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*Strategy, people,  
and processes*

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**Fulfilling the  
promise of  
enterprise asset  
management**



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# Executive summary



**Companies in asset-intensive industries** such as utilities, oil and gas, and airlines have long sought to manage their huge investments in assets more effectively. Yet even after significant investments of time and money in formal asset management programs, typically called enterprise asset management (EAM), companies often come away disappointed that their programs have not delivered on the promised benefits of more reliable assets, lower costs, and improved safety. And all too often executives aren't sure why the benefits haven't materialized.

When EAM programs fall short, it is often because the company has concentrated its efforts on technology upgrades without addressing underlying problems. The latest technology solution in itself will never enable companies to manage assets effectively. A successful EAM program must begin with the right strategy for managing assets, and then focus on the people, processes, and technology needed to carry it out.

A successful EAM program should integrate the three key disciplines of EAM: planning for and managing assets throughout their life cycles, carrying out the efficient maintenance of those assets, and managing the maintenance workforce. Companies must first develop an overarching asset strategy that includes all three of these elements. Then they must execute that strategy effectively, ensuring the participation of all stakeholders, designing the right processes and procedures, training employees well and managing the change process, optimizing the necessary data, and integrating asset maintenance tightly with the supply chain.

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# *The promise of EAM*

Companies in asset-intensive industries, such as utilities, oil and gas, airlines, industrials, and automotive, can spend hundreds of millions of dollars annually to ensure that their power plants, drilling rigs, refineries, factories, and other major assets are functioning optimally and providing the level of service needed to execute their strategies and carry out their operations safely, effectively, and efficiently. The effort involves monitoring a multitude of processes and variables across the entire asset base, and at large companies it quickly becomes very complex.

To manage that complexity, many companies have turned to some form of enterprise asset management (EAM), a combination of processes and IT tools that can offer real benefits — if implemented properly. At the top of the benefits list are the sizable long-term cost savings resulting from effective operations management and improved financial tracking, as well as greater asset reliability and longer life. Companies can also expect improved health, safety, and environmental performance, and better response times in their efforts to meet service and regulatory requirements. Finally, EAM can improve regulatory compliance and, in certain industries such as utilities, make companies eligible for government funding.

And with the explosive growth and maturity of high-quality mobile capabilities — including hardened handhelds, GPS, autonomous vehicles, ubiquitous wireless networks, and the Internet of Things — the benefits to be reaped from a successful EAM program that can leverage these technologies to manage assets even more efficiently are set to expand even further.

Still, many companies have been disappointed with the outcome of their EAM efforts. Companies often fail to invest the time and effort to fully define a strategy and business case for why they are implementing EAM, to develop the management processes needed to make the effort succeed, or to put in place the necessary training and change management programs. Often, disappointments can be

*Companies often fail to fully define a strategy and business case for implementing EAM.*

traced to an overemphasis on the IT component of EAM projects without dealing thoroughly with the underlying causes of inefficiencies. Studies by Strategy& and others show that as much as 70 percent of large technology initiatives such as EAM fail to be ultimately successful in delivering expected benefits and full scope, or even to complete the implementation at all.

For EAM efforts to succeed, companies must approach them strategically, while concentrating on the people and processes needed. This requires companies to take into account the full meaning of EAM, and work to get over the key hurdles that typically lead to failure. Only by doing so will they reap the full benefits that superior enterprise asset management can provide.

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# ***EAM structure and challenges***

We define EAM as “the set of integrated processes and tools for managing and maintaining operational assets at target service levels while optimizing life-cycle costs and asset life.” As such, it combines three core disciplines, all of which must work in concert if the system as a whole is to function smoothly:

- *Asset management*: Planning for and managing all assets through their entire life cycle, from when they are put into service through major maintenance and upgrades to final decommissioning
- *Maintenance management*: Conducting required preventive and reactive asset maintenance
- *Workforce planning*: Managing the maintenance workforce

A well-structured EAM program incorporates these three disciplines, which must be tightly integrated. The overall asset and maintenance management strategy, based on the company’s operational and business needs, governs the program. That includes the assets themselves, and an asset management plan tailored to each asset or group of assets over its entire life cycle — acquiring, maintaining, and monitoring the asset; refurbishing it as needed; and replacing it when its life cycle ends. The program also covers financial management of the assets, including projections, estimates, and budgeting. The overall strategy should also determine how the team responsible for managing the assets will function, what processes are needed to monitor the asset through its life cycle, and what IT systems are required to support those processes (*see Exhibit 1, next page*).

