

Manufacturing Execution Systems

The 2026 Buyer's Guide & Vendor Landscape

A practitioner's guide to evaluating, costing, and selecting an MES or manufacturing operations management platform: what these systems do, how the market and vendors stack up in 2026, what they cost, how to run the selection, and how to de-risk the implementation.

Prepared by **Supply Chain Research** · June 2026 · Vendor-neutral: we take no payment from the vendors covered.

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1. Executive summary

A manufacturing execution system (MES) is the software that runs the shop floor. In the ISA-95 model of the automation pyramid it is the Level 3 layer, sitting between the business systems above it (Level 4, the ERP) and the control systems below it (Levels 0 to 2, the sensors, programmable logic controllers, and process control). Gartner defines an MES as a specialist class of production-oriented software that manages, monitors, and synchronizes the execution of the real-time physical processes that transform raw materials into intermediate or finished goods. Put plainly: the ERP says what to make, the control systems run the machines, and the MES is the system of record for what actually happened on the floor, in real time.

This guide is written for manufacturing operations, quality, and IT and OT leaders evaluating an MES or the broader manufacturing operations management (MOM) suite around it. It is deliberately vendor-neutral: we accept no payment from the vendors covered, and we name no single best system, because the right platform depends on your industry, your existing automation stack, and your tolerance for customization. One analyst note frames the whole landscape: Gartner retired its Magic Quadrant for MES after 2023 and now publishes an unranked Market Guide, so there is no current Gartner Leader to point to, and IDC's MarketScape has become the principal ranked evaluation.

~\$16-20B

MES software market in 2025, by the consensus of most research firms

~10% CAGR

mid-range growth; published estimates span roughly 6.9% to 14.9%

~62%

of MES deployments remain on-premise or at the edge

What the evidence says

There is no current Gartner Leader, by design. Gartner discontinued its MES Magic Quadrant after April 2023 and replaced it with an unranked Market Guide (latest March 2026). Treat any claim of a 2025 or 2026 Gartner MES Leader with caution.

IDC is now the ranked anchor. In its 2024-2025 MarketScape for worldwide MES, IDC named Siemens, AVEVA, and Infor as Leaders across an 18-vendor field; the historical 2023 Gartner Leaders add useful context.

Market sizing diverges by definition. Estimates cluster around \$16B to \$18B for 2025 but the CAGR ranges widely, mostly because firms differ on where MES ends and the broader MOM suite begins.

Implementation, not licensing, decides success. MES is notoriously hard to deploy, and the difficulty is integration with PLCs, SCADA, and ERP, plus customization, validation, and shop-floor change management, not the software itself.

No-code and AI are the disruptive vectors. Composable, no-code MES (led by Tulip) and AI on the shop floor are reshaping the category, though Gartner notes only about one-third of vendors can cite live production AI use cases.

2. What MES and MOM software is

MES answers what is happening on the shop floor right now and what should happen next. It is distinct from the planning systems above it and the control systems below it. Manufacturing operations management (MOM) is the broader category, adding scheduling, quality, maintenance, inventory, and labor management around the MES execution core; vendors and analysts use the two terms almost interchangeably, which is a primary source of market-sizing confusion. A useful test: MES executes and records production, MOM is the wider operations suite, and neither is the ERP or the machine controller.

The automation pyramid and ISA-95

The ISA-95 standard organizes manufacturing systems into levels. Level 4 is business planning and logistics (the ERP). Level 3 is manufacturing operations, where MES and MOM live. Levels 0 to 2 are the physical process and its control: sensors and actuators, programmable logic controllers, and supervisory control and data acquisition (SCADA). The MES consumes data from the control layers and exchanges orders and results with the ERP, which is why integration in both directions is the defining technical challenge of any MES program.

How MES differs from adjacent systems

Category confusion drives buying mistakes, and the manufacturing software stack is especially crowded. The MES executes production; the surrounding systems do related but distinct jobs.

System	What it owns	Relationship to MES
ERP	Business transactions, finance, the system of record	Sends production orders down and receives results up; ERP is Level 4, MES is Level 3
APS	Advanced planning and scheduling: what and when to produce	Optimizes the plan; MES executes and tracks it on the floor
SCADA / PLC	Real-time machine control and process automation	Levels 0 to 2; the MES consumes their data but operates above them
QMS	Enterprise quality and compliance management	Increasingly embedded in modern MES, a 2026 convergence theme
PLM	Product design, the engineering bill of materials	Defines the product; MES executes its manufacture

Core capabilities

- **Production execution and work-order management:** releasing, sequencing, and tracking orders and operations on the floor.
- **Scheduling and dispatching:** turning the plan into executable work for machines and operators.
- **Data collection:** automated capture from machines and manual entry from operators, the raw material for everything else.
- **OEE tracking and downtime analysis:** measuring overall equipment effectiveness and the root causes of lost time.

