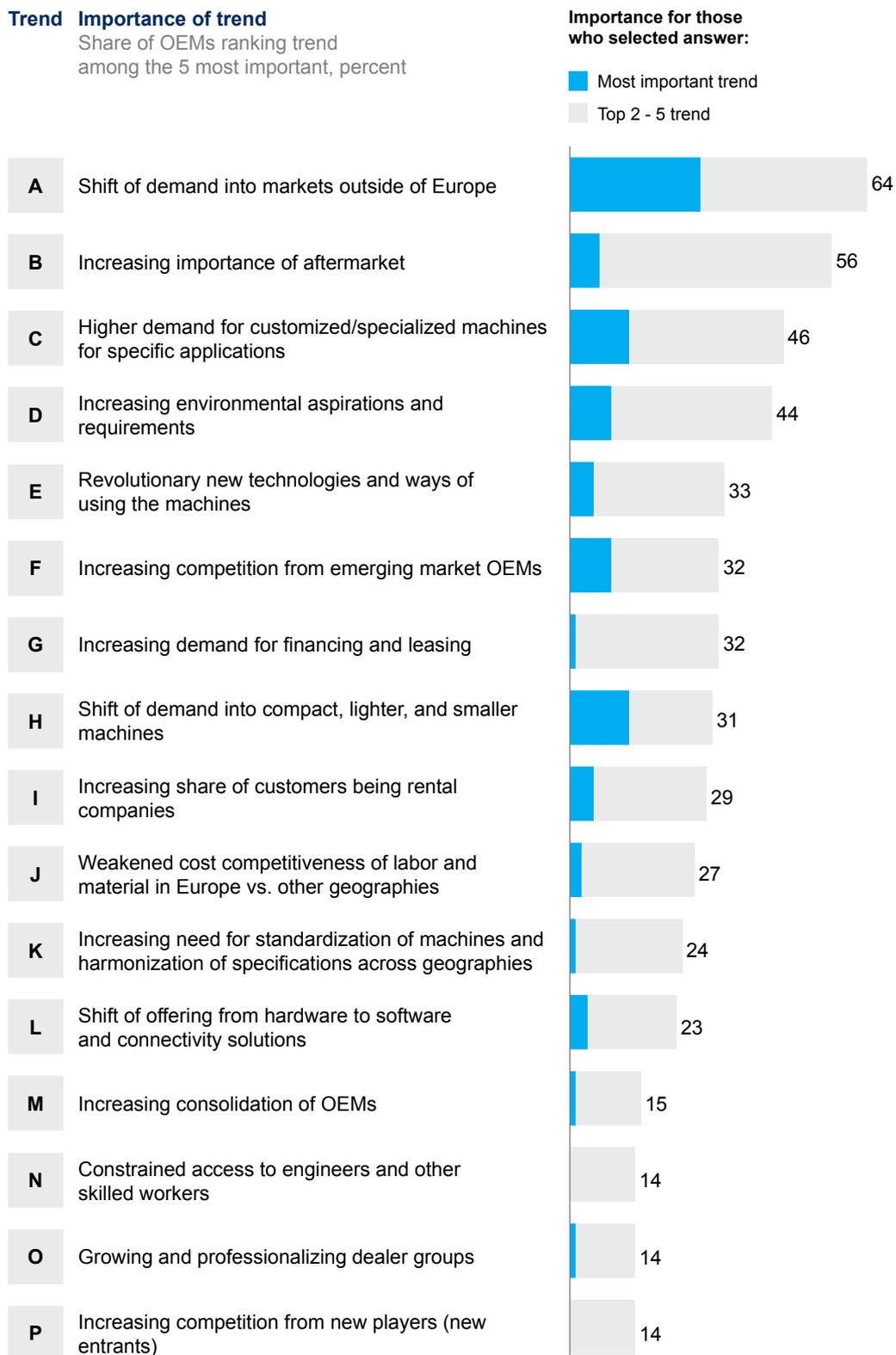
2.2 The trends – primary changes in the coming years

There are many changes happening in the industry in the coming years. Construction equipment OEMs list multiple trends as relevant for the years to come (Exhibit 11). The majority of these trends represent opportunities for OEMs, and most see themselves as well prepared to respond. This sense of readiness may be what is behind the optimism revealed by the research.

There are two primary trends that OEMs expect will be most important for their business – a shift in demand to markets outside of Europe and the increasing importance of aftermarket, ranked as top five trends by 64% and 56% of OEMs, respectively.

Already today, European OEMs are fairly international in nature, with around 40% of their revenue generated outside of Europe on average. Respondents expect this trend to continue and even increase in importance as they may be faced with continued low demand in their home markets. Even if near-term volume levels are low, there are fundamental infrastructure needs that will drive construction equipment demand, especially in emerging markets.

OEMs consider "shift of demand into markets outside of Europe" and "increasing importance of aftermarket" the 2 most important trends



SOURCE: European construction equipment survey 2015 - 16

Aftermarket is generally a high-margin and especially attractive business for many OEMs in slower-growing home markets in Europe. The existing machine base can be used to generate sales even in slower times, with repair and maintenance and spare parts supply as the essential basics, along with financing and leasing. Many experts also cite that end customers are increasingly focusing on their core business and demanding more advanced services from the OEMs (and dealers), e.g., uptime and output contracts.

The third most important trend is higher demand for customized/specialized machines for specific applications, rated as a top five trend by almost half of the OEMs. Although standardization – as a means of driving scale in production, shortening lead times, and addressing the growing rental business – is a common theme in the industry, end customers are under continuous pressure to lift productivity, and this requires machines tailored precisely for their needs. In McKinsey’s experience this is not necessarily a conflict, as modularization can be a way of providing customized machines without being encumbered by an endless variant list.

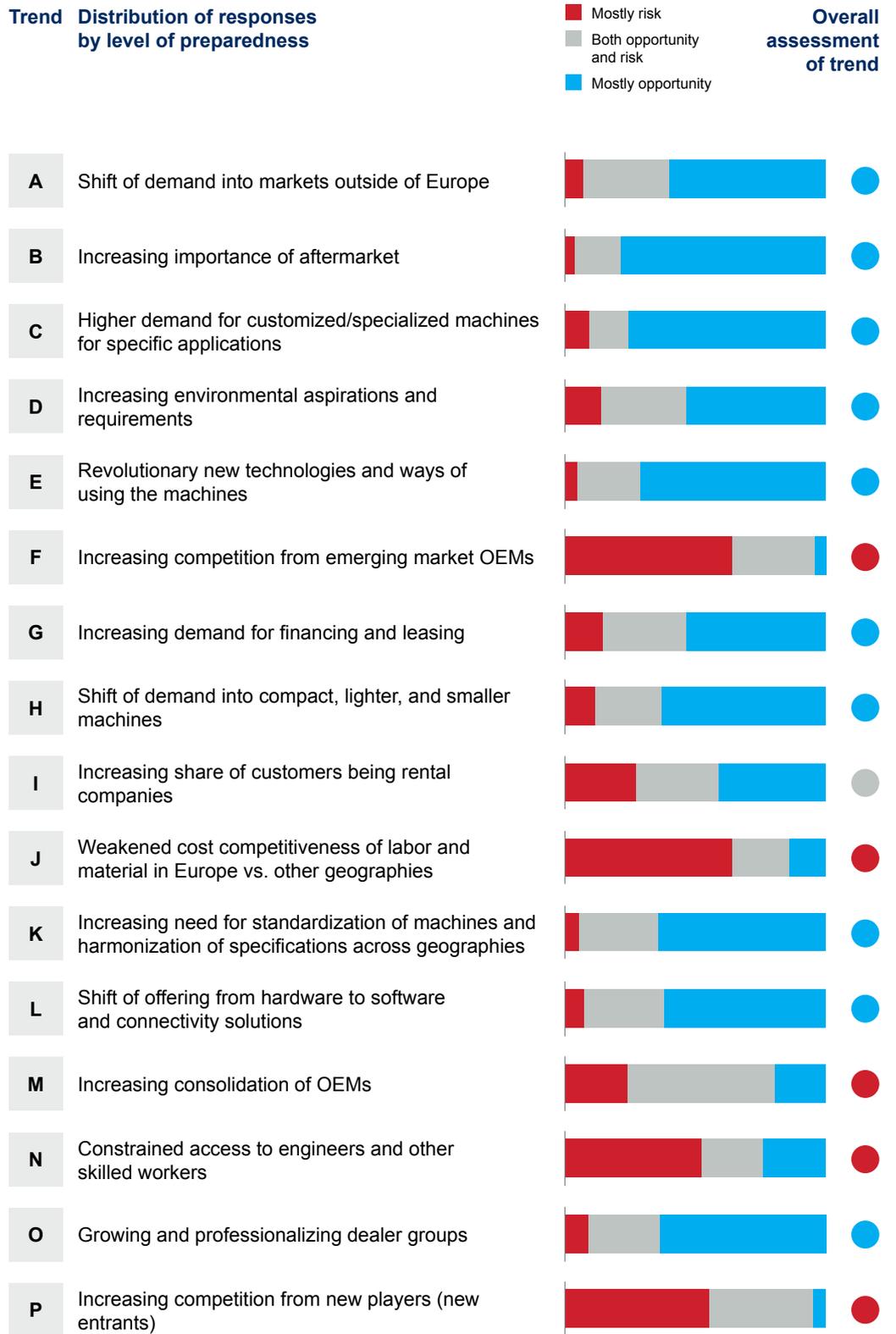
Increasing environmental aspirations and requirements is the fourth most important trend for the OEMs. The trend is driven largely by regulation, which for many years has been central to OEMs’ R&D efforts for the European home markets. OEMs and industry experts expect implementation of and adherence to existing and extended/new regulations to continue to be of high importance to the daily business.

Revolutionary new technologies and ways of using the machine is ranked fifth. There are several large technological changes happening in the industry now and in coming years, which will likely drastically change how machines are used and OEMs value propositions. Some of the more prominent changes are hybrid and electrical powertrains, digitization and leveraging big data, and driverless machines.

Related to the demand growth on other continents, European OEMs also view increasing competition from emerging market OEMs as one of the more important trends. Emerging market OEMs have been gaining share in their home markets over the past decade, as well as taking share in other emerging markets (e.g., Africa, South America). This has been fueled by a strong demand for “value” machines across markets. As European OEMs compete in these markets, they face competition from emerging market OEMs that can offer similar levels of functionality and quality at lower price points. Competition from emerging market OEMs is relatively low in Europe and North America today. Several industry experts mentioned that if emerging market OEMs decide to enter at scale, they will likely face the same challenges faced by Japanese and Korean OEMs in the past (e.g., establishing dealer and service networks) but eventually succeed.

At the other end of the spectrum, most OEMs do not view potentially disruptive trends such as “consolidation,” “shortage of talent,” “professionalization of dealer groups,” and “increasing competition from new entrants” as trends that will happen in the coming years. While there are arguments both for and against the likelihood of these trends becoming reality, there is no clear consensus among the industry experts we interviewed. Nevertheless, we would strongly urge OEMs to plan for and take proactive measures to address these potentially disruptive trends.