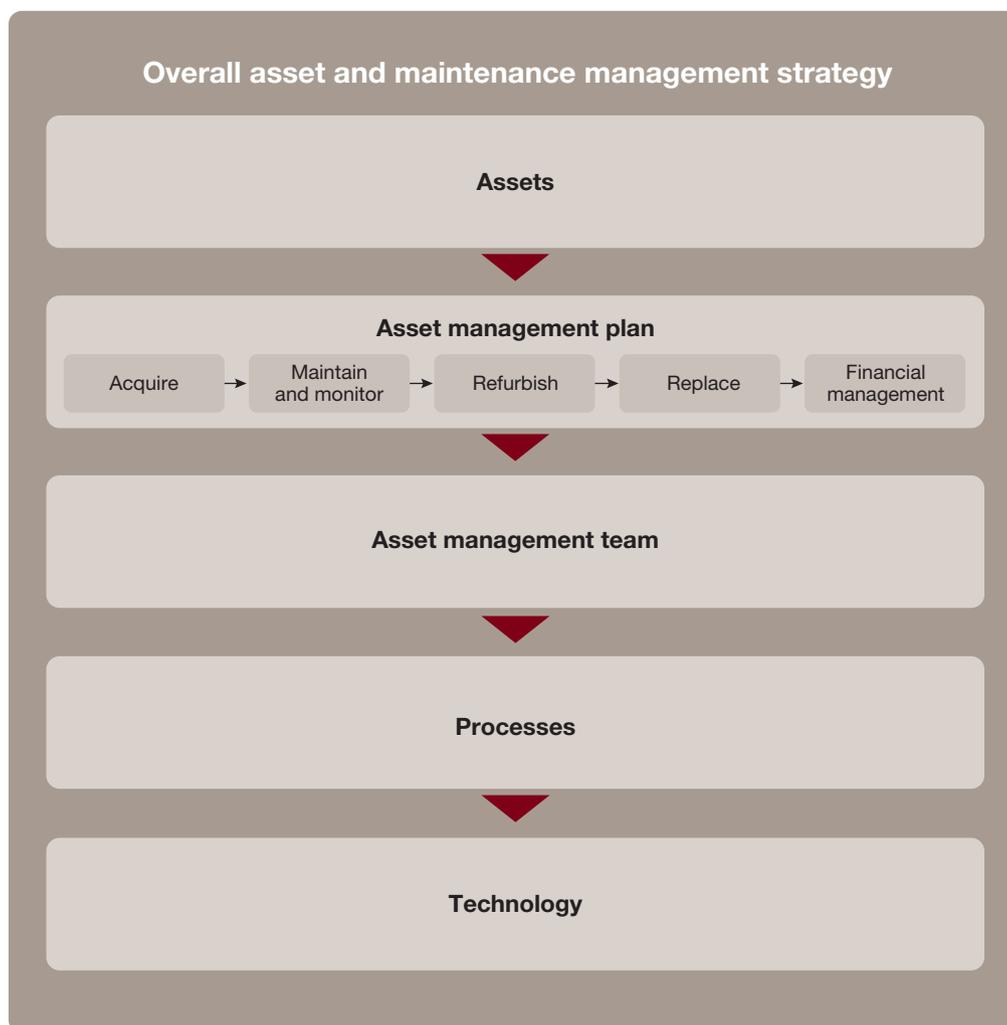
As straightforward as this structure seems, many companies and senior leaders remain unhappy with their EAM efforts. Every company’s situation is different, of course, but our experience shows that there are six primary reasons that many such programs don’t meet expectations: poor EAM strategy development; inadequate stakeholder management; poor processes and procedures; insufficient change management and

training; problems with data management; and insufficient integration with the supply chain.

It is our experience that companies that address each of these challenges early on are much more likely to develop a robust and effective EAM program, and thus experience a vast improvement in their ability to maintain and maximize the benefits of EAM.

*Exhibit 1*

**The key components of an asset management program**



Source: Strategy& analysis

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# *Developing strategy*

All too often, companies tend to de-emphasize the development of a long-term strategic plan around their assets, trying instead to solve short-term problems, or simply installing a new software solution and moving on, while ignoring long-term root causes. The lack of an overarching strategy and an overreliance on IT are likely to lead to disparate and disjointed asset management tactics that will never work together holistically.

When designing an EAM strategy, companies can focus too much on technology. The very scale and complexity of asset management can be overwhelming, leading these companies to reach for a technological solution without examining whether the system will meet key business needs. Many companies, including SAP, Oracle, and IBM, offer EAM solutions, but enabling business and operational capabilities with the chosen solution is ultimately more important than the solution itself.