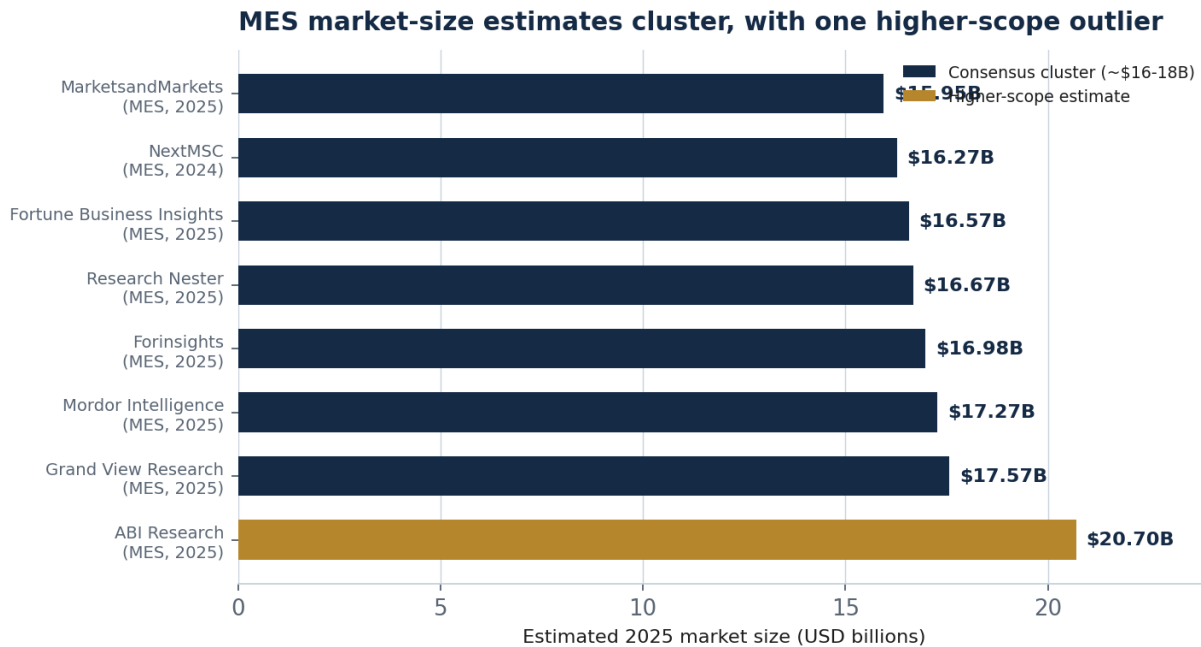
- **Quality management and genealogy or traceability:** in-process quality checks and full forward and backward lot and serial traceability.
- **WIP tracking, labor tracking, and electronic batch records:** work-in-process visibility, labor capture, and paperless batch records (EBR), the latter essential in regulated pharma.

MES and Industry 4.0

MES is the operational backbone of Industry 4.0 and smart manufacturing. It is where industrial IoT data becomes actionable, where IT and OT converge, and where digital-twin and AI initiatives connect to the physical plant. The platforms that matter in 2026 are those that can ingest high-volume machine data, run at the edge for latency and resilience, and still integrate cleanly with enterprise systems.

3. The MES market in 2026

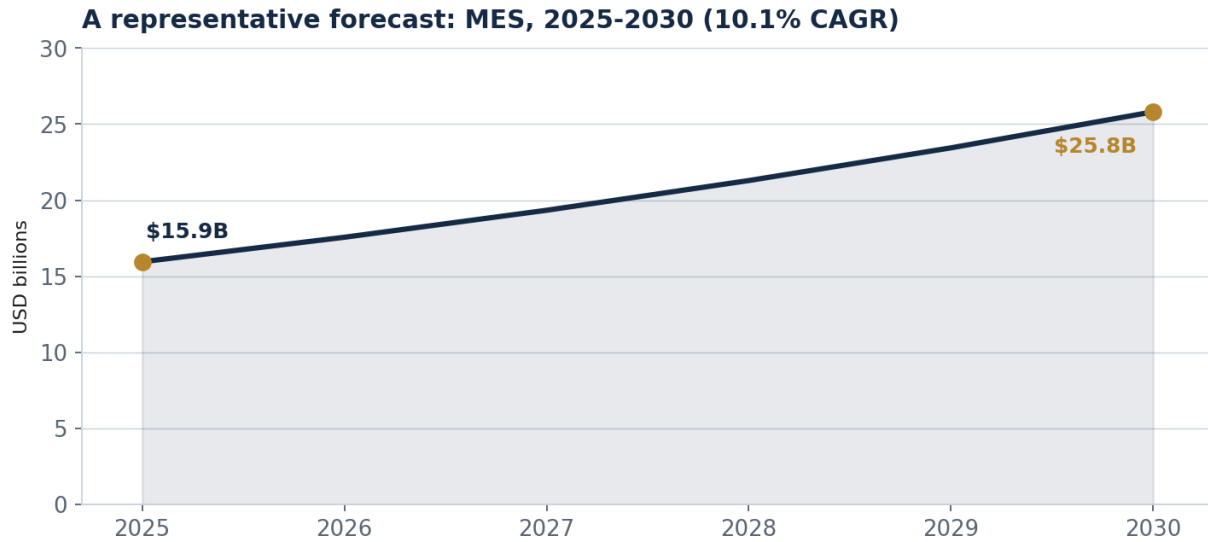
The MES market is large and growing steadily, but sizing it precisely is difficult because firms draw the boundary between MES and the broader MOM suite differently. Unusually, the 2025 size estimates cluster fairly tightly; the wide divergence is in the growth rate, which ranges from the high single digits to the mid teens. Treat the figures below as directional and anchor on the consensus that the market is in the high teens of billions of dollars and compounding around 10 percent.