Most trends are seen as opportunities by the OEMs



SOURCE: European construction equipment survey 2015 - 16

Eleven of the trends are seen as opportunities by the OEMs, while just five are seen as threats. The trends that are rated as the highest opportunities are increasing importance of aftermarket, higher demand for customized/specialized machines for specific applications, and revolutionary new technologies and ways of using the machines. These three trends have in common the fact that they create options for how OEMs can differentiate their offerings. Among the trends seen as high risks, only one, increasing competition from emerging market OEMs, is considered very likely to happen in the coming years (Exhibit 12).

OEMs perceive themselves as prepared or well prepared to handle most trends, especially those seen as most relevant at the top of the ranking. The exception is increasing competition from emerging market players. In addition, increasing financing is not seen to be a trend that OEMs feel particularly ready to take on. Industry experts cite that these types of solutions are increasingly in demand, especially by capital-heavy end customers such as rental companies, and many larger OEMs already have internal financing arms in place for the purpose. However, smaller OEMs could also organize such contracts with the aid of external financing and leasing providers (Exhibit 13).

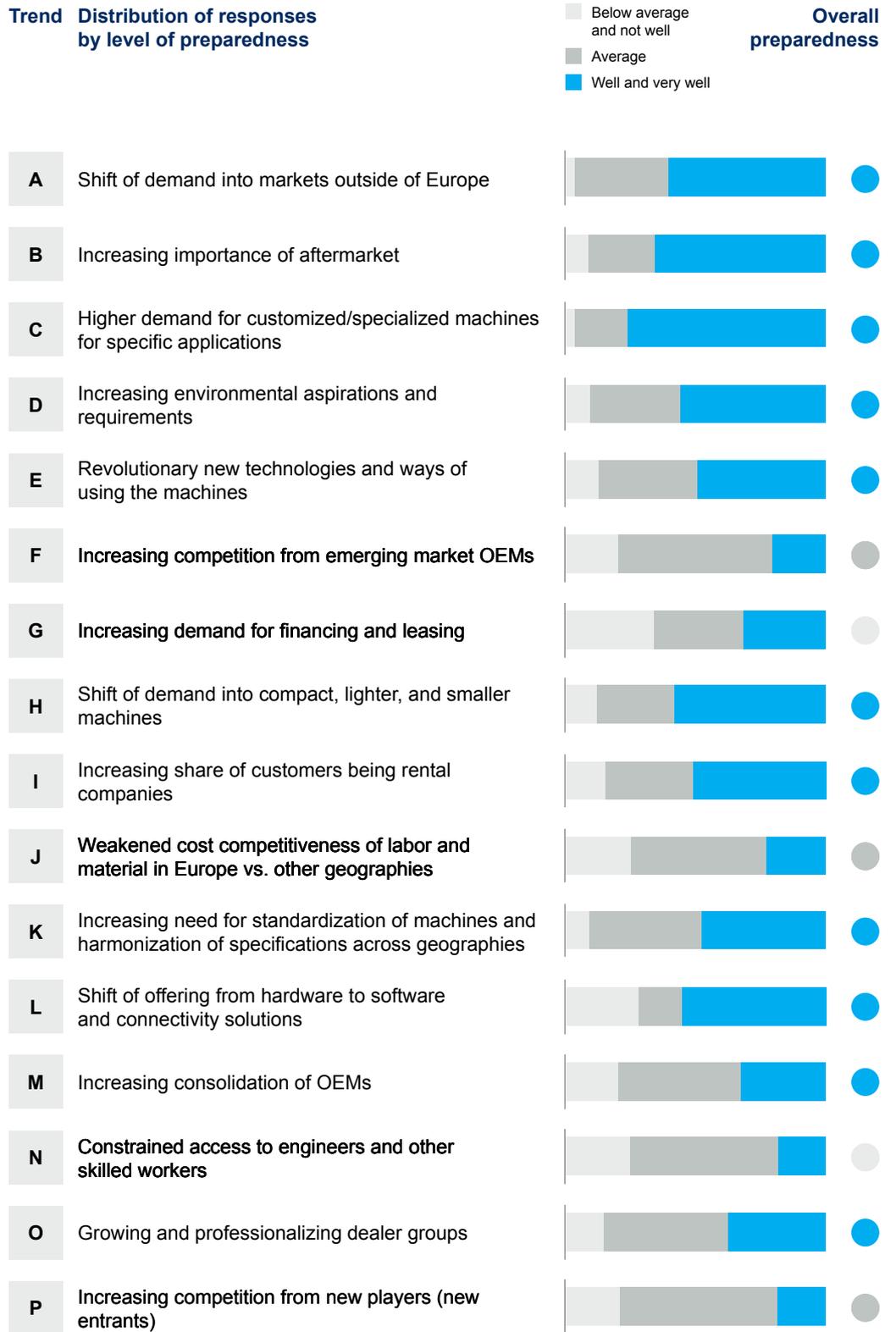
The ranking of trends is generally similar for OEMs of all sizes. The primary exception is that medium-sized OEMs (EUR 100 million to 1 billion in revenues) do not consider the shift of demand into markets outside of Europe a top five trend. Industry experts see this difference driven by the fact that many medium-sized European OEMs are regionally focused (Exhibit 14).

Similarly, there is only little variation in the perception of the top trends between OEMs of different primary²³ machine types. Across the board, OEMs regard a shift of demand outside of Europe being as the top trend, and increasing importance of aftermarket is most commonly ranked second (Exhibit VI in the appendix).

The average revenue share from aftermarket is 16%, and almost all OEMs rate the increase of aftermarket as a key trend. Current activity in this space, however, varies significantly depending on company size. Large OEMs are typically much more engaged in aftermarket with almost one quarter of their sales coming from this part of the value chain. This is enabled mainly through strong service organizations, active dealer steering, and increasingly using remote monitoring and data analytics. Compared to the large OEMs, small and medium-sized companies more often face constraints in the dealer and service networks' reach and capabilities. At the same time, very small companies are often highly local, closer to end customers, and thereby in a better position to provide aftersales and services (Exhibit 15).

²³ The machine type that represents the highest share of their revenues

OEMs generally perceive themselves as well prepared for the coming trends



SOURCE: European construction equipment survey 2015 - 16

Depending on company size, there is some variation in perception of top trends

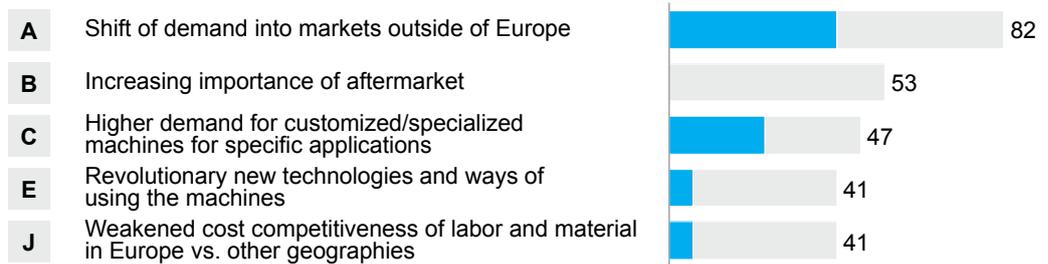
Importance of trend

Share of OEMs ranking trend among the 5 most important, percent

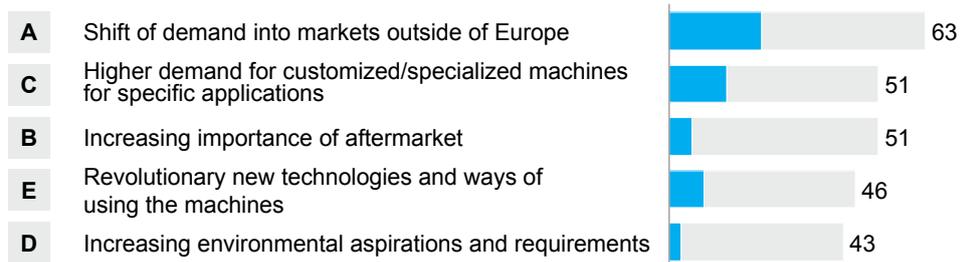
Importance for those who selected answer:

■ Most important trend
 ■ Top 2 - 5 trend

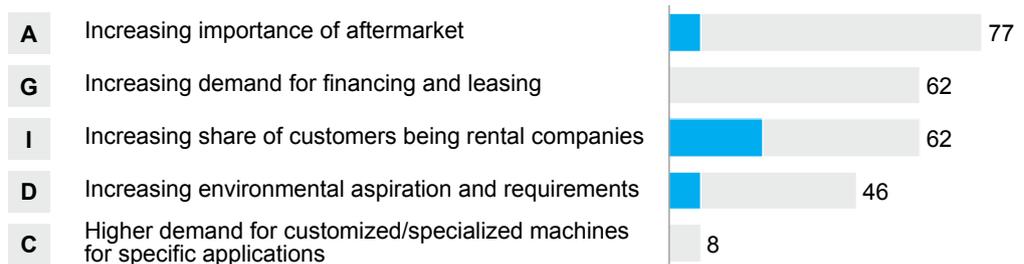
Very small companies (< EUR 10 million, n = 17)



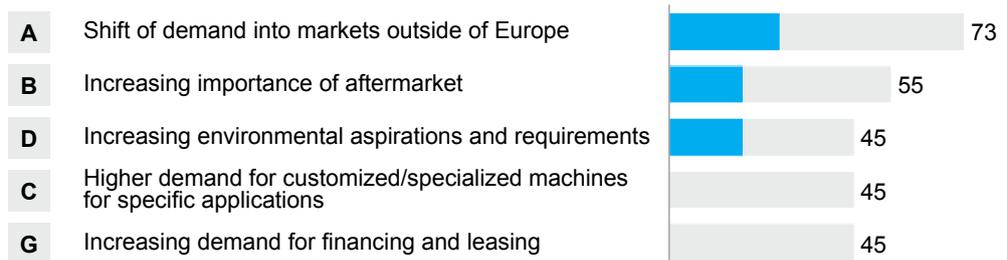
Small companies (EUR 10 million - 100 million, n = 35)



Medium-sized companies (EUR 100 million - 1 billion, n = 13)

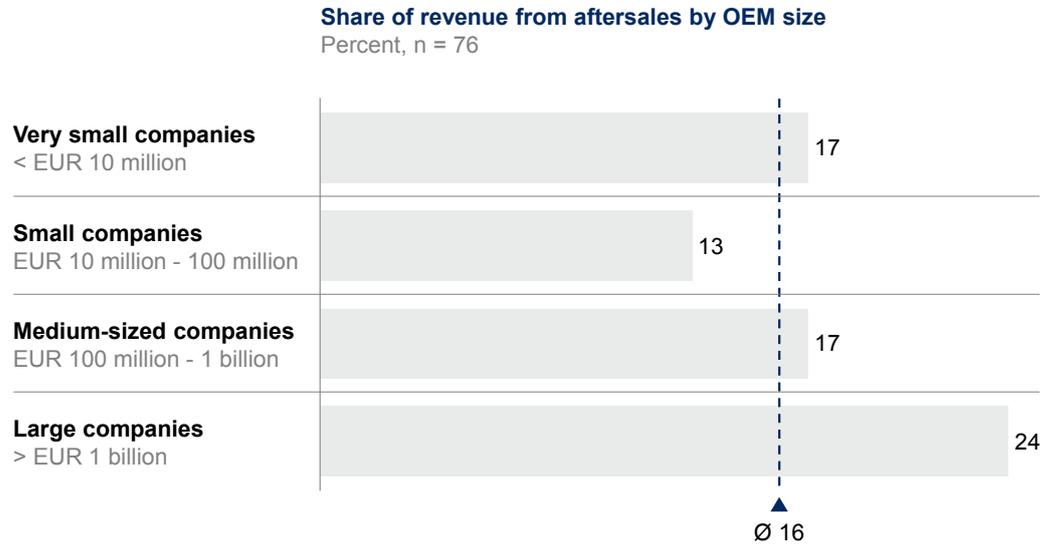


Large companies (> EUR 1 billion, n = 11)