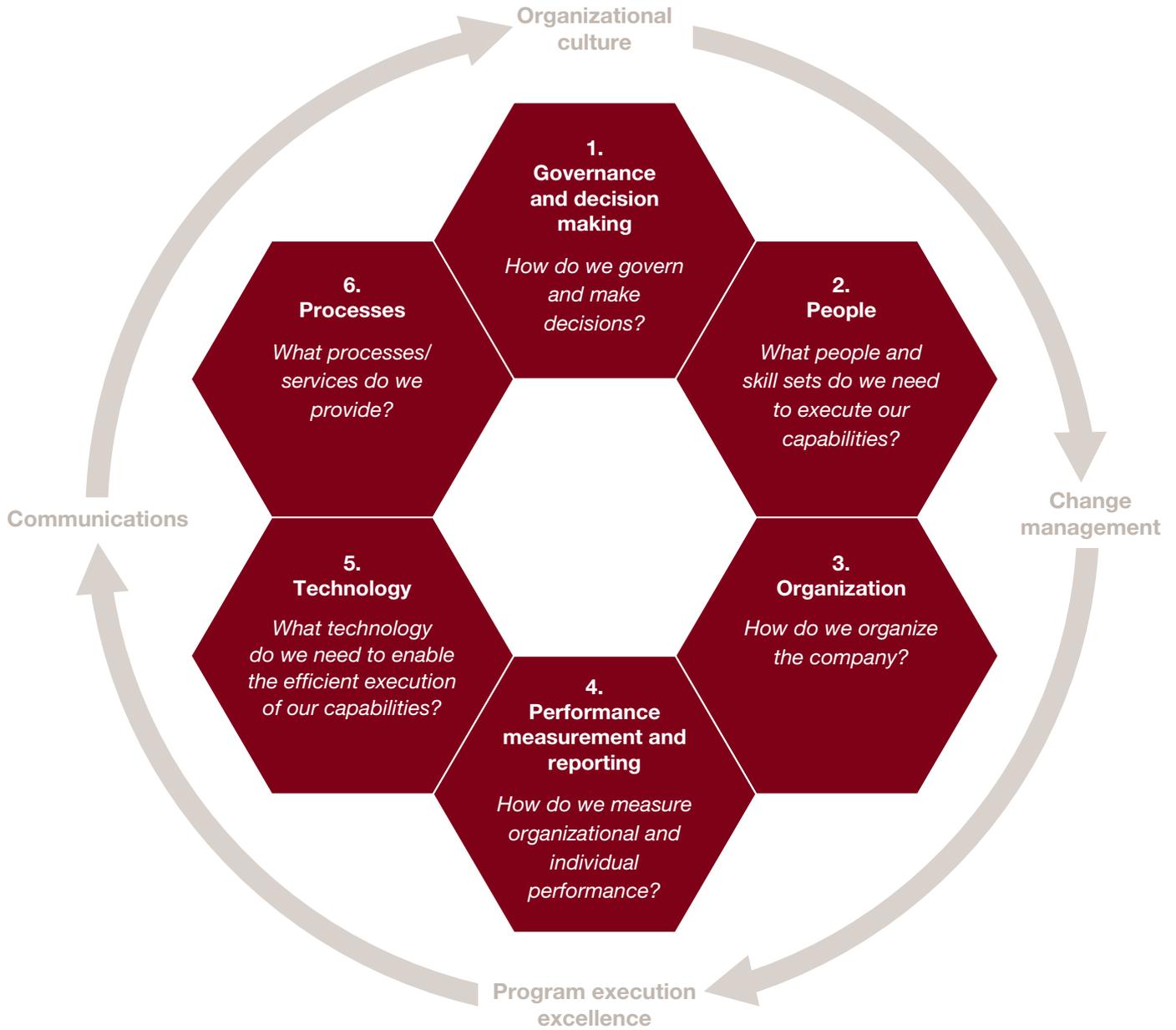
The exact shape of an EAM strategy will vary from company to company, but it must at least address the following questions:

- What are our overall business objectives for our assets, now and in the future?
- Does our EAM strategy support our overall business strategy?
- How centralized or decentralized should we be in managing our assets?
- What is our time line for getting to our target level of maturity in managing our assets?
- Do all stakeholders agree with the strategy?
- What will our operating model be for managing our assets?

A good starting point for designing an EAM strategy is to create a target “operating model,” which should address the way many key aspects of the EAM program, including technology, will work in concert to achieve the business objectives. It has several key components, which are summarized in *Exhibit 2, next page*.

Exhibit 2

Investment decisions should be supported by six key cost-related components to achieve sustainable growth



Source: Strategy& analysis

Some companies may not take the time to develop an accompanying business case that tangibly defines the expected costs and benefits of the EAM program. This is especially common on the benefits side: Many times we have seen companies offer vague qualitative statements about expected benefits that are open to interpretation, with hazy targets that are virtually impossible to measure once the program is implemented.