Source: Supply Chain Research analysis of published estimates, 2024-2025. MES-narrow and MOM-broad definitions drive most variation in CAGR rather than 2025 size.

Figure 1. Published MES market-size estimates for 2025. Estimates cluster, with one higher-scope outlier.

Research firm	2025 size	Later forecast	CAGR
ABI Research	\$20.7B	\$40.3B / 2035	6.9%
Grand View Research	\$17.57B	\$41.6B / 2033	11.7%
Mordor Intelligence	\$17.27B	\$29.35B / 2031	9.2%
Forinsights	\$16.98B	\$33.79B / 2034	10.3%
Research Nester	\$16.67B	\$48.19B / 2035	11.2%
Fortune Business Insights	\$16.57B	\$56.65B / 2034	14.9%
MarketsandMarkets	\$15.95B	\$25.78B / 2030	10.1%



Source: MarketsandMarkets, 2025 (mid-range of the field). Published CAGRs across firms range from about 6.9% to 14.9%.

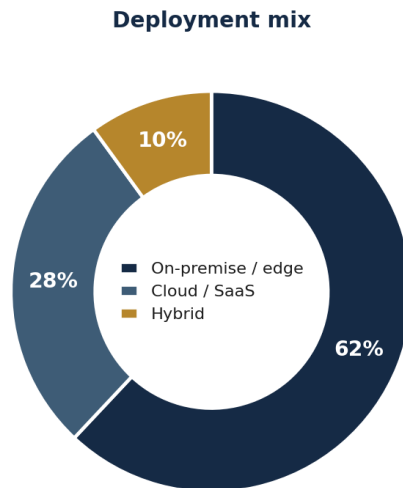
Figure 2. A representative trajectory at the mid-range 10.1% CAGR. Published rates span roughly 6.9% to 14.9%.

Why the estimates diverge

The unusual pattern here, tight on size but wide on growth, comes from definitional scope. Narrow MES counts production-execution software; broad MOM folds in scheduling, quality, maintenance, and analytics, and projects faster growth as those adjacent modules attach. The highest CAGR figures, such as Fortune Business Insights at 14.9 percent, reflect the broadest definitions and the fastest-growing regions. For planning, treat MES as a high-teens-of-billions market growing around 10 percent, and read the higher figures as MOM-scope.

Regions, deployment, and verticals

North America leads, at roughly a third of the market, with Asia-Pacific the fastest-growing region (India highest). Deployment is the reverse of most enterprise software: on-premise and edge still dominate, at about 62 percent, because latency, data sovereignty, and integration with plant equipment favor local deployment, though cloud is growing the fastest. Automotive is the largest vertical, at roughly a quarter of spend, with pharma and life sciences the fastest-growing, driven by electronic batch records and serialization, followed by food and beverage, electronics and semiconductor, and aerospace.



On-premise and edge still dominate MES (~62%); cloud is growing fastest. Source: SCR synthesis, 2025-2026.

Figure 3. Deployment mix. On-premise and edge still dominate; cloud is growing fastest.

Drivers and restraints

- **Drivers:** Industry 4.0 and IIoT adoption, the labor shortage and skills gap, quality and traceability regulation, reshoring of manufacturing, and the spread of cloud and edge computing.
- **Restraints:** high implementation cost and complexity, deep integration with legacy PLCs, SCADA, and ERP, heavy customization, validation burden in regulated industries, and shop-floor change resistance.

