INDUSTRY 4.0 AND

FABRICATION & ASSEMBLY COMPANIES

abas ERP

GAINING A COMPETITIVE EDGE THROUGH DIGITAL INNOVATION

After the economic challenges of the past decade, the fabrication and assembly industry is experiencing renewed growth, bolstered by technical innovations, expanding market opportunities and growing product demand.

Overall, the global metal fabrication market was valued at over $16 billion USD in 2015, and it is expected to reach over $24 billion USD by 2024[1]. Many of the leading metal fabrication companies in the U.S. are reporting substantial growth rates approaching double digits.

At the same time, digital innovations are transforming manufacturing and assembly operations, opening the doors for small operators as well as big players to improve processes, increase efficiency and drive profits. With automated controls becoming more affordable, faster and more consistent, these tools are able to take on more complex and varied tasks than they could even just a few years ago.

> A SMART FIRST STEP TOWARD THE FACTORY OF THE FUTURE IS MOVING TO A MODERN ERP PLATFORM—ONE THAT IS READY TO ADAPT AND CAN MEET THE DEMANDS OF THE JOURNEY.

[1] Metal Fabrication Trends in 2018, Mainstay Manufacturing, 2018. https://mainstaymfg.com/metal-fabrication-trends-in-2018/

HOW F&A IS MEETING NEW SPEED AND AGILITY DEMANDS

A number of emerging trends and technology breakthroughs are poised to have the greatest impact on the fabrication and assembly production model of the future. Following are several that will be driving much of the change.

MASS CUSTOMIZATION

Custom manufacturing is a fluid environment, which means fabricators and assemblers must be agile enough to optimize material and resources and make changes on-the-fly without the entire project coming off the rails. These are not easy hurdles to overcome, particularly when you consider that most manufacturing operations are designed to support build-to-stock processes. Controlling costs is vitally important in mass customization, since margins tend to be razor thin. Modular redesigns, advanced resource planning capabilities and flexible scheduling technology become increasingly critical.

INDUSTRIAL INTERNET OF THINGS (IIOT)

At the center of digital disruption is the IIoT, which provides fabricators and assemblers with an effective way to link products, devices and machines to enable new levels of information monitoring, collection and analysis. Digitizing the flow of products and material gives managers a precise accounting of resource use and production rates, along with insight into methods to curtail costs and forecast future needs. IIoT technology of the future is expected to extend beyond real-time measuring and reporting to integrated systems that analyze data to help streamline operations and deliver more reliable, higher-quality products.

3D PRINTING

Rapid improvements in 3D technology are now intersecting with metal fabrication, balancing customization and personalization with efficiency and waste reduction. 3D technology is quickly gaining ground in low-volume manufacturing of custom products, helping fabricators and assemblers reduce design-to-manufacturing cycle times and dramatically alter the economics of production. Custom manufacturers can apply 3D printing technology to the product development and prototyping process, where its agility and speed can increase efficiency and drive innovation.
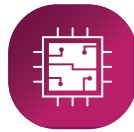
AUTOMATION

Today's advanced robots and automated controls are capable of simulating more human attributes such as memory and dexterity, making them particularly valuable in fluid, made-to-order production environments. Robots fitted with sensors can provide valuable data and feedback, allowing operators to quickly identify issues and make adjustments, helping to reduce cost and waste. With better production accuracy and workflow, quality is no longer at the expense of efficiency, as machine learning techniques decide which elements affect product and service quality.

EMBRACING THE FACTORY OF THE FUTURE

INDUSTRY 4.0 AND THE FABRICATION & ASSEMBLY INDUSTRY

Industry 4.0 provides a vision into the future of manufacturing—one where agile factories use intelligent machines to produce superior products at lower costs. The smart factory offers a huge stride beyond more traditional automation to an entirely connected and integrated system. Data moves across the enterprise, helping to boost production and optimize inventory and distribution. On the plant floor, this is achieved with sensors monitoring and recording a range of parameters, such as the quantity of raw materials entering the factory, as well as the volume of in-process products progressing through the plant.

Today's advanced tools and equipment—punch presses, welding robots, lasers—all produce fabricated parts extremely quickly. Yet fabricators and assemblers still struggle to deliver parts on time. According to one survey, respondents reported average on-time delivery rates in the mid- to upper-80 percent range. What's the stumbling block?

One major missing ingredient is information. Machines can be highly efficient in an otherwise frenzied production environment, with hundreds of part numbers, numerous reworks, planned maintenance schedules, and work orders in various stages of completion across the plant floor. And when equipment fails break, the disorder and confusion becomes even more severe.

DRIVING DECISIONS THROUGH BETTER INTELLIGENCE

With more advanced computing and analytical capabilities, new intelligent manufacturing platforms integrate information into the proper context and securely deliver it into usable reports and dashboards. For example:

- **Operators** can review cycle times and yield rates, directly from the machine interface.

- **Production managers** can examine efficiency figures and analyze root-causes and asset availability.

- **Quality managers** can inspect defined work cells and drill deeper into adverse events and quality levels.

- **Plant managers** can view individual plant-wide metrics, such as yield and throughput.

- **Executives** can assess real-time performance data to monitor key indicators.

