IBM and SAP power digital transformation for Electronics and High-Tech manufacturing

The transition to SAP® S/4HANA is an opportunity to turbocharge digital transformation. IBM, in collaboration with SAP, is uniquely placed to help high-technology manufacturers maximize the benefits of this new generation of intelligent enterprise software.

This paper looks at some of these challenges and opportunities, explaining how IBM's consulting and SAP S/4HANA's functionality together provide a unique combination of capabilities to optimize the end result, minimize implementation time and reduce risk.

01.

Knowledge is power: How to modernize your core applications to improve your business through digital transformation

Modernizing to SAP S/4HANA over the coming years offers high-technology manufacturers the opportunity to re-imagine and increase efficiency right across their business. The discipline of automating, standardizing and connecting data and processes provides a structure for genuine digital transformation. This process can help manufacturers harness and analyze their data in real time for radically improved performance. From improving complex supply chain visibility to reducing downtime. From demand forecasting to decreasing time-to-market.

Over the years, SAP has added specific functionality to address a wide range of client needs. To take advantage of that functionality, however, a client needs a partner that can translate the client's needs through a deep understanding of their business and industry, and match those needs to specific SAP S/4HANA functionality and configurations.

As a high-technology manufacturer itself, IBM understands the nuances and complexities of the industry, and how to tune processes to support it, in a way no other integrator can. This enables IBM's consultants to direct the software implementation team to better match client needs and opportunities to specific capabilities within the unrivalled breadth, depth, and responsiveness of functionality of SAP's platform. The result is an implementation which is efficient, tuned to the client's current needs, and flexible to support business transformation in the future.

For electronics companies, operational excellence and financial control are key. There is much to gain in those areas with the latest SAP S/4HANA functionality and IBM's deep industry expertise, augmented by innovative technologies like the View series of manufacturing execution system (MES) software, SAP's intelligent Enterprise Suite and Business Technology Platform, and intelligent workflows enabled by RPA and integrated AI, blockchain, IoT, etc.

This paper will introduce you to the changing market conditions in the electronics industry, and the opportunities provided by the combination of SAP S/4HANA and IBM.

02.

It’s tough out there: High-tech/ electronics manufacturing in a post-pandemic world

High-tech manufacturing is a tough and competitive business, and that competition is global. The post-pandemic world presents challenges to all sectors of industry (as any very sudden disruptive force would). But there are several factors which are specific, and especially acute, for electronics manufacturers.

Demand for electronic products can often be unpredictable, yet customers set high, sometimes even unreasonable expectations. For example, the pandemic has seen the demand for computers and office equipment to support home workers (and network equipment to supply their connectivity) far outstrip the need for traditional consumer electronics. But office technology companies were still expected to respond quickly to that unexpected surge in demand.

Consumers expect almost immediate product availability, while it takes months for semiconductor manufacturers to respond to sudden changes in demand. This puts tremendous pressure on forecasting and its associated disciplines: supply chain management and optimization, inventory management and procurement.

In the global electronics industry, supply chains are intermediated, global, and very complex. Nearly every global electronics company has moved away from vertical integration. Networks of multiple partners, suppliers, and component manufacturers form part of a global supply chain. Even though advanced semiconductor technology enables companies to embed millions to billions of transistors in a single “chip,” a typical electronic product still has hundreds of individual components, typically provided by dozens (or more) of different suppliers, often traveling thousands of miles. This has huge ramifications for transparency, product quality and availability, the need to hold inventory, and manufacturing yield. We frequently see spot shortages of some components, together with severe excess of others. Due to the global nature of the industry, these shortages have a powerful and immediate impact if the mechanisms are not in place to mitigate them. And although supply and demand can fluctuate, production lines work best and most efficiently when they are running consistently and smoothly. This challenges both demand forecasting and predictive operational maintenance.

Beyond these issues, there is an established consumer expectation for ever-more functionality at a consistently decreasing cost. This places continuous pressure on all the disciplines that support and execute product development.