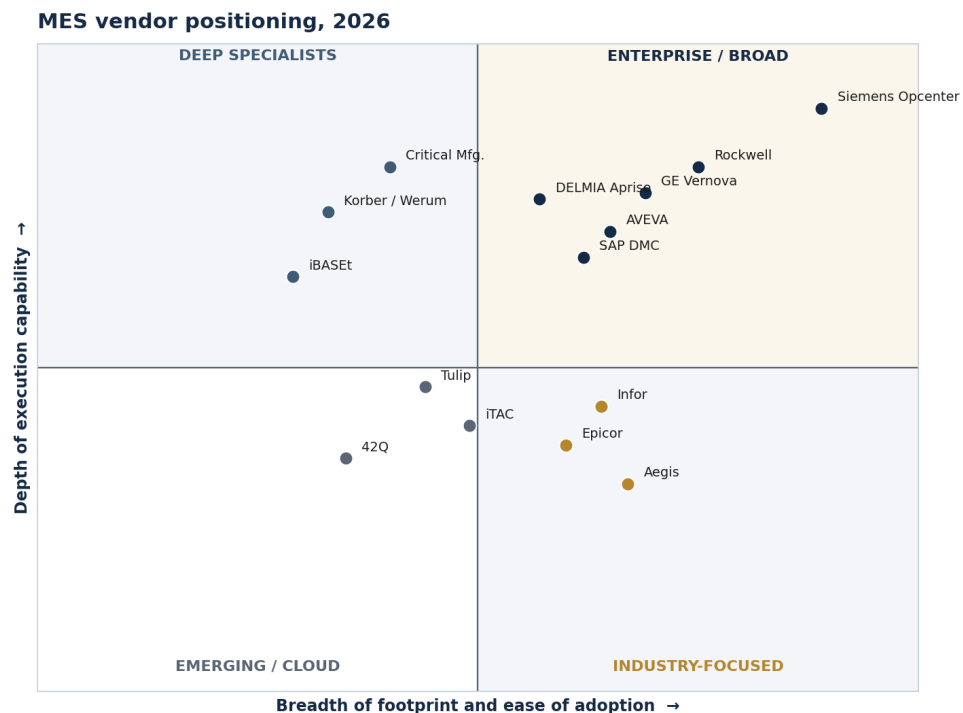
4. The vendor landscape

The MES field spans automation-vendor-aligned enterprise suites, best-of-breed specialists, deeply industry-specific platforms (pharma, electronics, aerospace), and an emerging wave of no-code and cloud-native players. This section profiles the vendors that matter in 2026, grouped by the role they play. Each profile is vendor-neutral and notes both strengths and limitations.

What the analysts say

The analyst picture for MES changed in 2023, and reading it correctly matters.

- **Gartner retired the MES Magic Quadrant.** The last edition was April 2023; Gartner now publishes an unranked Market Guide (latest March 2026) that names representative vendors rather than Leaders, and reports that AI in MES is nascent, with only about one-third of vendors able to cite live production use cases. There is no current Gartner MES Leader.
- **IDC's MarketScape is the ranked anchor.** Its 2024-2025 worldwide MES assessment evaluated 18 vendors and named Siemens, AVEVA, and Infor as Leaders, with Tulip recognized as a Leader in the discrete MES assessment.
- **The 2023 Gartner Leaders provide context:** Siemens, Rockwell, GE Digital (now GE Vernova), Critical Manufacturing, Korber, and iTAC. Forrester has not published a Wave for MES or MOM.



Gartner discontinued the MES Magic Quadrant after 2023; structure synthesizes the 2023 MQ and the 2024-2025 IDC MarketScape. Placements are SCR's directional interpretation, not analyst coordinates.

Figure 4. MES vendor positioning, synthesized from the 2023 Gartner Magic Quadrant and the 2024-2025 IDC MarketScape. Placements are SCR's directional interpretation, not analyst coordinates.

Enterprise and automation-aligned

Siemens Opcenter

The broadest enterprise MES, a Gartner Leader six consecutive times in the era of the Magic Quadrant and an IDC MarketScape Leader. Opcenter (which absorbed Camstar and SIMATIC IT) spans execution, quality, scheduling, and R&D across discrete and process industries, and now embeds Siemens-owned Mendix for low-code extension. Strengths are breadth, multi-plant scale, and integration with the wider Siemens automation and PLM portfolio. The trade-off is the cost and effort that come with that breadth, which can mean longer deployments.

Rockwell Automation (Plex and FactoryTalk)

A Gartner Leader offering both a cloud-native SaaS MES (Plex) and an on-premise platform (FactoryTalk ProductionCentre), strong in automotive and discrete manufacturing and backed by Rockwell's controls and edge portfolio. The breadth of the edge-to-cloud stack is a genuine advantage; the main caution is overlap and integration between the Plex and FactoryTalk lines.