In addition, some companies fail to get their key stakeholders involved in the development of their EAM strategy, which invariably leads to insufficient buy-in and accountability, and overall poor governance of the program.

Companies can take a couple of steps to put a robust EAM strategy in place. The first step should be an overall assessment of how the company conducts its current asset management, maintenance management, and workforce planning efforts. As part of the assessment, companies should benchmark their current capability level in each of these disciplines against leading practices among companies in and outside their own industry, as well as EAM strategy consultants, technology consultants, and systems integrators, in order to identify their capability gaps, which can then be used to focus the overall strategy and goals of their EAM program.

Second, during creation of the business case, it is critical to involve key senior leaders in both the assessment of the current program and the identification of capability gaps, to ensure buy-in and accountability. Executives with deep expertise and industry-level knowledge are best equipped to define potential EAM benefits and should be engaged in building the business case. The case should identify only those benefits that are tangible enough to be measured and tracked, such as labor required to perform specific tasks, and cost savings through replacement of old technology with new. Teams must be held accountable for reaching these targets, through periodic performance measurement once the program is operational. The benefits chosen should be confirmed by all stakeholders before the full team signs off on the business blueprint.

A major natural gas storage, transmission, and distribution company, for example, had difficulty obtaining corporate support for a prospective EAM investment. The business case for the program had been deemed a “finance” exercise, and included only general descriptions of “productivity improvements.” As a result, the investment requested was rejected by the executive team. The business case was approved only when it was reconstructed with actionable details on where specific cost reductions would be enabled, including information on specific labor and service reductions. Moreover, the new business case ensured that the program had specific objectives for obtaining those productivity improvements.

*Failure to get key stakeholders involved in the development of EAM strategy leads to poor governance of the program.*

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# *Expanding stakeholder management*

Every corporate leader understands just how challenging it can be to keep abreast of day-to-day operational issues. At the same time, many fail to involve people with current field experience to help identify current operational issues and potential solutions that could save companies significant time and money. And when such issues do filter up to senior leaders, they have often been diluted to the point where they do not accurately reflect the real problem at hand. This behavior can be especially problematic for EAM programs.

Senior leaders who do not involve their field staff are more likely to commit millions of dollars to solutions that don't address the real problems. In turn, impacted employees end up feeling that operational changes are being imposed without their involvement in understanding the real challenges or helping to develop the solution. Some employees may even feel that their jobs are in jeopardy due to new technologies and new skills they are expected to learn. Such feelings can lead to an unwillingness to support the necessary changes, and ultimately poor adoption of the new EAM program by the very workforce needed to carry it out.

The use of mobile technologies can also lead to disruption in the execution of new EAM programs. Enabling workers to be fully connected while in the field or on the plant floor has tremendous potential benefits, but companies can underestimate how resistant their workforces can be to the feeling that "big brother" is watching them through these enhanced technologies.

Involving the right people at the right time is essential to the success of any EAM program. One way to gauge whether the best people are on the EAM team is to note resistance on the part of business leaders to requests to include their top people on the project, simply because they feel that their most knowledgeable and insightful people are too valuable to let go. These are the very people you need to have on board.

The key to building the best team for developing the overarching asset and maintenance management strategy and EAM solution is to enlist a mix of individuals with overlapping specialized talents. Teams function best when they include individuals with the right combination of technical, business, and operational knowledge to link business and operational needs together with technical requirements.

The team should include experts in all affected areas, including operations, back-office functions such as HR, supply chain, finance, and IT, with an emphasis on including field personnel who will need to live with the results of the program. Their input can ensure that the program has the mix of enhanced processes and supporting technology needed to make day-to-day execution more effective while increasing the willingness of users to adopt the program — all of which improve the likelihood that the program's expected benefits will be realized.

As more and more companies outsource key asset maintenance processes, a further key to success is the appropriate involvement of outside vendors such as EAM strategy consultants, technology consultants, and systems integrators, which can help companies devise the best solutions for maintaining critical assets. Because such vendors work with multiple companies as well as other asset management technology, product, and services vendors, they often have valuable insights into how others have implemented similar programs. They can also help companies better understand trends in the industry, new technologies, and best practices.

This is especially important when considering the inclusion of mobility options in an EAM program. Significant advancements in technology have changed how field workers update asset records, plan and schedule work, and record their time. Companies must not underestimate the value of these technological advances — or the change management effort required to implement them effectively.