SOURCE: European construction equipment survey 2015 - 16

For large companies, aftermarket generally represents a higher share of revenues



SOURCE: European construction equipment survey 2015 - 16

The aftermarket’s share of revenues varies even more substantially between machine types. Industry experts highlight the fact that the largest aftermarket proportion generally is in equipment types that are critical to the workflow (e.g., concrete mixers) and, hence, “cannot” break down. Likewise, equipment types with a lot of wear parts come out on top, such as crushing and screening. On the other end is compact equipment that, according to industry experts, is generally simpler to maintain by the end customer itself alone and often relatively less critical to the workflow. Consequently, there is less overall money in aftermarket for compact equipment, as OEMs (and their dealers) are competing here with independent workshops and spare parts suppliers (Exhibit VII).

Increasing environmental aspirations (including health and safety) and requirements is a top trend for most OEMs. Respondents indicated that the most important environmental technologies for the future are all directly related to the machine, including emissions reduction, safety in operation, fuel consumption, and noise reduction. Environment-related manufacturing considerations, e.g., energy consumption, hazardous material, and waste, are not considered as important. OEMs state that the primary reason for being active in environmental technologies is regulatory compliance, but it is also seen as a way to differentiate and improve the company image (Exhibit 16, 17). Industry experts also point to a growing demand for fuel efficiency from customers.

Exhibit 16

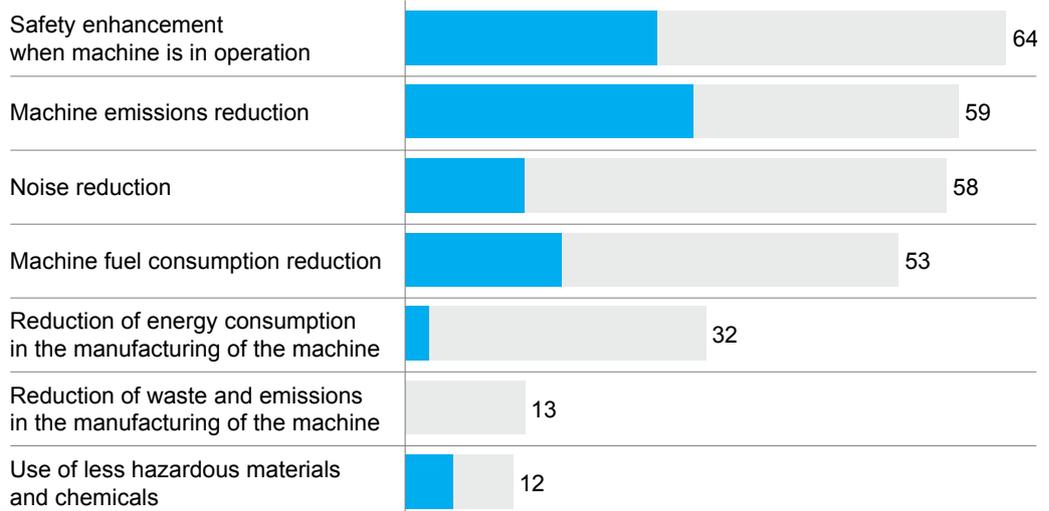
Environmental technologies are focused on the machine, not on the manufacturing of the machine

Importance for those who selected answer:
■ Most important technology
■ Top 2 - 3 technology

Environmental technologies

Importance of technology

Share of OEMs ranking technology among the 3 most important, percent



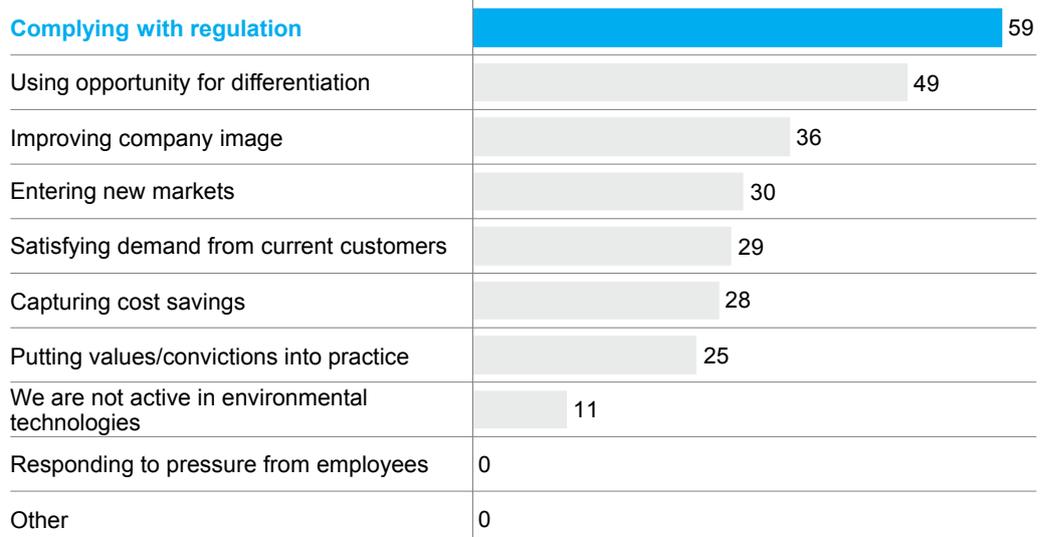
SOURCE: European construction equipment survey 2015 - 16

Exhibit 17

Primary reason behind environmental technology investments is compliance with regulations

Primary motivations behind OEMs' activity in environmental technologies

Share of participants selecting answer
Percent of OEMs



SOURCE: European construction equipment survey 2015 - 16

2.3 The actions – what success will require

With considerable change happening in the industry, the actions required to be successful are also changing. Construction equipment OEMs in Europe are clearly expressing a shift in what will be critical success factors in the future compared with today and in the past. Exhibit 18 presents an overview of what OEMs consider to be the top ten success factors today and what will likely be the top ten success factors in future. An exhaustive list is provided in Exhibit VIII in the appendix.

The capabilities associated with the most high-performing OEMs today are primarily linked with operational factors. Scale advantage in production, purchasing, etc. is considered the single most important success factor, with nearly one third of surveyed OEMs listing it as the number one capability. In third place comes low-cost production and sourcing. To date, being cost competitive has clearly been the top priority for many OEMs. Experts point out the fact that many OEMs are, by heritage, focused on engineering. Over the last decades, they have also become more focused on operational cost efficiency and manufacturing scale. Intensified competition, the increasing presence of emerging market OEMs, and the commoditization of machines have made these areas priorities for OEMs.

The second most important criterion for success in today's construction equipment market is a well-positioned and right-sized dealer/sales network. Market access and sales effectiveness is a crucial factor, especially given the fragmented and local end customer landscape, both for equipment sales and aftermarket services and parts. Strong dealer networks and/or local sales organizations are often a key differentiating factor and an entry barrier for new competitors, which, based on McKinsey's experience from this and similar industries, can have a profound impact on performance.

Going forward, the picture changes quite substantially, indicating that the successful OEMs of the future will rely on a skill set that is balanced in a different way from today. Operational factors, such as scale advantages in production, purchasing, etc., and low-cost production and sourcing drop in ranking from 1 and 3 to 10 and 6. At the top of the list, instead, are success factors centered on differentiation through proximity to customer and technology. The number one success criterion of the future is expected to be deep understanding of customers' businesses and how they create value. In third and fourth place are high R&D investments/being at the technological forefront and short lead times. As success factors of tomorrow, all three of these factors are ranked three spots higher than as success factors of today. It is not that customer orientation has been unimportant for OEMs, but the outlook is that this perspective needs to be elevated above other priorities. A well-positioned and right-sized dealer/sales network holds steady in second place, as it is a critical enabler for getting closer to the customer.

Getting closer to the customer in practice means understanding how the machine is part of the customer's flow, what bottlenecks and inefficiencies there are in the customer's processes, and how the machine and OEM may be able to improve the business. Improvements are both about the design and functionality of the machine, as well as the services around it. Machines may be redesigned to better fit the yard, they may be simplified to come at a lower cost, and customers may be supported in choosing the right machine size and specifications

There is a shift in key success factors from operations focused to customer centric

Top 10 most important success factors of financially successful companies

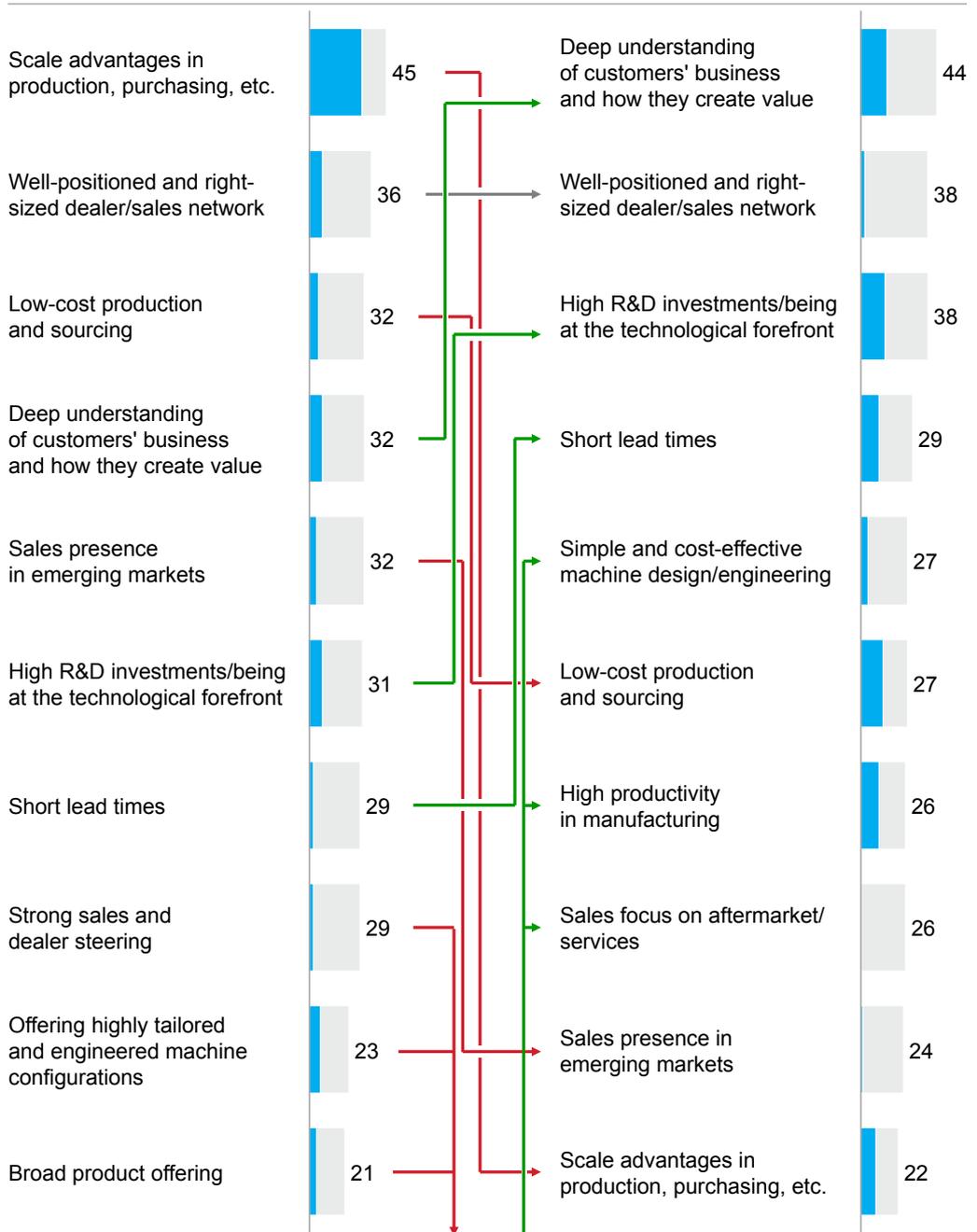
Share of OEMs rating factor in the top 5 on importance