Dassault Systemes DELMIA Apriso

A strong global, multi-site MES integrated with the 3DEXPERIENCE platform, well suited to large manufacturers standardizing operations across plants. Notably, it was a Challenger rather than a Leader in the 2023 Magic Quadrant, and implementation complexity is the recurring critique.

SAP Digital Manufacturing

SAP's cloud MES, tightly integrated with S/4HANA and the Joule AI assistant, is the natural choice for SAP-centric manufacturers that value native ERP integration. It was positioned as a Visionary rather than a Leader in 2023, and its best fit is firmly within the SAP estate.

AVEVA and GE Vernova

AVEVA (formerly Wonderware) is an IDC MarketScape Leader with deep process-industry roots, now transitioning to a subscription model on its CONNECT cloud. GE Vernova (formerly GE Digital) Proficiency was a Gartner Leader, strong in smart-factory analytics; the company cites customer results such as a paper manufacturer saving about \$4M annually and an automotive maker cutting inspection costs by 40 percent, figures that are vendor-reported.

Best-of-breed and industry-specific

Critical Manufacturing

A Gartner Leader three consecutive times in the Magic Quadrant era, focused on high-tech, semiconductor, and electronics manufacturing with its cmNavigo platform. A point of fact often gotten wrong: Critical Manufacturing is majority-owned by ASMPT (ASM Pacific Technology), not Amazon, and has been an active acquirer, adding visual-AI defect detection in 2025.

Korber (Werum PAS-X)

The pharma and biotech standard for electronic batch records, a Gartner MES Magic Quadrant Leader for three consecutive editions through 2023, and the default shortlist entry for regulated life-sciences manufacturing where validation and compliance dominate the requirements.

Other capable specialists include **iBASet** (Solumina, for aerospace and defense and complex discrete), **Aegis Software** (FactoryLogix, for electronics and SMT), **iTAC** (a 2023 Leader in electronics), and **42Q, Epicor, and Infor**, the last an IDC MarketScape Leader. These are strong fits where industry depth outweighs breadth.

Emerging no-code, cloud, and AI

Tulip

The leading no-code, composable MES and the clearest disruptor in the category. An MIT spinout, Tulip lets engineers build frontline operations apps without traditional coding; in 2025 it reported tens of thousands of apps serving 60,000 frontline workers across 1,000 sites in 45 countries, with customers including AstraZeneca, Stanley Black and Decker, and Richemont. In January 2026 it raised a \$120M Series D led by Mitsubishi Electric at a \$1.3B valuation. A Forrester Total Economic Impact study, commissioned by Tulip, reported an average 448 percent three-year ROI and large labor and defect improvements; those figures are vendor-commissioned and should be validated locally.

Other emerging players include **Sight Machine** (manufacturing data and analytics), **Plataine** (AI for advanced materials), and **MasterControl and Apprentice.io** (quality and electronic batch records for life sciences).

Vendor summary

The table is an orientation aid, not a scorecard. Use it to frame a shortlist, then evaluate candidates against the framework that follows, weighting industry fit heavily.

Vendor	Tier	Best fit	Notes
Siemens Opcenter	Enterprise	Multi-plant, discrete + process	6x Gartner MQ Leader to 2023; IDC Leader; Mendix low-code
Rockwell (Plex)	Enterprise	Automotive, discrete, edge-to-cloud	Gartner MQ Leader (2023); SaaS + on-prem
DELMIA Apriso	Enterprise	Global multi-site	3DEXPERIENCE; Challenger in 2023
SAP DM	Enterprise	SAP-centric manufacturers	S/4HANA-native; Visionary in 2023
AVEVA / GE Vernova	Enterprise	Process; smart-factory analytics	AVEVA an IDC Leader; GE a 2023 Gartner MQ Leader
Critical Mfg.	Specialist	Semiconductor, electronics	3x Leader; ASMPT-owned
Korber (PAS-X)	Specialist	Pharma EBR	3x Leader; life-sciences standard
iBASEt / Aegis	Specialist	Aerospace / electronics	Complex discrete and SMT
Infor	Industry suite	Industry-specific ERP + MES	IDC MarketScape Leader
Tulip	Emerging	No-code, frontline ops	IDC discrete Leader; \$1.3B valuation

5. How to evaluate an MES

Because MES platforms vary so much by industry, the most common selection mistake is choosing on brand or a polished demo rather than fit. Score every shortlisted vendor against the same defined dimensions, weighted for your industry and your existing automation stack. A pharma manufacturer and a discrete automotive plant evaluating the same vendors should reach different answers.