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# ***Improving processes and procedures***

Implementing world-class assets means little, however, if poor processes are used to operate and maintain them. Yet surprisingly, many of the largest, most asset-intensive companies employ inefficient maintenance practices throughout their operations. Work scheduling is frequently done manually, on paper; parts management is often performed locally at each site; and maintenance is reactive or simply based on inflexible, predetermined schedules. Moreover, the procedures used to execute various tasks — such as tracking the workforce, managing inventory, and order processing — are often cumbersome, redundant, and strewn with errors and inefficiencies. And the planning of the work orders for these maintenance activities is often poorly defined, resulting in lost time, lack of proper parts, rework, missed maintenance schedules, and even unsafe working conditions.

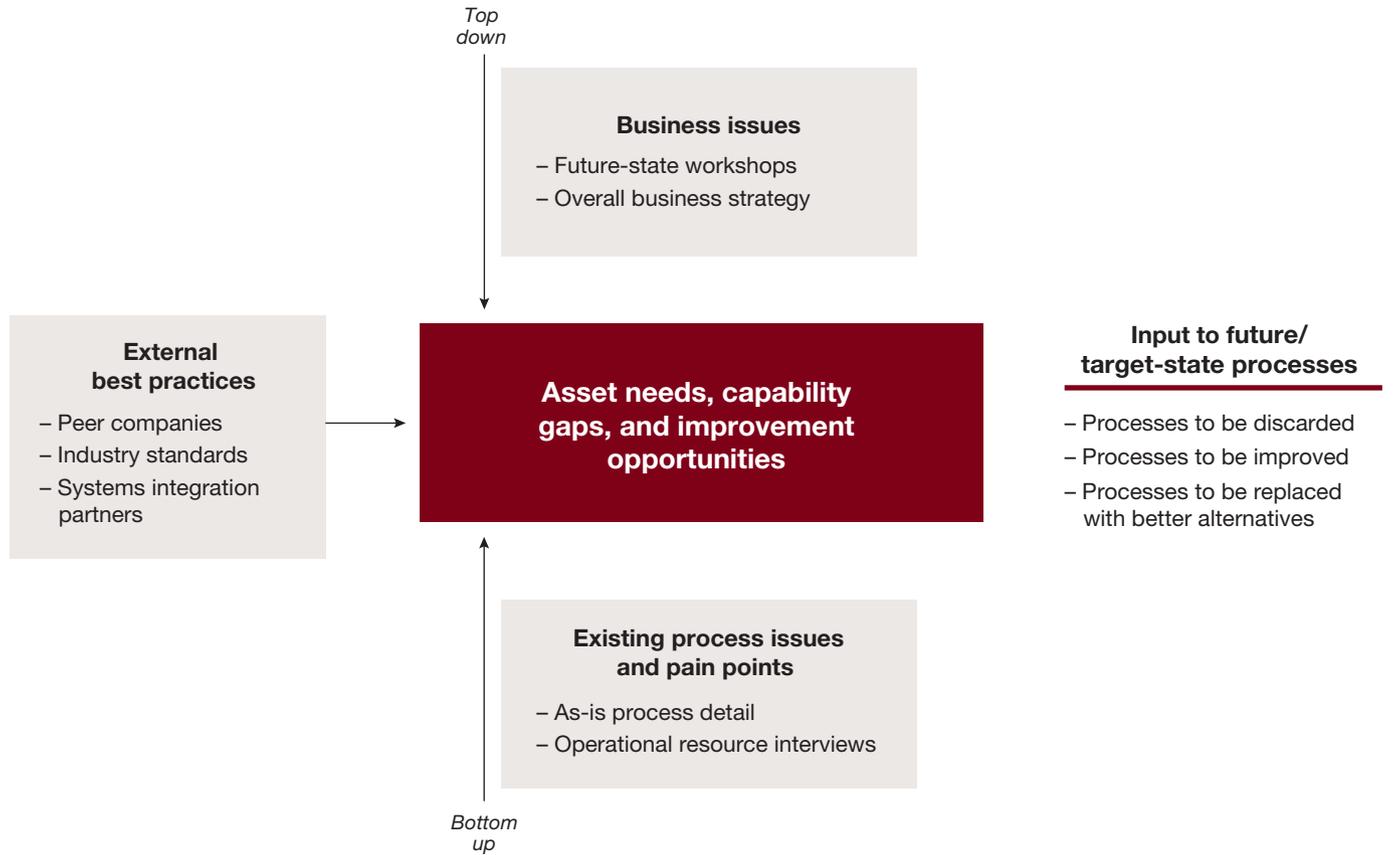
Companies need to take several commonsense actions to solve these challenges. First, they must analyze their existing processes and procedures to find opportunities for improvement, with operations people deeply involved in the effort. The analysis should result in clear documentation of which process steps can be modified and improved, which can be completely done away with, and which can be replaced with better and faster alternatives (*see Exhibit 3, next page*). The key guiding principle should be a focus on developing processes that are simple, are easy to follow, and can be adopted quickly.