What all these challenges have in common is that solving them means having more complete, accurate and up-to-date data, and using it more effectively. For example, if each stage in the supply chain takes one or two weeks to respond to a change in consumer demand, the aggregated impact can be months of delay. SAP and IBM help to improve this through the combination of SAP HANA® in-memory database—where changes are reflected and proliferated immediately, instead of waiting for a batch process—and IBM's ability to transmit changes instantaneously throughout the supply chain.

Older ERP systems typically run a batch process once a day, or even once a week, to recalculate the impact of the demand and supply changes that have occurred. With SAP S/4HANA, the effect of each individual change is immediately reflected throughout the system, making it possible to manage in real time. This means that, for instance, an operation can update its manufacturing plans in response to shifts in customer demand, and the impact of those changes can be shared instantaneously with suppliers through IBM Sterling® Supply Chain Business Network or SAP Business Networks. Another example, higher than expected yied of semiconductor can be detected in IBM SiView MES and integrated into SAP S/4HANA, and can immediately be shared with a company's distribution network to enable higher revenues.

03.

Using data for competitive advantage: SAP S/4HANA at the center of digital transformation

Looking at the challenges above, we can see that the transparency, completeness and quality of data is more critical than ever. Your visibility of core processes is driven by the data you have available. The way that you implement enterprise systems—especially using the combination of SAP's and IBM's "Best Practice" preconfigured SAP S/4HANA processes—offers the opportunity to both improve the quality and completeness of your data, and to identify ways to benefit from it. This involves identifying currently siloed data sources (for example from the IoT sensors in your production line) and gaining insight from them within a centralized system of record and action. Achieving these benefits will inevitably require cleansing, harvesting and standardizing that data to make it accessible to AI, machine learning and analytics.

With the right data, and the right AI and analytics, you can create meaningful insights. This in turn helps increase the frequency and accuracy of demand planning, predict lead times for shipments in your complex supply chain, intelligently manage inventory, and integrate predictive maintenance with production optimization. It can also enable you to improve product design and testing.

You may also find opportunities to increase your competitiveness by reducing operational costs, improving efficiency, and flexibility. With end-to-end supply chain visibility from suppliers to service providers, you are in a better position to develop innovative products and build new service offerings.

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Modernizing to SAP S/4HANA, taking advantage of IBM's industry-specific expertise and 40+ specifically engineered high-tech processes gives you the best route to gaining these advantages while minimizing cost, risk and time to value.

High-tech manufacturers have some common needs, and some very specific requirements depending on their specific industry segment. For example, wafer fabs benefit from specific processes for binning, multi-level subcontracting, and managing semi-finished goods; and the ability to set up an effective MES, create a "digital twin," and perform real-time data analytics in manufacturing. Low-volume assemblers can benefit from more effective minimum order quantity management, and configure-to-order functionality. For high-volume assemblers, it is vital to scan their supply/demand data to detect potential shortages early, as well as to prevent surplus materials becoming obsolete. For most of these companies, there will be a need to manage international trade processes, rebates, trade promotions and warranty, service and repair requirements. All these specific needs can be managed and harnessed from within SAP S/4HANA using IBM's processes and experience.

04.

Making an IMPACT with IBM and SAP S/4HANA: Turbocharge your digital transformation

For IBM, modernizing to SAP S/4HANA is not only about giving customers assistance with a complex technical migration. It is also about the opportunity to embrace digital transformation in a way that supports electronics businesses as they fight their way through the competitive challenges outlined above.

To support this transformation IBM offers a combination of SAP "best practices," IBM-built cross-industry processes, and industry-specific processes designed for the high-tech industry. Together, we call this the IMPACT template.

But IMPACT is more than just a template. It is a complete set of tools that manages risk and accelerates time to value for an SAP S/4HANA project while opening up the possibilities of digital transformation.