Importance for those who selected answer:

■ Most important success factor
 ■ Top 2 - 5 success factor

Today

Tomorrow



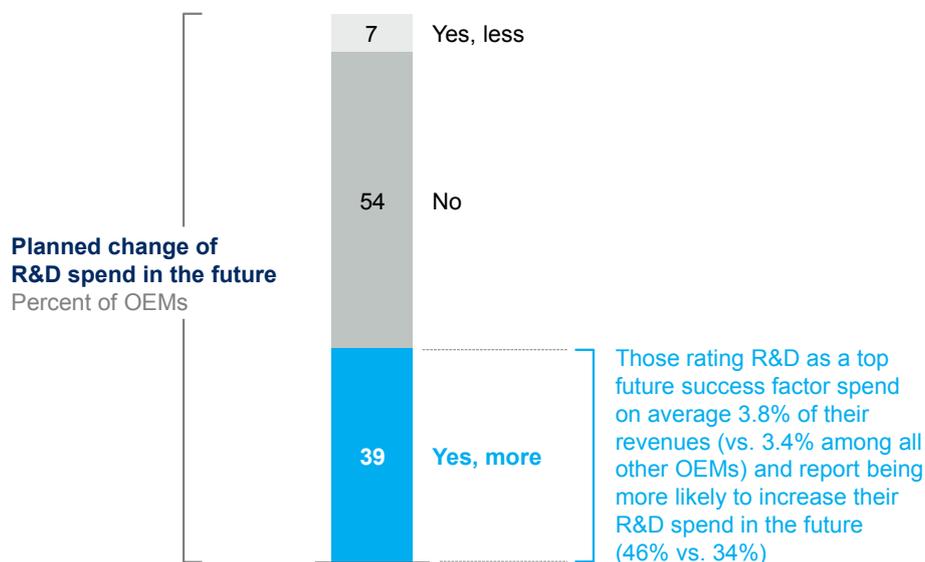
SOURCE: European construction equipment survey 2015 - 16

to optimize cost and productivity. Repair and maintenance services may be calibrated to optimize uptime during operating hours and, consequently, keep service costs low. Furthermore, understanding the customer may be about the interactions between the OEM, its dealers, and the end customer, for example, shortening lead times to enhance flexibility for a construction company to quickly take on new projects. Lead time is generally seen as a key criterion. For each OEM, understanding the customer will mean different things, as will be explored later.

OEMs indicate that being on the technological forefront is critical for both differentiation and as an enabler of customer-specific machine and service offerings. Experts reinforce the critical nature of this success factor, as technological development is accelerating fast and in many large areas, including new drivetrains, telematics, and driverless machines. Already today, the majority of European OEMs consider themselves to be at the forefront of innovation, with half of the OEMs perceiving themselves as innovation leaders. A further third recognizes themselves as early adopters, while only around 10% of the OEMs classify themselves as late adopters of innovation. For the coming years, roughly 40% claim that they will increase R&D spend, while 50% plan to maintain their current levels of spending. Only a small minority indicates that they plan to decrease their R&D budgets (Exhibit 19 as well as Exhibit IX in the appendix).

Exhibit 19

4 out of 10 OEMs plan to increase their R&D spending



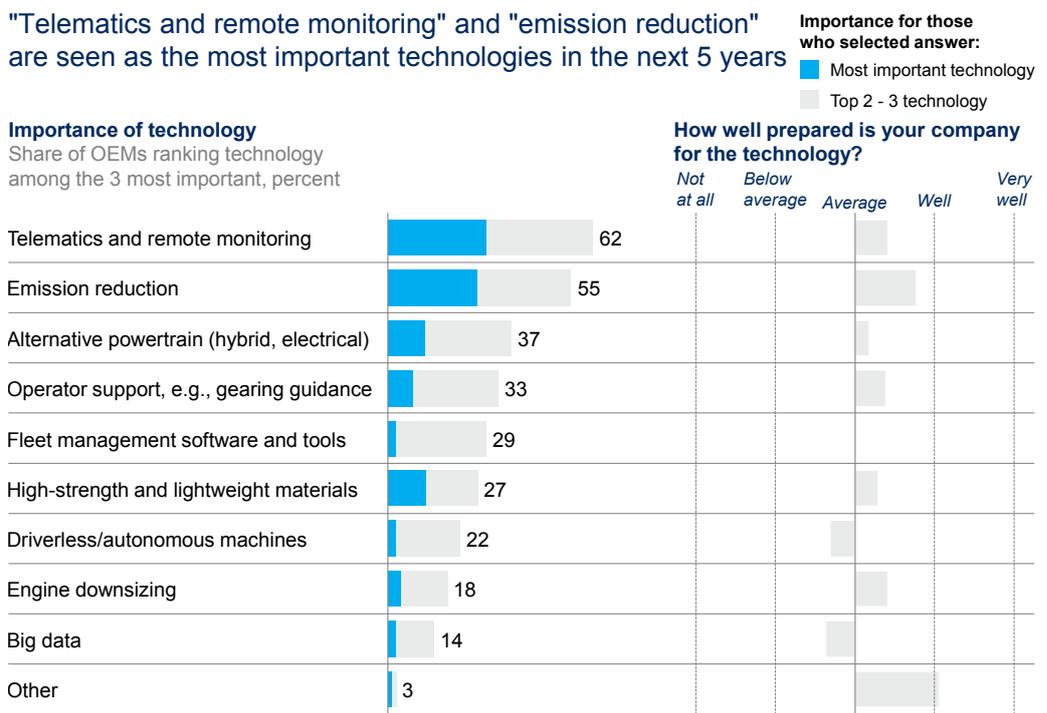
SOURCE: European construction equipment survey 2015 - 16

The construction equipment industry has long been at the forefront of traditional mechanical engineering, with R&D being the “heart and soul” of many OEMs. For next-generation technological changes – e.g., big data, driverless electrification, fuel efficiency –, industry experts overall admit that many other industries are ahead. They believe construction equipment OEMs are generally later adopters due to relatively lower volume and higher end user process complexity, but there are obviously exceptions. Compared to other automotive and machinery industries, R&D spend as a share of revenues in construction equipment is low at around 3%. By comparison, industrial aerospace and defense OEMs spend 6.6% on R&D, and

automotive OEMs spend 4.6%. However, comparability is limited, particularly as construction equipment OEMs – to a great extent – source engines, transmissions, and other R&D-heavy components from outside and, hence, do not directly carry the expenses (Exhibit X in the appendix).

The technologies that OEMs believe will be most important for the industry in the next five years are primarily telematics and remote monitoring, as well as emission reduction. Almost two thirds of OEMs rank telematics a top three technology, and more than half of the OEMs see emission reduction as highly relevant (Exhibit 20).

Exhibit 20



SOURCE: European construction equipment survey 2015 - 16

Telematics and remote monitoring is closely linked with better understanding customers, as well as with the highly-ranked aftermarket trend. Real-time data from the machine can help increase performance, optimize maintenance, and reduce downtime. Longer-term benefits include the impact on refining machine design and functionality. However, at present, most construction equipment OEMs mainly use telematics and remote monitoring for more basic tracking of the machine.

Emission reduction is tightly linked to regulation and has been a focus of OEMs for several years, consuming large parts of R&D resources.²⁴ As OEMs have come far in emission reductions, industry experts believe that there will now be increasingly more room to divert resources to other areas, which may stimulate further technological advancements.

Telematics and remote monitoring are the gateway to more advanced data-driven applications – both machine improvements and service and solutions to the customers. Furthermore, sensors are a key step towards driverless machines. Big data and driverless machines are both ranked as technologies of low importance to OEMs in the next five years. In our view – as well as in the view of most independent experts – these digitization technologies will likely take

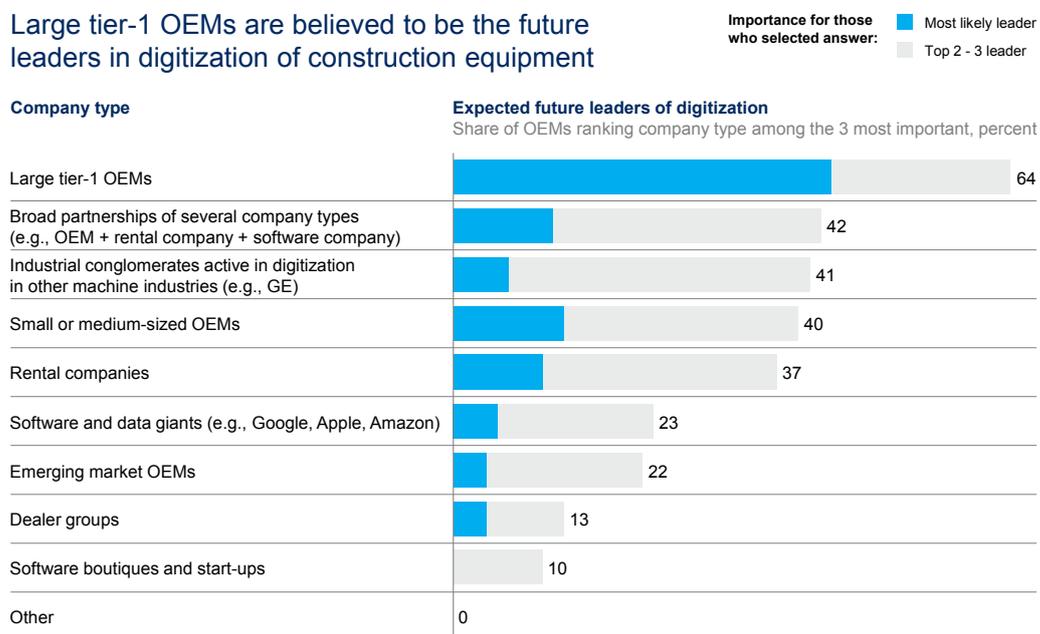
²⁴ According to interviews with industry experts

longer to impact the construction equipment industry for several interlinked reasons. First, the machines are often not used in industrialized/repetitive processes compared to those deployed in, for example, a processing plant. Exceptions here include quarries and road construction. Second, the machines are often just one small component in a larger flow, including other machine types, construction workers, logistics, etc. And third, the machine space is very diverse in terms of type, and most customers have a mix of machine types and brands.