In one case, for example, a large mining company had significant maintenance capital expenditures due to its drilling equipment's electrical failures. The root cause turned out to be workers running over electrical feeds when backing up their equipment. A simple process change was able to significantly reduce the maintenance capital budget and improve overall operational efficiency.

External sources, including peer companies, EAM strategy consultants, technology consultants, systems integrators, and advisors on industry standards, can provide further insights and guidance as to where opportunities might exist and how to enhance processes. Companies more mature in the development of effective EAM can offer practical

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*Exhibit 3*  
**Addressing poor processes and procedures**



Source: Strategy& analysis

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advice based on their own experiences and lessons learned. Of course, all such input must be examined through the lens of the company's own unique situation to determine the best course of action to pursue.

Once new processes and procedures are in place, and supported by new technologies, companies must regularly measure whether they are being followed as expected, and if not, why not. It is crucial to measure results and use consistent key performance indicators as the basis for rewarding good behavior, a practice that can go a long way toward changing employees' beliefs, attitudes, and actions.

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# ***Implementing change management and training***

In any large organizational transformation, managing the change and equipping employees to thrive in the new environment are essential. As noted above, companies often neglect to involve operational field staff in designing the overall EAM program, a failure that can easily lead to high resistance and poor adoption of the program down the road. Moreover, senior leaders, fearing the loss of critical employees and reduced productivity, are often reluctant to divulge the nature and magnitude of impending changes. So it is critical to establish and maintain open lines of communication with all stakeholders in the program. In fact, our experience shows that *not* clearly communicating business strategy and plans increases employee stress, fans the flames of negative rumors, decreases productivity, and can result in the unexpected loss of key personnel.

The absence of adequate planning for post-implementation support is frequently a factor in a program's lack of effectiveness in the longer term. Of course, there will inevitably be "misses" in the design, the data, and the processes once the new program is implemented, but they will be much more easily remedied if all stakeholders are on board. Without effective support planning for encouraging "ownership" by all stakeholders in sustaining the solution, an EAM program is unlikely to succeed over the long term.

Adequate training is also critical in achieving a high level of buy-in from all involved. Often, companies do not evaluate whether employees have the skills needed to perform their new duties and execute the modified processes, procedures, and technologies proficiently. Poorly trained users often get frustrated and revert to old, inefficient processes or begin using new technology in ways never intended. Effective training can also help alleviate the frustration often felt by older workers when asked to change their work habits, and can help mitigate the risk of such workers, and their essential knowledge and experience, walking out the door.

In other instances, training is simply not done well. This can result from poor quality of training materials and delivery of the training,

or trainers who are not sufficiently experienced in asset management to be effective in connecting with, and responding to, more experienced trainees. Too often, companies simply underestimate the time and resources needed to provide effective training, and don't make clear who is accountable for setting the level of training required.

A successful change management effort begins with a select group of "sponsors" of the impending EAM changes. The group should be a mix of senior and mid-tier employees who command respect and bring credibility to the new approach. These sponsors should act as beacons for clear and honest communication as to the goals of the overall asset management strategy and the purpose of all changes to be implemented, whether in people, process, or technology.

Moreover, senior leaders need to involve field-level workers in the design and implementation of the new EAM program. That means remaining completely up front about the rationale for change, and actively soliciting and seriously considering suggestions that come from "where the rubber meets the road." Although not every idea can be acted on, a clear communication channel that encourages dialogue and provides useful, frequent updates through newsletters and town hall and departmental meetings will tend to quell the rumor mill and keep employees positive about the impending changes.

Companies also need to devise a plan for sustaining process improvement over the longer term. The plan should include establishing a team charged with ensuring that the new processes are working as designed, field workers are supported when they encounter problems, future enhancements are encouraged and prioritized, and ongoing training is provided to new employees.