The five evaluation dimensions

1. **Functional and execution fit.** Does the platform natively cover the execution, scheduling, quality, traceability, and OEE capabilities your operation needs, for your process type (discrete, process, or batch)?
2. **Shop-floor connectivity and ERP integration.** Assess pre-built connectivity to your PLCs, SCADA, and IIoT devices, and the quality of integration with your ERP. This is where MES programs most often stall, so probe it hardest.
3. **Architecture.** Decide between on-premise or edge and cloud, and weigh composability and no-code configurability. Edge matters for latency and resilience; no-code matters for who can change the system and how fast.
4. **Total cost and commercial model.** Look past license to the multi-year total, including integration, customization, and validation, and understand whether pricing is per-seat, per-site, subscription, or perpetual.
5. **Viability and industry fit.** Weigh financial stability and roadmap, and demand references in your specific industry, because MES value is industry-specific and a strong reference elsewhere may not transfer.

Buy, build, or configure

Few manufacturers build an MES from scratch today, given mature platforms and the maintenance burden a custom build creates. The more live question is how much to customize versus configure. Heavy customization is the leading driver of MES cost and risk; favoring configuration, and increasingly no-code, keeps programs on track and upgradable.

Industry fit

Industry specialization is real and consequential. Regulated pharma needs validated electronic batch records (Korber, MasterControl, Apprentice); semiconductor and electronics need fine-grained genealogy and equipment integration (Critical Manufacturing, Aegis, iTAC); aerospace and defense need complex discrete and as-built configuration (iBAsEt). Start the shortlist from your industry, not from a generic leaderboard.

A selection process that works

6. **Define your processes, automation stack, and industry requirements** (process type, equipment, ERP, regulatory needs).
7. **Shortlist three to four candidates** that fit your industry and architecture preference.
8. **Score against the five dimensions** with a weighted scorecard so every vendor is compared on the same basis.

9. **Run a proof of concept on one line or cell**, testing real machine integration and a real production scenario.
10. **Check industry references and model multi-year total cost**, then decide and plan a phased rollout before signing.

6. Cost and pricing

MES pricing models include per-seat and per-site licensing, subscription (SaaS, increasingly common) versus perpetual license, and edge or on-premise deployment for latency and data control. The dominant budgeting truth is that services frequently rival or exceed license cost, because integration, customization, and (in regulated industries) validation are substantial. Lightweight, OEE-focused SaaS platforms are priced per production line as a lower-cost entry point.

Cost element	Indicative figure	Notes
Enterprise MES (per site)	Six to seven figures	Scales with sites, seats, modules, and customization
Subscription / SaaS MES	Per-seat or per-line	Lower entry cost; cloud-native vendors
Implementation and integration	Often equals or exceeds license	PLC/SCADA/ERP integration and customization
Validation (regulated)	Significant added cost	21 CFR Part 11, EU Annex 11, ALCOA+ in pharma
OEE-only SaaS	Per line / month	Fast payback as a lighter-weight alternative

What drives cost, and the multi-year view

Four variables move the total more than the license rate: the number and complexity of equipment and system integrations, the degree of customization versus configuration, validation requirements in regulated industries, and the number of sites and seats. Model the full multi-year picture, license or subscription, integration, customization, validation, training and change management, and ongoing support, before comparing vendors. A platform with a lower license but a heavier, customization-dependent implementation can be the more expensive choice once the multi-year view is in front of you.

Most vendors gate pricing and quote per site; confirm via direct quotes, and model integration and validation cost explicitly, because they usually dwarf the license.

7. Implementation: where programs succeed or fail

Selection is the consequential decision; implementation is where MES programs are won or lost, and MES is notoriously hard to implement. Lighter, phased SaaS deployments can deliver value in about eight weeks; full pharma platforms can take 6 to 18 months before a single validated batch is produced. The timeline matters less than the discipline, because the failure modes are about integration, data, and people rather than software quality.

Why programs fail

- **Integration is underestimated**, the single most common cause, spanning PLCs, SCADA, IIoT devices, and the ERP.
- **Customization outruns the plan**, driving cost and risk and making the system hard to upgrade.
- **Validation is underscoped in regulated industries**, surfacing late, when it is most expensive.
- **Shop-floor change management is neglected**, leaving operators distrustful and reverting to paper and workarounds.

MES-specific failure data is limited, so the figures below are enterprise-software and ERP analogs. They likely overstate MES-specific risk, but the directional lesson holds.

~70% of ERP implementations will fail to meet objectives over the next three years (Gartner)	~50% of ERP projects fail on the first attempt (RubinBrown / Deloitte analysis)	8 wks-18 mo go-live, from a lightweight SaaS rollout to a validated pharma platform
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Three principles that separate success from failure

Treat integration as the program. Inventory every machine and system connection early, and track integration and data accuracy as primary metrics.

Configure, do not customize. Favor configuration and no-code over custom code; every shop-floor-specific modification is cost and upgrade risk.

Win the floor. Operators decide whether the system is used as designed; budget for training and change management, not just software.