Although digitization (mainly big data and driverless machines) is not seen as a major technology trend in the next five years, experts are unanimously convinced that it will be central to the industry soon thereafter. There is also wide agreement that it will likely impact industry dynamics, business models, and the OEM landscape drastically. Many OEMs are already actively working on these topics.

The complexity in the usage of the machines is seen as a barrier for new entrants, with very few OEMs believing that large software/data giants or data start-ups will be driving digitization for construction equipment. Instead, they think large OEMs will be leaders in the digitization of the industry, with two thirds of the OEMs selecting them as a top three driver of digitization. However, broad partnerships are cited as a possibility in the future by around 40% of respondents, indicating that OEMs may not see themselves as having all of the needed in-house capabilities for driving digitization (Exhibit 21).

Exhibit 21



SOURCE: European construction equipment survey 2015 - 16

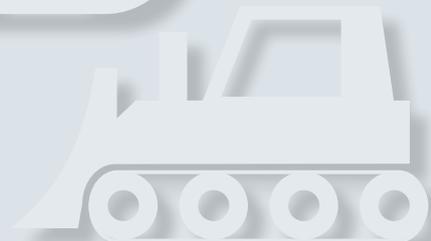
At the same time, McKinsey's experience from many other industries that are ahead in the journey to digital is that digitization usually happens fast and is often driven by companies entering from adjacent industries as well as software specialists. This insight is something that many construction equipment OEMs do not seem to reflect, and we – along with other independent experts – are thus concerned that the industry overall may underestimate the potential impact and speed of this change.





III. Considerations and guiding questions for OEMs

Construction equipment is a complex and fragmented industry, which is highly diverse in terms of company sizes, machine types, geographical plays, and value chain roles. The OEMs participating in the survey behind this report represent all these models. However, despite this diversity, they express an almost unanimous view on the industry's outlook, trends, and what it will take to be successful going forward. The results are also strikingly consistent across the questions and jointly express a narrative about how the construction equipment industry in Europe is undergoing a considerable transformation – one that most OEMs have just embarked on.



3.1 The shift in priorities to capture future opportunities

After a turbulent decade, there is clear optimism about the years to come, with expected acceleration of growth and higher profitability. Two primary opportunities that the OEMs point out are growth from markets outside of Europe and increasing importance of aftermarket. Emerging markets are likely to offer the highest growth rates in the coming years (although the very near term is probably less promising), and European OEMs are principally well positioned with a global sales presence, particularly in the Middle East and parts of Asia. Europe is likely to provide smaller sales growth opportunities, although some countries may rebound in the next years, but there is room to grow the highly profitable aftermarket business.

Neither emerging market growth nor aftermarket business are by any means revolutionary ideas; they have been on the strategic agenda for many years. However, what is clearly pointed out by the OEMs is a shift in how these opportunities are pursued.

Succeeding in emerging markets requires going head to head with emerging market competition. Emerging market OEMs have put forward their positions forcefully in recent years and are catching up on technology and quality. They have also moved outside their home geographies and are actively pursuing markets closer to home for the developed market OEMs, e.g., Africa, the Middle East, and South America. The OEMs that participated in the survey clearly expressed their sense of competition from emerging market OEMs as a key threat, for which most do not consider themselves well prepared. European OEMs that want to be successful in emerging markets will, in our view, need a differentiated offering, as opposed to trying to compete on price. However, we would like to emphasize that price will remain critical, and economies of scale, low-cost production, and cost-effective machine designs for local needs will still be important for European OEMs.

Succeeding in the aftermarket business requires an offering that goes beyond selling “steel and hydraulics.” There is certainly significant potential value in selling parts and repair and maintenance, but OEMs and their dealers need to provide more value than independent local workshops and part manufacturers. For OEMs to be truly competitive, we believe the key lies in marrying their deep machine know-how with insights into the customer’s specific operations and into how the machine can improve these operations. Collecting and analyzing machine data will be essential in this and is a potential competitive asset of OEMs.

Essential for capturing the potentials in both markets outside of Europe and aftermarket is offering differentiated products, services, and solutions. European OEMs will rarely win on price and need to be highly relevant to the end customer. Executing on this in practice requires a deep understanding of customers’ business and a leading technology position, both on the actual machines as well as within the ecosystem in which the machines are built, sold, operated, and maintained. The OEMs express how their most successful peers in the past and today excelled in operational scale and low-cost production. Yet, they also express a radical shift going forward. The most important success criterion of the future is perceived to be deep understanding of how customers create value and being on the technological forefront: ***a clear shift in industry mindset – from operations focused to customer centric!*** Importantly, this is not to say OEMs have not been customer oriented up until now, or that operations factors will not be important tomorrow, but rather that the relative importance is clearly changing.

Industry experts acknowledge that they see this shift in priorities already happening and unanimously applaud it as a critical enabler for European construction equipment OEMs to capture the growth and margin opportunities, and to ensure an overall positive trajectory for the industry. That this shift is happening right now is the result of several converging changes in the industry, with industry experts pointing to five changes in particular:

- For many machine types and OEMs, machine-operating data has now reached a pivotal point. There are large fleets with installed sensors and a significant cache of historical data, and the cost of collection and processing is dropping. OEMs, therefore, have or can gather more insights on customers' behavior and activities (e.g., the driving patterns of the operators) and can provide more tailored offerings. Furthermore, the process of setting up the sensors and analyzing the data has brought OEMs, dealers, and users closer together and established more interaction points related to the actual operation of the machine.
- The machines are getting increasingly complicated to maintain and repair. Customers need to be closer to the OEMs (and their dealers) as well as component suppliers, as traditional repair shops and customers' own mechanics are less able to address their maintenance and repair needs.
- Many customers are striving to focus on their core business and therefore want to increasingly outsource machine maintenance and repairs and, in some cases, even operations. Not uncommonly, customers are also reducing their in-house technical capabilities. This is in line with the increasing penetration of rental machines.
- Competition is steadily intensifying and there is a looming threat of emerging market OEMs also entering Europe at scale, which is driving European OEMs to strengthen their customer and dealer relationships.
- Suppressed local demand and a lack of high growth prospects mean production scale will be relatively less beneficial.

3.2 Customer orientation in practice for different OEMs

McKinsey considers this shift in mindset and priorities a critical step; however, the new attitude needs to be translated into concrete plans and actions. Several OEMs are taking active measures, and some have been focusing on these topics for years. Although most of the surveyed OEMs state that they are well prepared for the coming trends, the general perspective from experts is that many OEMs have only recently started this relative shift in focus from operations to customer – a shift that is not easy as McKinsey has observed in many other industries. There are a large number of strategic decisions to take and obstacles to overcome. Some of the primary considerations that need to be emphasized are:

Targeted partnerships with dealers. Truly understanding the end customers will require that OEMs get “up and close” with their customers. For many OEMs, this will have to involve the dealers. Select OEMs are actively managing and cooperating with their dealers,

whereby the dealers function as an extended arm of the OEM. However, for many OEMs, the dealer is an intermediate layer, disconnecting the manufacturer from the user. Any strategy about better understanding the end customers will require much closer cooperation and alignment with dealers, whereby dealer steering will have to be a key area to invest in.

Strategic R&D investments and partnerships. Successful differentiation requires selectively investing R&D money in the most promising areas. Other areas may be more suitable for partnerships or outsourcing. The technology areas of the coming years – e.g., powertrains, digitization, driverless machines – are all massive and complex and will require high investments. Few companies will be able to take overall leadership, whereby surgical focus combined with partnerships will be essential for most OEMs to keep up.

Relevant, profit-generating business models. Understanding the customers, increasing focus on aftermarket, and acting as an advisor will also require OEMs to revise business models to be relevant and generate profits. OEMs should consider and pilot performance-related offerings and contracts – e.g., selling of uptime or output (e.g., material moved) –, which will require new risk management and pricing skills. Broad experience and a large number of reference cases will be critical and early movers will have an advantage.

Modular machine design. Differentiating the offering to meet individual customer needs as well as succeeding both in developed and emerging markets, will still require a scalable production (even if not on the top of the list). A modular machine design that still allows for specificity will be increasingly critical to accommodate this, as well as to ensure short lead times.

Customer-centric capabilities and governance. The drastic shift in focus requires an equally drastic shift in capabilities and governance. OEMs will need to invest in frontline resources (directly and together with dealers) which primarily act as advisors to customers and secondarily machine salespeople. Given the often fragmented customer landscape, an OEM could optimally help customers by sharing operational best practice. This shift needs to be carried all the way through to senior management, with rebalanced skill sets and team compositions. To ensure traction, targets and KPIs need to be adjusted to refocus management attention.

Agile, action-oriented organizational culture. The breadth and depth of change necessary to realign the business fully towards the customer, as well as the accelerating pace of change in technology and other areas, will require OEMs to become more nimble and faster on their feet. Reaction time and the ability to quickly and firmly take informed decisions will be essential. OEMs should strengthen their business case development skills, shorten and simplify their decision making process, and be prepared to increasingly dare to take bets based on calculated risks.

Since construction equipment is such a wide and diverse industry, this shift in relative focus will vary in the degree of importance depending on OEM type. It will also imply different actions depending on the OEM's size, geographical focus, and machine portfolio. Each OEM has a unique set of circumstances, and every management team will need to review their specific situation and opportunities and take clear action accordingly. Nevertheless, we do see a handful of general archetypes among the OEMs (Exhibit 22).