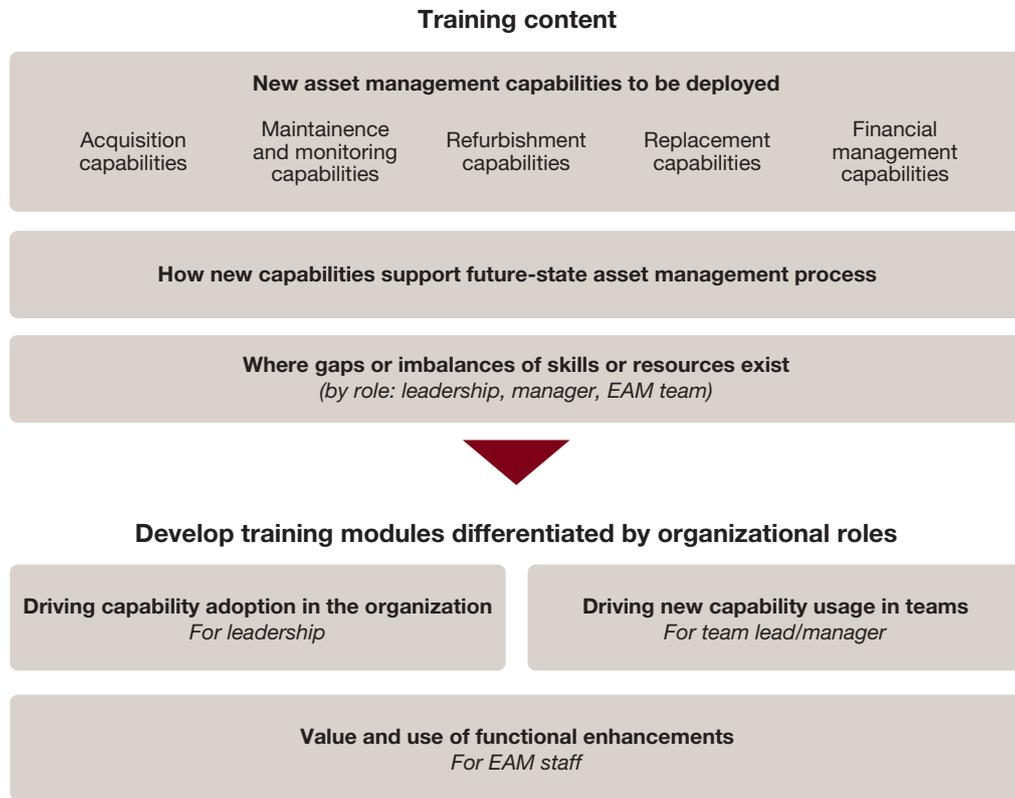
The first step in developing a superior EAM training program consists of assessing the capabilities and skills of the current workforce. These capabilities need to be mapped against the newly updated set of processes and procedures to uncover any gaps or imbalances. Using this information, companies can then settle on an overall training strategy to fill the gaps and achieve a better mix of the required skills (see Exhibit 4, next page).

Companies are well advised to develop training programs matched to their culture and learning style, whether that means town hall-type events, Web-based training, regionally based training, or other methods. One company undergoing an EAM transformation developed a strong program by encouraging employees in the field not only to help design the new program but to train their peers in the new technology as well. This approach gave the program increased credibility, leading to strong adoption and positive feelings about the coming changes.

*Companies are well advised to develop training programs matched to their culture and learning style.*

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*Exhibit 4*  
**A plan for developing an EAM training program**



Source: Strategy& analysis

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# Optimizing data management

Data is the lifeblood of any EAM solution. The ability to manage and maintain assets depends largely on the quality of data available about them. But the challenge of managing all this data is complex, given the sheer number of different systems, both automated and manual, that gather, analyze, and report on it all. These systems, typically cobbled together from a variety of legacy efforts, are often incompatible and of varying quality. As a result, many companies struggle to produce the complete, coherent, accurate data needed to operate new EAM programs effectively.

The list of potential problems is long: Data about the status of assets, replacement parts, maintenance, workforce scheduling, and the like is often poorly organized, poorly integrated, and redundantly maintained in more than one repository. The quality of the data can be poor, and key data fields may be either corrupted or missing altogether. Poorly managed data can also lead to inaccurate forecasting and poor work planning and scheduling, thus driving increases in operating costs. If the data quality is not assessed and optimized before a new EAM program is implemented, all these inefficiencies will simply reemerge, creating the same problems in the new solution (*see Exhibit 5, next page*).