The role of a systems integrator

Enterprise MES programs are rarely run by the software vendor alone. Experienced systems integrators handle the equipment integration, customization, and validation, and an independent integrator can keep scope honest and the plan realistic. Treat integrator selection with the same rigor as software selection, and confirm the integrator has done your industry and your equipment before.

A phased rollout

The lowest-risk pattern is to prove the system on one line or cell, validate the machine integration and the production scenario, then template and extend site by site. This contains risk, delivers early wins, and gives operators time to adopt new ways of working before the rollout scales.

8. Trends shaping 2026

Cloud, SaaS, and edge

MES is migrating to the cloud, but more slowly than other enterprise software, because latency, resilience, and equipment integration favor on-premise and edge deployment. The emerging pattern is hybrid: edge computing on the plant floor for real-time control and data, with cloud for analytics, multi-site visibility, and AI. Cloud-native MES is the fastest-growing deployment model even as on-premise retains the majority.

No-code and composable MES

No-code and low-code, led by Tulip and reinforced by Siemens-Mendix, is reshaping who can build and change an MES and how fast. Composable MES lets manufacturers assemble and adapt capabilities rather than deploy a monolith, reducing the customization burden that has historically made MES so hard.

AI on the shop floor

AI and machine learning are being applied to quality (visual defect detection), predictive maintenance, and scheduling, and the first agentic capabilities are appearing. The reality check is Gartner's: AI in MES is nascent, with only about one-third of vendors able to cite live production use cases, so buyers should separate shipped capability from roadmap.

Convergence and the digital thread

MES is converging with MOM and with quality management on unified platforms, and connecting to digital twins and the broader digital thread from design through production. IT and OT convergence underpins all of it, making clean integration and data governance more important than any single feature.

9. Segment-specific guidance

MES value is industry-specific. The table summarizes what tends to dominate the decision by profile; the notes that follow add detail.

Operating profile	What matters most	Vendors that fit
Automotive / discrete	Throughput, OEE, sequencing, traceability	Siemens, Rockwell, DELMIA Apriso
Pharma / life sciences	Electronic batch records, validation, compliance	Korber PAS-X, MasterControl, Apprentice
Food & beverage / process	Recipe execution, yield, quality, shelf life	AVEVA, Siemens, Rockwell
Electronics / semiconductor	Genealogy, equipment integration, SMT	Critical Manufacturing, Aegis, iTAC
Aerospace & defense	Complex discrete, as-built configuration	iBASEt, Siemens, DELMIA Apriso
SMB / mid-market	Fast deployment, no-code, OEE first	Tulip, 42Q, OEE-focused SaaS

Automotive and discrete manufacturers prioritize throughput, OEE, and sequencing, the home turf of the enterprise suites. **Pharma and life sciences** are dominated by validated electronic batch records and compliance, where Korber leads. **Electronics and semiconductor** manufacturers need fine-grained genealogy and equipment integration, favoring Critical Manufacturing and Aegis. **Aerospace and defense** need complex discrete and as-built configuration, where iBASEt is strong. And **smaller manufacturers** should start with OEE and a no-code platform rather than a heavy enterprise deployment they cannot staff.

10. ROI and the business case

MES ROI concentrates in equipment effectiveness, quality, and labor. Vendor-sourced figures should be validated against your own baseline, but the direction is consistent: better real-time visibility and control raise output and reduce waste.

+OEE double-digit OEE gains reported; one biologics maker cited a 19% jump in six months	-Scrap scrap and rework reductions and 40% lower inspection cost in vendor cases	-42% batch-release time reduction documented at one pharma facility
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The value levers

A credible business case usually rests on several levers that compound. Higher OEE and throughput come from real-time visibility into downtime and its causes. Scrap and rework fall as in-process quality catches defects early. Labor productivity rises as paperless work instructions and automated data capture remove manual effort. Compliance and quality improve through enforced procedures and full electronic records, reducing the cost of audits and deviations. Traceability and faster, narrower recalls protect both margin and brand. And paperless operation removes the hidden cost of manual batch records entirely. The most reliable business case is built on your own OEE, scrap, and labor baseline, with vendor figures used only to size the opportunity.

Use a simple frame: ROI equals annual benefit (recovered capacity, reduced scrap and rework, labor savings, and avoided compliance cost) minus annual platform and run cost, divided by that cost. Pharma programs typically see returns over 12 to 24 months; lightweight OEE platforms can pay back in weeks. Build the case on a multi-year horizon for full-scope MES.

11. Frequently asked questions

What is an MES?

Software that manages, monitors, and synchronizes real-time production on the shop floor: work-order execution, scheduling, data collection, OEE, quality, traceability, and electronic records. It is the system of record for what actually happened in production.

What is the difference between MES and MOM?