View on success factors varies by OEM type

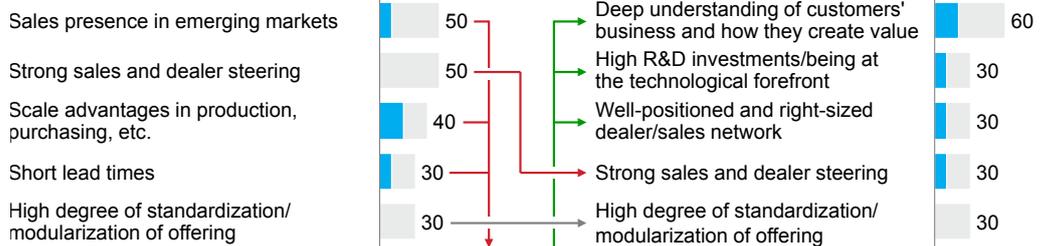
Top 5 most important success factors of financially successful companies
 Share of OEMs rating factor in the top 5 on importance

Importance for those who selected answer:
 ■ Most important success factor
 ■ Top 2 - 5 success factor

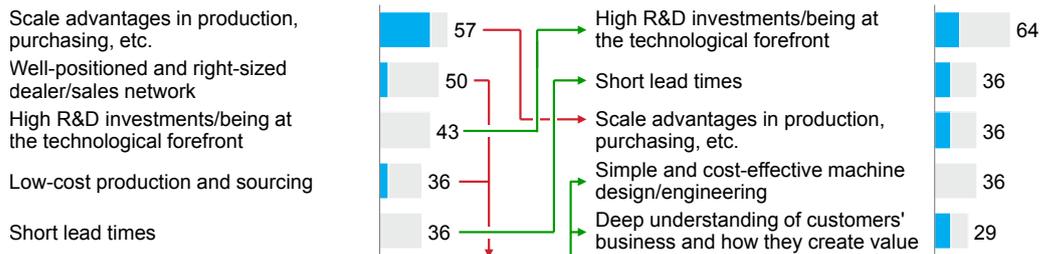
Today

Tomorrow

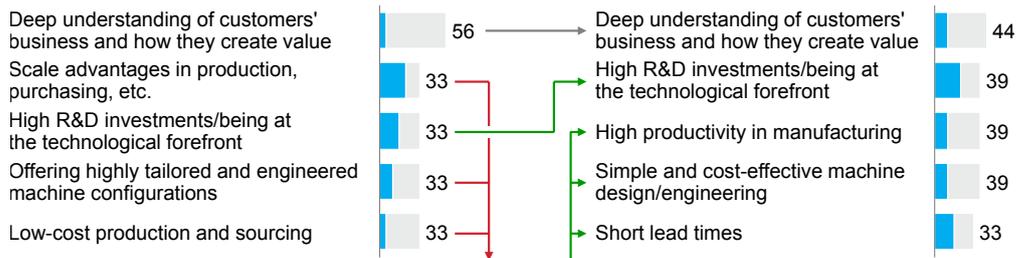
Large global OEMs¹ (n = 10)



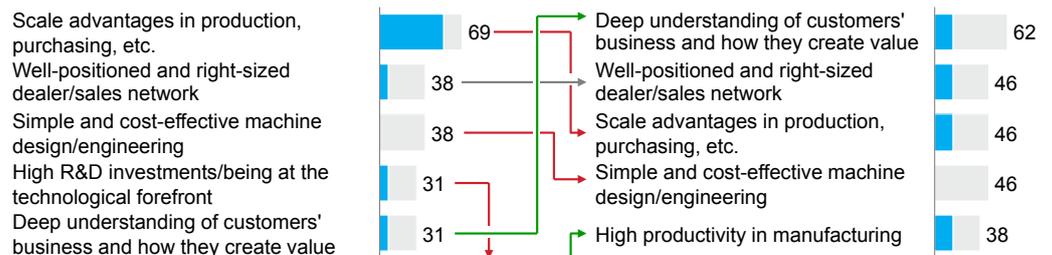
Small global niche players² (n = 14)



Local/regional OEMs³ (n = 18)



Compact earthmoving equipment⁴ (n = 13)



1 Revenue > EUR 1 billion, > 20% of sales outside of Europe
 2 Revenue < EUR 100 million, < 50% of revenue in Europe, headquarters in Europe
 3 > 80% of revenue in Europe, headquarters in Europe
 4 OEMs with compact earthmoving equipment as primary machine category; partly overlapping with the 3 other categories of OEMs

SOURCE: European construction equipment survey 2015 - 16

Large global OEMs. The largest companies in the European construction equipment industry are generally focused on heavy earthmoving equipment, but they can also be active in compact earthmoving equipment, lifting equipment, etc. Some are headquartered in Europe, but several are based in North America, Japan, and Korea. Compared with smaller OEMs they generally have more well-established dealer networks, but they are also often further away from the end customer and typically only dealing directly with the largest fleet owners. Through global presence and a focus on higher-volume machines, essential scale advantages are achieved. Dealer management, however, is also important. This is also reflected in the top five success criteria indicated by survey respondents representing OEMs with revenues of more than EUR 1 billion. Looking forward, these large OEMs clearly reflect the shift seen among OEMs in general. While deep understanding of customers' business and how they create value is their number five success factor today, they see it as the clear number one success factor of the future. Also rising in ranking are high R&D investments/being at the technological forefront and a well-positioned and right-sized dealer/sales network.

Large OEMs are generally the most advanced in telematics and machine data analytics, which will be essential to leverage in getting to know the end customers better and tailoring machines and solutions. For large OEMs, the dealers will be critical as the primary customer interface and on-the-ground supplier of services and solutions. Hence, large OEMs should particularly focus on how to quickly turn their data into operational insights and concrete offerings, how to keep the dealers closely involved and aligned on the priorities, and how to modularize offerings and manufacturing to cost-competitively cater to customer-specific needs across both developed and emerging markets.

Small global niche OEMs. There are many small OEMs based in Europe that have leading positions within certain niche machine types, such as trenchers or tunnel boring machines, or within certain special variants of machine types for specific applications, such as side-tipping dump trucks, or articulated backhoe loaders. Most of these OEMs have the majority of their sales outside of Europe, although some are also geographically focused within their home region. As they generally compete with more standardized machines from the large OEMs, e.g., a trencher can replace heavy excavators, deep understanding of customers' processes and leading engineering are essential. The machines are, by definition, highly customized.

European OEMs with less than EUR 100 million in revenues and more than 80% of sales on other continents are the only surveyed OEM category that does not rank deep understanding of customers' business and how they create value as a top success criterion for the future. This is likely because the customer relationship is so central to their business that it goes without saying. The clear number one for this group of OEMs is high R&D investments/being at the technological forefront, which will become even more essential for the small global niche OEMs to stay competitive. The technological changes ahead are comprehensive, with larger OEMs generally having stronger financial muscle and being ahead on digitization. Small global niche OEMs should carefully review how to stay relevant when customers and generalist competitors digitize and selectively trade off in-house R&D investments and potential partnerships, e.g., for machine data analytics and protocols.

Locally/regionally focused OEMs. In Europe, there are many OEMs that primarily serve their regional market. In Italy, for example, there is a high number of local crane manufacturers. Most of these OEMs are small and actively compete with larger OEMs across most machine types. Their edge is in deep customer relationships and the flexibility to manufacture tailored, one-off machines to suit specific customer needs or region-specific requirements (e.g., local regulation). Engineering know-how is a key trait. Often, the volumes and degree of customization have not been sufficiently attractive to larger OEMs. Local presence and long-standing relationships build strong customer loyalty for the locally/regionally focused OEMs.

As larger OEMs strive to get closer to end customers and further customize their offering, locally/regionally focused OEMs need to increasingly strengthen their customer relations and loyalty, as well as continually invest in technology. This is reflected in what surveyed European OEMs with more than 80% of revenues generated in Europe rank as key success factors for the future. Locally/regionally focused OEMs should assess how to leverage their unique, ongoing customer relationships and understanding to selectively invest in R&D and tailor solutions, as well as review where and how to partner with peers to be able to keep up. Furthermore, the close customer relationships and often local presence are key assets to drive the increased aftermarket business (services and solutions, and thereby parts), and the OEMs should potentially also consider acting as dealers of related machines and attachments as a way to grow with existing customers.

OEMs in more commoditized machine segments.²⁵ Machine types, such as compact earthmoving equipment, RTLs, aerial work platforms, and parts of heavy earthmoving equipment, are generally more standardized and homogenous across OEMs. Overall, these machine types are often technically somewhat less advanced than many other segments, with limited room for differentiation. The machines are commonly used in processes where they are less critical to the overall flow, often without halting the customers operations fully, as opposed to, for example, pavers in road construction, a cement mixer, or a tunnel boring machine. Consequently, aftermarket services are not as essential for machines in this category as they are for many other machine types. What is more, rental companies are increasingly the largest customers of these commoditized machines, further driving standardization, mainly buying “no-frills” machines in large volumes and often more capable of servicing them themselves.

Although deep understanding of customers’ business and how they create value is rated as the top success factor for surveyed OEMs active primarily in compact earthmoving equipment, translating those insights into differentiated offerings and aftermarket services may be more difficult than for other OEMs. At the same time, this is the only OEM type that does not rate high R&D investments/being at the technological forefront in the top five, probably due to the fact that differentiation is more limited in this segment. For OEMs in more commoditized machine segments, the relative importance of operational factors will likely remain higher in the years to come, as is also reflected by the success factors rated three, four, and five. OEMs should primarily assess how to continuously increase scale and drive down costs, considering further operational improvements, as well as M&A, partnerships, and portfolio streamlining.

²⁵ Partly overlapping with the three segments above

3.3 Preparing for the expected changes, and the unexpected

In general, European construction equipment OEMs should probably also consider some of the trends and success factors that were not highlighted in the survey. In McKinsey's view, there are several areas where OEMs may overlook some risks and underestimate the pace of change once the ball starts rolling. Even though OEMs generally state that they are well prepared for the coming changes, disruptive events may alter the business conditions fast and considerably. We would particularly highlight that OEMs need to test their strategy and prepare to take actions against the following plausible disruptive events:

Big data solutions may become a critical differentiation factor and value creation driver already in the coming years, as data banks build up and customers get increasingly sophisticated in their demands. This can quickly spark a revolution in business models. We would urge OEMs to increasingly invest in this area to stay at the forefront when digitization takes off fully in construction equipment and, particularly, carefully review what protocols to bet on and learn from, proactively piloting new offerings.

New company types may enter and capture the digitization opportunities, possibly already in the next few years. The traditional Silicon Valley giants are possibly less interested due to the complexity and relatively small size compared with automotive, but start-ups and boutique companies can quickly move in. These new entrants could possibly provide software that leverages machine data to offer solutions which improve customer processes. They may leverage data across multiple machine brands and also go beyond the machine and optimize the full flows of the customers, including labor, logistics, etc. Without the legacy in manufacturing machines or the need to sell machines or spare parts, they may be well positioned to provide more holistic solutions. This has happened in comparable industries, and we urge OEMs to consider potential partnerships and acquisitions to stay at the front.

Emerging market OEMs could more forcefully target the developed markets, especially if the Asian and Middle Eastern markets do not rebound soon. Many are cash strained but may also make desperate moves. As pointed out by experts, several Japanese and Korean OEMs have in the past successfully entered and established themselves in Europe. We would urge European OEMs to look after their home markets by optimizing sales efficiency in-house and with dealers, as well as continuously review how to stay cost effective in design and manufacturing.

Consolidation and M&A do not appear to be on the near- or medium-term horizons according to the surveyed OEMs, but times of change can place companies under pressure. Companies may want to prepare themselves for structural changes and hone their target scanning, transaction, and integration skills.