THE NEXT WAVE OF INNOVATION IN FABRICATION AND ASSEMBLY

FOCUS ON STRATEGIC CHANGES

As digitization becomes ubiquitous, the next wave in manufacturing improvements will be about intelligence and data. While IIoT-enabled equipment allows a smarter way of doing business, not all factory functions are of equal value. The greatest business value will come to those who focus on improving their data integration and automation capabilities—not to those who simply connect the most devices to the network.

For many IIoT applications, data must be gathered, processed and integrated before it can be analyzed. The unmatched quantity and diversity of data, along with managing the inevitable complexities of connecting to a seemingly unlimited list of devices, make data integration a greater barrier than ever before.

Success in the digital era will hinge on having a shop floor with connected capabilities that drive better efficiency and throughput.

The age of Industry 4.0 will see a growing demand for automated technology to keep pace with production speed and efficiency requirements.

COMPONENTS OF A ROBUST ERP PLATFORM

In the age of Industry 4.0, technology simply can't be an afterthought—it must be a central component of the company's business strategy. Industry-leading fabricators and assemblers are increasingly focusing on innovative technologies and the comprehensive functionalities available in a modern, adaptable ERP platform.

But in the world of ERP solutions, not all software is created equal. Some applications have more exacting demands that require specialized features and functionality.

A cookie-cutter approach to software will only lead to costly customization or workarounds. In selecting the right system for your fabrication and assembly needs, there are several key factors to consider:

PLATFORM INTEGRATION

Distributed intelligence throughout the plant floor suggests that the Industry 4.0 world operates in an essentially a decentralized management mode. To accommodate, the ERP also must operate in a decentralized fashion—not literally but logically with self-governing controls and tools that flexibly coordinate production demands and efficiently manage information processes.

Meanwhile, horizontal integration provides transparency throughout the whole supply chain. This enables the decentralized production model to be extended to other factories. Instead of data residing in separate functional silos, the ERP system provides visibility of key performance metrics across the entire enterprise.

ACCURATE FORECASTING

To determine an expected sales price that will maintain profitability on any given project, fabricators and assemblers must make solid estimates in the beginning and then track their actual costs versus the estimates throughout the span of the project. That's where the right ERP system comes into play—it gives planners the ability to accurately forecast costs and create a complete operational plan.

On the production side, the software translates the design information into detailed planning, scheduling, procurement, routing, assembly and shipping instructions that detail every activity to be comple-

ted, step by step. This information is also translated into the financial side, capturing the estimated costs associated with each activity, such as labor costs, materials, R&D costs and other miscellaneous expenses.

INVENTORY CONTROL

Fabricators need to manage inventory for many of their materials using dimensional units of measurement. They need to be able to switch between these dimensions and standard units of measurement as easily as possible.

For example, most fabricators work with sheets and coils, which are measured in square feet or inches. That sheet will be machined into parts that are measured in standard units. To maximize the use of every sheet and eliminate waste, operators must be able to accurately and quickly convert these units of measurements for each specific part.

An application-specific ERP system will be equipped to do these kinds of automatic conversions to ensure that materials are used to their fullest potential.

DOCUMENT MANAGEMENT

A document management system is essential for complex industries like fabrication and assembly. Companies need a single, fully integrated ERP platform capable of connecting documents to a specific customer, vendor, product or event (a receipt from a customer, shipment notice,

etc.).These documents are crucial for accounting and compliance purposes, and they must be easily accessible for effective product management.

Additionally, the document archive should be available, with appropriate security access, to customers and vendors as well. This makes it easy for everyone in the supply chain to view key documents and the complete history of interactions between each stakeholder.

CONFIGURATION FLEXIBILITY

To take advantage of the opportunities presented by the digital era, fabricators and assemblers need agile, adaptable application infrastructures. Those serving regulated industries, such as automotive and aerospace, should be especially concerned about platform flexibility.

If the system's architecture makes it difficult to add functionality to support new regulatory requirements, companies may find themselves scrambling to find an alternative solution, which may be a cumbersome, error-prone manual system or an expensive replacement.

MAKING MORE INFORMED DECISIONS WITH ACCURATE INFORMATION IS THE GOAL OF THE CONNECTED ENTERPRISE.

CONCLUSION: BUILDING A SOLID TECHNOLOGY FOUNDATION

Competition in the fabrication and assembly industry is fierce, and with outsourcing, logistical and economic pressures mounting, companies need to find ways to speed time to market, increase throughput and better anticipate and respond to operational and market changes. A robust, modern ERP solution can help drive these improvements.

As digitization becomes the new standard in industry, competitive pressure will escalate the incentive to innovate and evolve. Tomorrow's leaders are already embracing the future today. Those that hesitate risk getting left behind.

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About abas

abas ERP is more than just software—it's a complete solution designed to meet your unique manufacturing requirements. Our expert consultants have a wealth of domain experience that makes them an ideal partner for midsize manufacturers and distributors. Not only can we implement software across an entire organization, but we can teach the relevant stakeholders how to make the most of the system to improve your business performance. Whether you have 10 employees or 1000, our aim is to optimize your processes so that you can save time and costs, improve visibility, implement reliable advance planning, and achieve competitive advantage.

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