

Digital Factory Transformation Case Study:

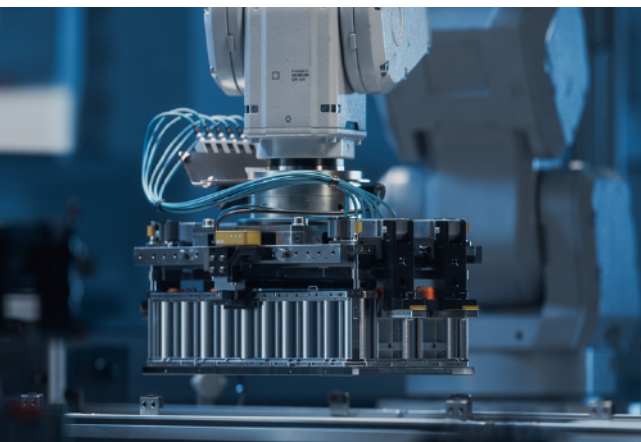
Breaking the Barriers to Scale with a Custom MES/ERP for a Battery Startup

BACKGROUND:

A Bay Area battery technology startup was struggling to scale. Their biggest barrier? A lack of product traceability. Production treated all cells as undifferentiated batches, with no tracking of individual battery data. Making informed decisions and monitoring performance in real time became an impossible task.

They lacked a consolidated historical run data sheet, a standardized bill of materials (BOM), and spent an entire workday manually generating charts. Off-the-shelf solutions couldn't deliver the traceability they needed for high precision battery manufacturing. So they partnered with one of our cofounders to build a system that could.

Our co-founder jumped on board to give this team something they'd never had before: live visibility, full traceability, and a digital foundation that could grow with their ambitions.



OBJECTIVES:

As with every transformation, we started by listening. To capture the Voice of the Customer, we sat down with the teams on the floor and decision-makers alike to understand their goals, pain points, and what “success” actually looked like in practice. Their insights shaped everything that followed.

We tackled the identified gaps by focusing the project around three key areas:

Digital Infrastructure and System Integration

- Develop a custom, integrated Manufacturing Execution System (MES) and Enterprise Resource Planning (ERP) to centralize data storage and tracking, incorporating manufacturing traceability software for improved tracking and compliance
- Implement real-time data updates for production, testing, and inventory
- Integrate live raw data into automated charting software
- Automate barcode scanning, link operator inputs to system calculations, and connect equipment directly to reduce manual entry and operator error

Process Standardization and Documentation

- Create standardized BOM template for consistent product documentation
- Early alignment on what metrics truly mattered, focusing first on Critical-to-Quality (CTQ) data and traceability

Operational Visibility and Performance

- Increase daily tracked metrics
- Enable cell-level traceability by linking process data (e.g. temperature, timestamps, equipment status) and test results (e.g. formation/cycling) to each cell ID
- Implement failure reason codes and real-time alerts to prompt operator intervention
- Track yields across individual process steps and use new insights to uncover bottlenecks

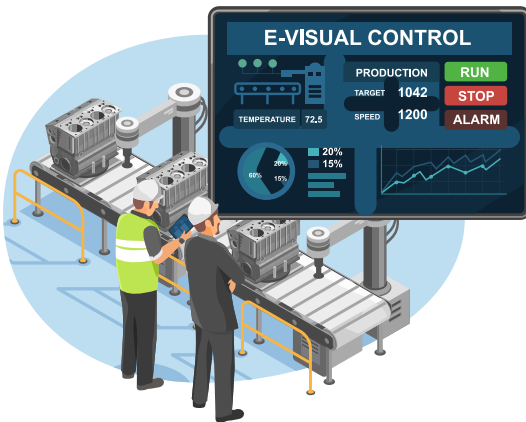
Our challenge was to design and integrate tailored digital systems from the ground up, all while racing to close critical gaps in data tracking, system integration, and documentation that were holding the entire operation back.



RESULTS:

What once took 48 hours of batch review took just 2 hours after the launch – a resource saving of over 95% – thanks to newly developed system efficiency and integration and a comprehensive MES. This allowed production throughput to soar and generated a dramatic boost in revenue.

Based on feedback from our interviews and the clear need for more standardization to stabilize operations, we developed a standardized BOM template and improved performance by increasing critical metrics and manufacturing throughput within the first year.



CONCLUSION:

By working closely with key stakeholders and team members to co-develop a tailored MES/ERP solution, we transformed fragmented workflows with real-time, cell-level traceability and automation.

Our collaborative and comprehensive approach resulted in a huge leap in throughput, more CTQ metrics tracked, and a boost in revenue—giving this startup the systems, visibility, and momentum they need to operate efficiently and scale confidently.

IMPACT:

\$386,000

Annual sales revenue generated

365%

Increase in manufacturing throughput

80%

Increase in critical to quality (CTQ) metrics tracked

We improved regulatory compliance readiness and product lifecycle management, increased operational scalability, and strengthened our client's competitive position through improved efficiency. Together, we also enhanced operational visibility which enabled data-driven decision making and laid the foundation for future Industry 4.0 initiatives and automation production systems.