In sum, McKinsey sees a handful of key questions that European construction equipment OEMs should carefully review to ensure they make the right strategic moves, push sufficient change, and act in due time:

- Which specific customer segments shall we focus on to be truly relevant and insightful on the end customers' operations, as well as capable to clearly help them generate more value?
- How do we involve and engage our dealers in truly understanding end customer needs, defining concrete and customized offerings, and delivering those on a daily basis? What role shall the dealers have in our long-term strategy to generate value for the end customers?
- Which technologies shall we focus our R&D money on to secure a distinct edge, given the breadth and depth of technological change? Which technologies are appropriate for partnerships and outsourcing to keep up in a cost-effective way?
- What partnerships should we enter within the digital space to secure sufficient capabilities and scale in platforms? Potential partners may be software companies, but also other OEMs, rental companies, and end customers.
- How shall we change decision making processes and steering mechanisms to make the organization radically more nimble, quick on its feet, and action oriented on the right priorities?
- Which bold actions shall we urgently take to propel change and stay ahead? This may be actions such as launching new customer solutions, taking engineering adaptations to customers, pursuing M&A opportunities, or entering partnerships.

The construction equipment industry in Europe is clearly about to transform in a profound way, and OEMs will need to determine which path will most likely lead to future prosperity. However, the direction in which to go is clear – with a distinct shift from operations focused to customer centric. Most critical will be taking quick and decisive action as the wheels (or rather tracks) will turn increasingly faster towards a future of great change and great opportunity.

Appendix

Additional findings from the European construction equipment survey 2015 - 16.

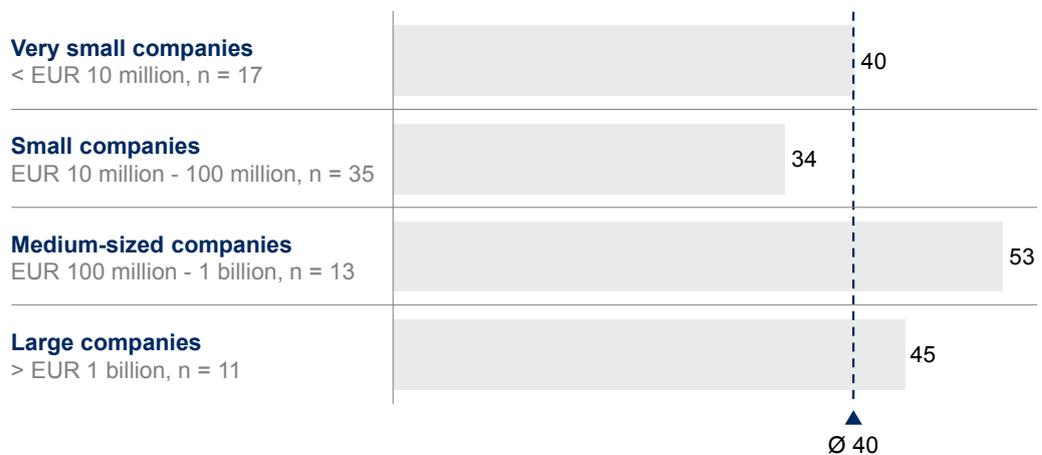
Since not all findings from the survey could be explicitly mentioned in the report, this appendix provides some additional detail.

Exhibit I

On average, 40% of OEM revenue is generated outside of Europe

Share of revenue generated outside of Europe

Only companies with headquarters in Europe included, n = 58



SOURCE: European construction equipment survey 2015 - 16

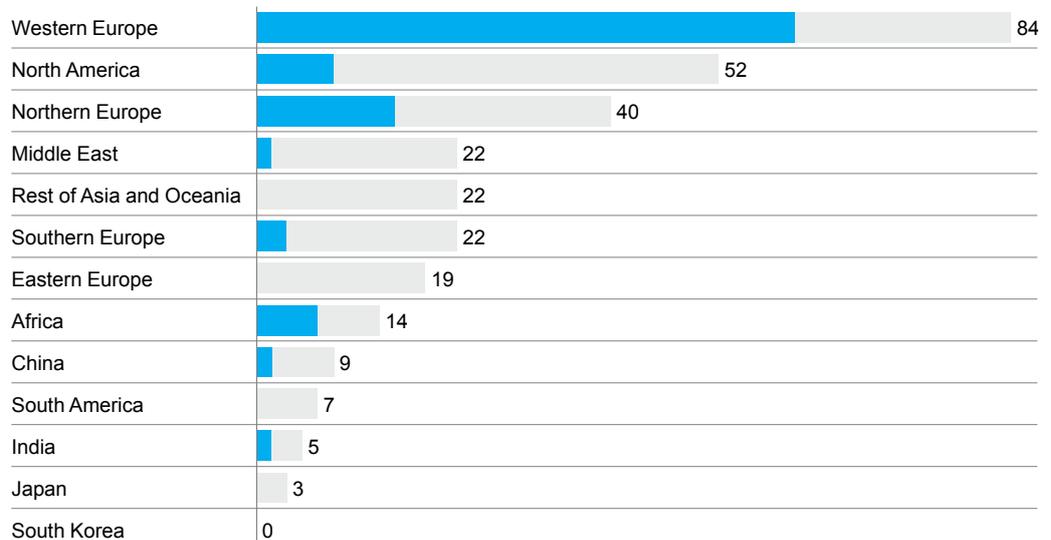
Exhibit II

Primary markets outside of Europe are North America and the Middle East

Importance for those who selected answer:
■ Most important market
■ Top 2 - 3 market

Largest revenue markets for construction equipment for respondents with headquarters in Europe

Percent of respondents indicating category in the top 3, n = 58



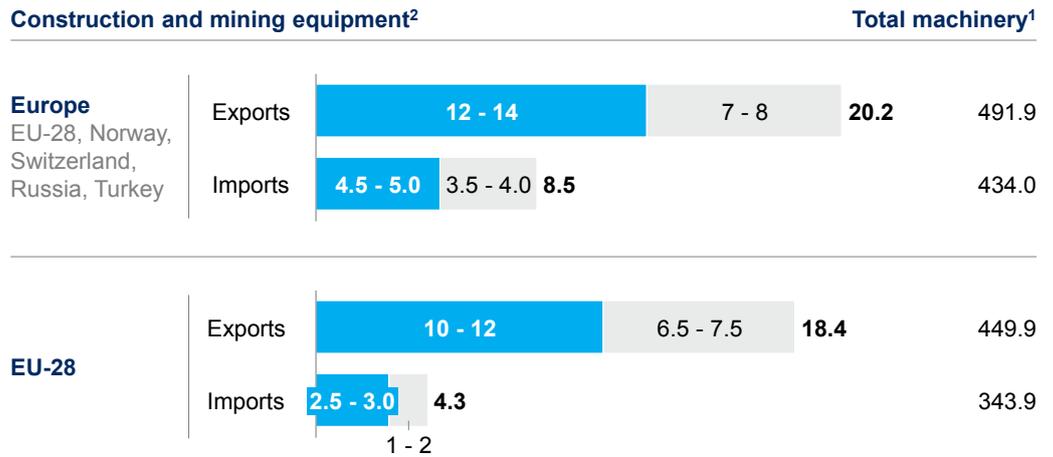
SOURCE: European construction equipment survey 2015 - 16

Exhibit III

European construction and mining equipment exports are 2 - 3 times higher than imports

EUR billions, 2013

■ Estimated construction equipment share



1 Machinery and transport equipment (SITC Rev.4 Code 71 - 77): largest machine categories for export are general industrial machinery and equipment; electrical machinery, apparatus, and appliances; machinery specialized for particular industries (incl. construction and mining equipment); and power-generating machinery and equipment

2 Construction, mining, and quarrying equipment (SITC Rev.4 Code 723)

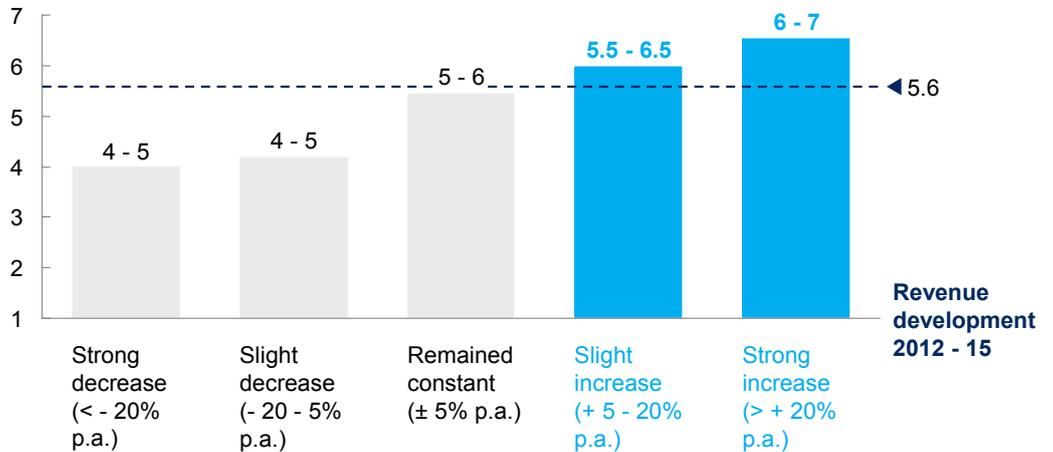
SOURCE: Eurostat; UN Comtrade; expert interviews

Exhibit IV

Respondents who have performed well in the past years are also more likely to have a positive outlook

Expected revenue development for next 5 years

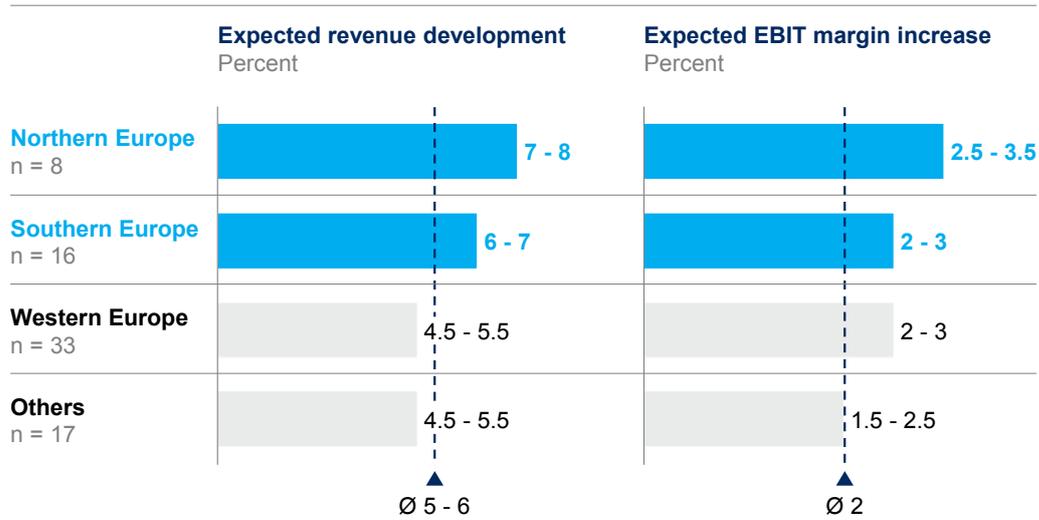
Percent p.a.