MES is the production-execution core; manufacturing operations management (MOM) is the broader suite that adds scheduling, quality, maintenance, inventory, and labor around it. The terms are often used interchangeably, which is a main reason market estimates diverge.

What is the difference between MES and ERP?

ERP (ISA-95 Level 4) handles business transactions and is the financial system of record; MES (Level 3) handles shop-floor execution in real time. They integrate, with the ERP sending orders down and the MES sending results up.

What is the difference between MES and SCADA or PLCs?

SCADA and PLCs (Levels 0 to 2) control the machines and the process in real time; the MES (Level 3) consumes their data and orchestrates production above them. The MES does not replace machine control.

What is ISA-95?

The standard that organizes manufacturing systems into levels, from sensors and controls (Levels 0 to 2) through manufacturing operations and MES (Level 3) to business planning and ERP (Level 4). It is the common reference for where each system sits.

What does an MES cost?

Enterprise MES runs into six and seven figures per site and scales with seats, modules, and customization; cloud and SaaS options price per seat or per line at lower entry cost. Budget implementation and integration to rival or exceed license, plus validation cost in regulated industries.

How long does an MES take to implement?

From about eight weeks for a lightweight, phased SaaS deployment to 6 to 18 months for a full validated pharma platform. Integration and data quality drive the timeline more than the software.

Why are MES projects so hard?

Because they require deep integration with PLCs, SCADA, and ERP, often heavy customization, validation in regulated industries, and significant shop-floor change management. The software is rarely the hard part.

Cloud or on-premise?

On-premise and edge still dominate MES, at about 62 percent, because of latency, resilience, and equipment integration, though cloud is the fastest-growing model. Many manufacturers adopt a hybrid edge-plus-cloud architecture.

Best-of-breed or ERP-embedded MES?

ERP-embedded MES (SAP, Oracle, Infor) offers tight integration and a single vendor; best-of-breed and industry specialists (Siemens, Critical Manufacturing, Korber) typically offer deeper capability for a given industry. Match the choice to your industry and existing stack.

12. Recommendations

- 11. Shortlist by industry, not by a generic leaderboard.** Automotive and discrete manufacturers should evaluate Siemens, Rockwell, and DELMIA Apriso; pharma should weigh Korber, MasterControl, and Apprentice; electronics and semiconductor should look at Critical Manufacturing, Aegis, and iTAC; aerospace should consider iBAsE; and smaller manufacturers should start with Tulip or an OEE-focused SaaS platform.
- 12. Do not anchor on a Gartner Leader, because there is not one.** Use the unranked Gartner Market Guide for the vendor field and the IDC MarketScape (Siemens, AVEVA, Infor as Leaders) as the ranked reference, alongside the historical 2023 Magic Quadrant.
- 13. Treat integration and validation as the program.** Inventory every machine and system connection, scope validation realistically in regulated industries, and engage an experienced integrator with references in your industry.
- 14. Configure, do not customize, and consider no-code.** Customization is the leading driver of MES cost and risk; favor configuration, and evaluate whether a no-code or composable platform can meet your needs with less of it.
- 15. Stage the rollout and prove value on one line first.** Start with OEE and a single line or cell, validate the machine integration, then template and extend site by site.

13. Methodology and caveats

- **Market sizing clusters on size but diverges on growth** (roughly \$16B to \$20.7B for 2025, with CAGRs from 6.9% to 14.9%), largely because firms differ on where MES ends and MOM begins; all figures are directional.
- **ROI and savings figures are often vendor- or vendor-commissioned** (GE Vernova, Tulip and its Forrester TEI study, and integrator case studies) and should be validated against your own baseline before use in a business case.
- **Implementation-risk statistics are ERP and enterprise-software analogs** (Gartner, RubinBrown/Deloitte), not MES-specific, and likely overstate MES-specific risk.
- **Gartner retired the MES Magic Quadrant after 2023** and now publishes an unranked Market Guide, so there is no current Gartner Leader. The IDC MarketScape (Siemens, AVEVA, Infor as Leaders) is the ranked anchor, and the quadrant in Figure 4 is SCR's directional synthesis, not a reproduction of any analyst chart. Gartner and IDC do not endorse any vendor.
- **Ownership and product details are accurate as reported** at the time of writing; Critical Manufacturing is ASMPT-owned, and most vendor pricing is gated, so confirm via direct quotes.

14. Sources

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Additional figures drawn from: ABI Research, Research Nester, NextMSC, and Forinsights (market sizing); the 2023 Gartner Magic Quadrant for Manufacturing Execution Systems and the 2024-2025 IDC MarketScape for Worldwide MES; and vendor materials for Siemens, Rockwell, Dassault, SAP, GE Vernova, Korber, and Tulip. Vendor capability and customer claims are vendor-stated unless otherwise noted. Gartner and IDC do not endorse any vendor, product, or service depicted in their research.

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