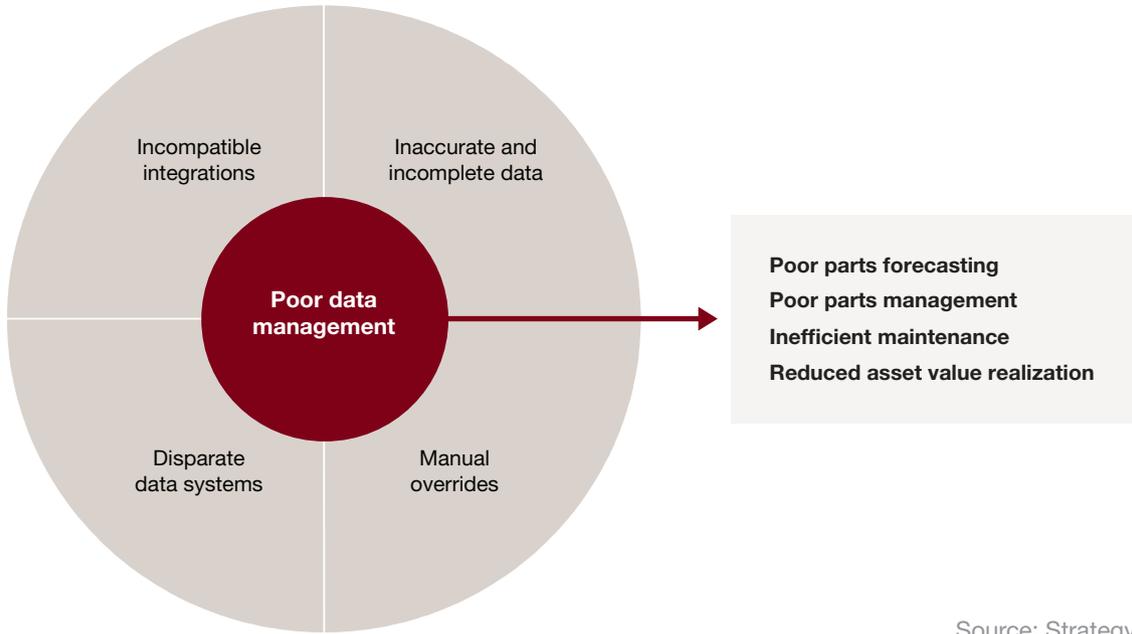
The first step in optimizing the data to be used by the new program's technology systems involves taking a full inventory of the data the system currently uses. Automated systems will be easiest to find and analyze, but the manual logs and Excel spreadsheets often used in maintenance activities can be a real problem. A dedicated data management work stream — including data profiling, quality, cleansing, testing, validation, and post-production support — is essential in ensuring the highest data quality possible.

Companies should ensure that the data is examined and cleansed by teams with prior experience in this activity and managed by leaders with real expertise. This is often best done by bringing in a third-party vendor that specializes in data cleansing and has a deep understanding of the new technology to be implemented — though it is also important to supplement the vendor with a core internal team intimately familiar

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*Exhibit 5*

**Poor data management brings with it a variety of challenges**



Source: Strategy& analysis

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with the data the company uses. These teams should work together with the frontline employees who monitor assets, order parts, manage inventory, and the like to ensure that the data inventory is comprehensive and will meet the needs of the new system.

The new EAM technology solution should be designed to include processes that validate the data as it is being entered, minimize overly difficult data entry, add requisite new data fields, and make the user interface easy to work with. Here too, frontline workers should be enlisted to help with the effort. And now that mobile devices can be used to record how much time is required to perform various maintenance activities in the field in real time, the HR processes included in the new system must be designed very carefully to avoid any potential payroll integration issues.

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# *Integrating the supply chain*

Because maintenance is such an enormous part of every EAM program, it must be fully integrated with the supply chain that procures and delivers the replacement parts that maintenance teams need. When done poorly, the result is often delayed maintenance, wasted time, incorrect or unavailable parts, and potentially costly asset breakdowns. Logjams in waiting for parts that delay maintenance of critical systems can quickly erode the benefits of any new EAM program.

Harmonizing and integrating the supply chain strategy and systems with the overall EAM program and technology is a major task. The involvement of supply chain leaders in the development of the overall asset management strategy is an important early first step. As the EAM program is implemented, the EAM team must continue to coordinate closely with supply chain executives. Supply chain processes and procedures should be examined in tandem with EAM processes and procedures to hunt down and root out any inefficiencies.

Involving suppliers that make up critical links in the parts supply chain is also critical, since EAM will not produce expected benefits if it is not fully integrated with procurement processes. Companies must closely analyze the often complex procedures and processes that EAM and supply chain teams use to engage with each other as well. An EAM program will have a greater likelihood of success if its maintenance efforts are fully integrated with its supply chain processes.

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# *The right strategy, people, and processes*

Good EAM practices can yield significant benefits to companies — cost savings, operational efficiency, increased asset reliability, longer asset life, and increased safety. Implementing EAM, however, is a highly complex endeavor, and there are many reasons that it can fail to produce the hoped-for benefits.

Surprisingly, the most critical reasons aren't technological, but rather strategic, people-based, and process-oriented. With the right people, strategy, and mind-set, these problems can be solved. The key is to devise a complete and coherent strategy, backed up by a full business case, and then to translate that strategy into the processes and technology needed to carry it out. Companies determined to create such a program must enlist the right set of employees — from top executives on down to field-level employees — to put the program into operation, and then to consistently monitor its results. With hundreds of millions of dollars at stake, the rewards of getting it right are high.

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