SOURCE: European construction equipment survey 2015 - 16

OEMs from Northern and Southern Europe have a more positive outlook

Outlook for next 5 years by company headquarters



SOURCE: European construction equipment survey 2015 - 16

Top 5 trends differ somewhat by primary machinery type

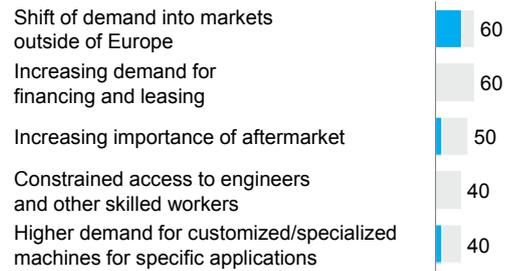
Importance for those who selected answer:

- Most important success factor
- Top 2 - 5 success factor

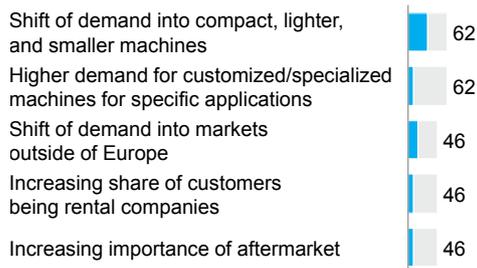
Heavy earthmoving equipment (n = 12)



Lifting equipment (n = 10)



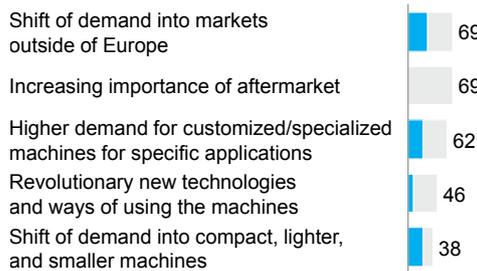
Compact earthmoving equipment (n = 13)



Road construction and compaction equipment (n = 7)



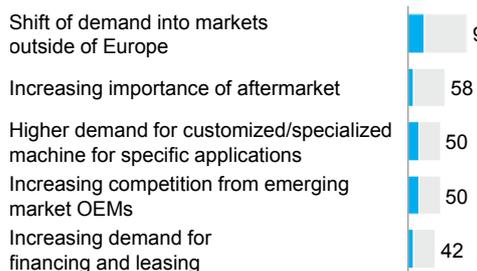
Attachments (n = 13)



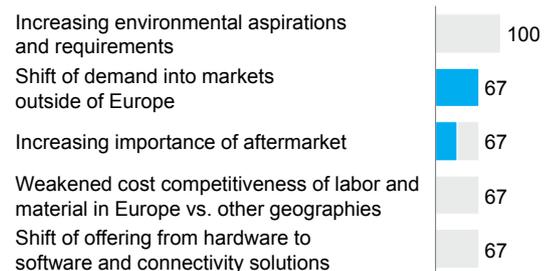
Civil engineering equipment (n = 4)



Concrete equipment (n = 12)



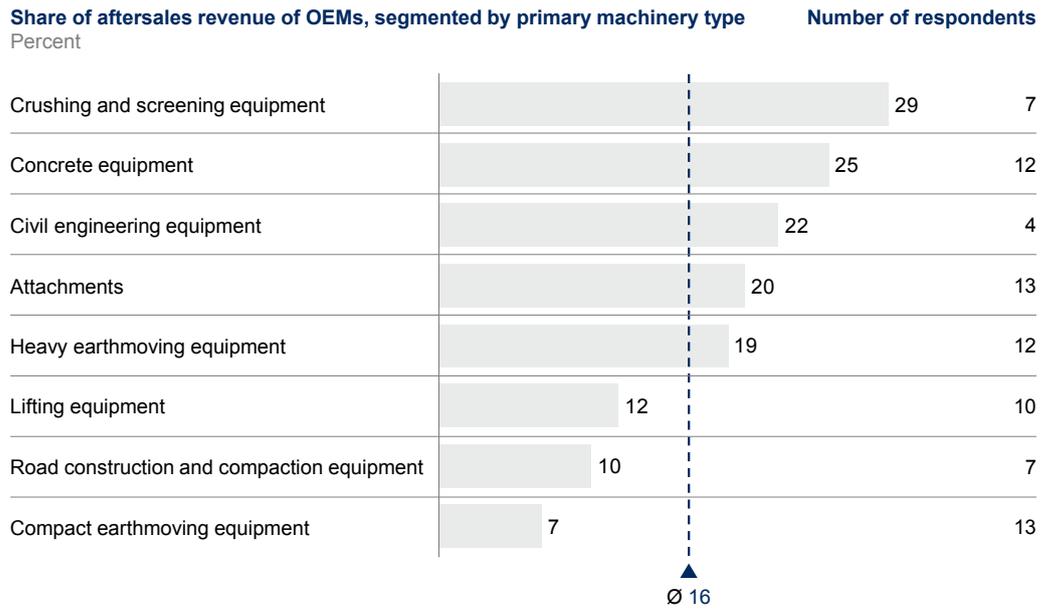
Crushing and screening equipment (n = 3)



SOURCE: European construction equipment survey 2015 - 16

Exhibit VII

Depending on equipment type, there is a large variation in degree of aftersales activity



SOURCE: European construction equipment survey 2015 - 16; expert interviews

There is a shift in key success factors from operations focused to customers centric

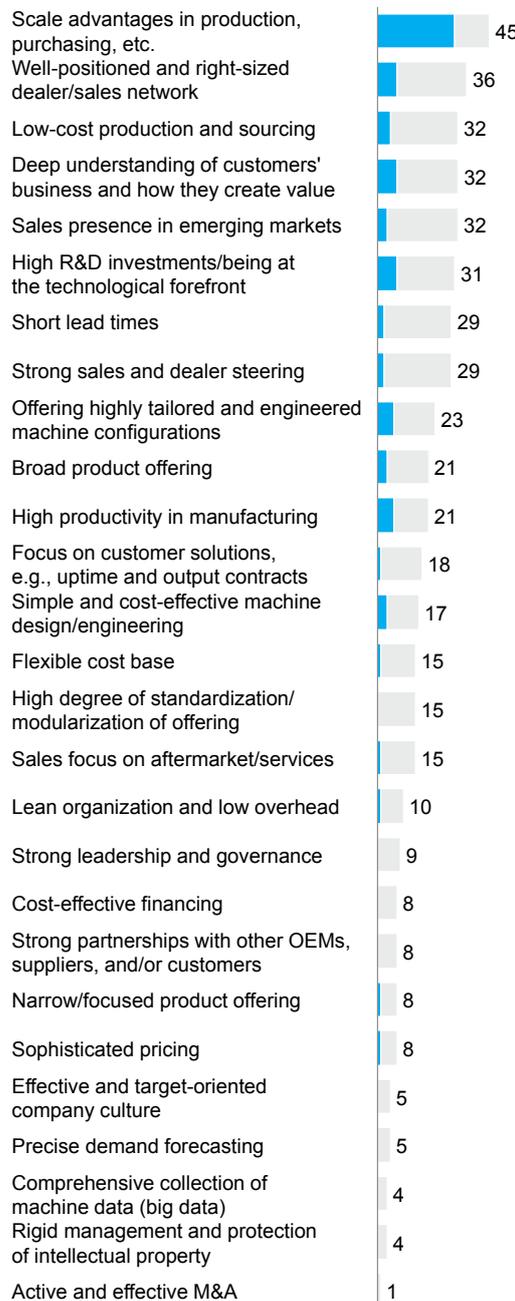
Important success factors of financially successful companies today

Share of OEMs rating factor in the top 5 on importance

Importance for those who selected answer:

- Most important success factor
- Top 2 - 5 success factor

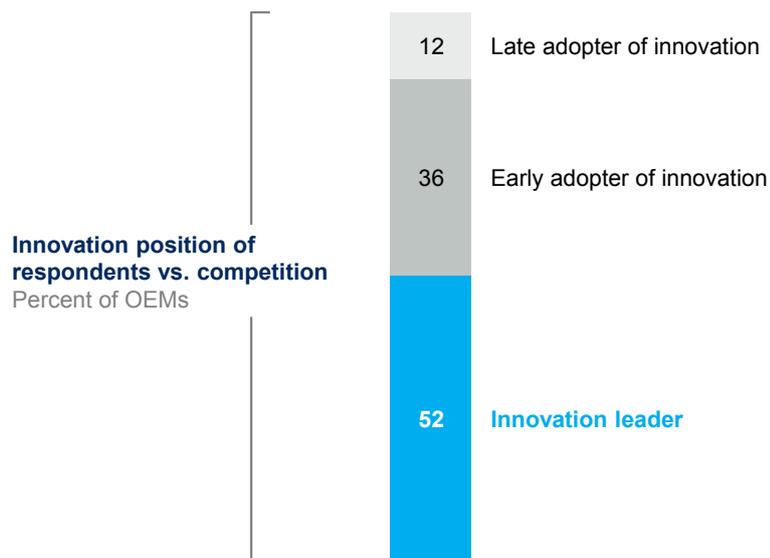
Today



Tomorrow



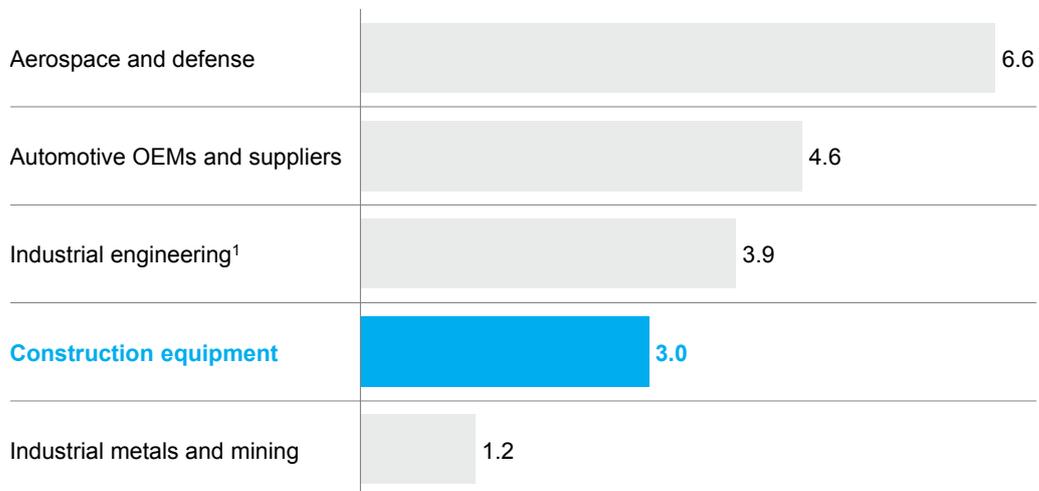
Exhibit IX The majority of OEMs see themselves as innovation leaders



SOURCE: European construction equipment survey 2015 - 16

Exhibit X In construction equipment, R&D spend as percent of revenue is below that in most other automotive and machinery industries

Actual average R&D spending by industry, EU, 2014
Percent of revenue



¹ General category that includes construction equipment
SOURCE: EU R&D Scoreboard 2015; company annual reports and Web sites

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