It starts, on day one, with a pre-configured, fully functional SAP S/4HANA system and full suite of documentation and accelerators. This will not be a complete match for your requirements, but it will provide a great foundation and starting point. We will work with you to customize that system to the exact requirements of your business. We also use tools such as IBM's Enterprise Hub to speed up, simplify, and standardize data migration (and ingestion from non-ERP data silos and sources), along with pre-configured test scripts and enhanced, sped-up security. These four elements–templates, data ingestion/standardization, scripts and security–strip significant amounts of time, risk and cost out of the migration.

Electronics companies' use of SAP resembles other industrial companies', with a small number of unique processes. As a high-tech original equipment manufacturer (OEM), one of the world's largest software and service providers itself, IBM understands these nuances and business requirements, and brings real, practical industry knowledge and expertise to SAP. The IMPACT approach starts out with a robust cross-industry template and adds industry-specific processes. Key areas of special emphasis include binning, outside manufacturing/ subcontracting, plant maintenance, Kanban/ pull signals, sales offices, recycling management and others, as well as excellent coverage of Order to Cash, Plan to Manufacture, Procure to Pay, and Record to Report. It also includes less traditional product-related processes like license management, as-a-Service, and pay-per-use. These are examples of the 40+ processes which IBM has specifically created and optimized for the needs of the global high-tech manufacturing industry.

Beneath this layer of sector-specific optimizations, is a broader package of over 1,000 pre-configured end-to-end processes which IBM brings to SAP S/4HANA systems. IBM provides documentation of each process, as well as a detailed business process hierarchy, which reduce the lag between business process validation and design. At one semiconductor company which was using a highly customized version of earlier SAP ERP software, IBM was able to demonstrate that the IMPACT template would permit that client to support their business needs using SAP /4HANA without customization.

All this allows us to be more ambitious. Instead of getting you just a system which is functional at the end of the process, we start from that point. What we aim for is a system which is supremely optimized for your business and can offer you the digital transformation infrastructure to find your solutions to the huge challenges facing the industry today.

05.

When ERP is not just about ERP: Enabling true end-to-end processes

SAP S/4HANA will become the center of your digital ecosystem. But to make the best use of it, and drive your digital transformation, you need to think beyond it. How do you integrate with other technologies in the SAP family—SAP® Ariba®, Product Data Management (PDM), Integrated Business Planning (IBP), Customer Experience and CRM, Extended Warehouse Management (EWM), SAP® Global Trade Services (SAP® GTS®) , Business Technology Platform (BTP), and others—to get the best and most consistent overview of your systems and processes? IBM's knowledge and experience of implementing SAP will allow you to do that in a way which doesn't pull your data or your processes out of shape. If you want to use a third-party company's software, SAP provides the tools and IBM the expertise to effectively integrate that software into SAP.

But IBM can bring you much more than that.

Using Hyperledger blockchain technology, which includes code contributed by both IBM and SAP, IBM has built solutions that can be integrated with SAP S/4HANA to improve processes that extend outside the enterprise, enabling partners to share data through permissioned blockchain solutions. These solutions include:

- Blockchain service integrated with SAP's Business Technology Platform
- IBM Blockchain Transparent Supply for track and trace/provenance as well as reverse supply chain
- Tradelens for shipment tracking
- IBM Trust Your Supplier, combined with the Responsible Sourcing Blockchain Network to improve ethical sourcing of raw materials.

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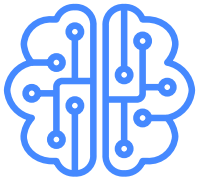
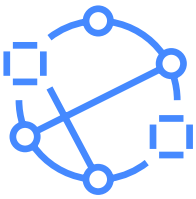
Multi-tier supply chain collaboration and transparency can also benefit from the use of blockchain technology. One example is SAP Logistic Business Network's material traceability option, which creates a trust chain for up- and down-stream product genealogy. By enabling data sharing across an n-tier supplier and demand network, companies have improved end-to-end visibility with the support of multi-component provenance. By building trust through transparency, companies can support sustainability initiatives to reduce waste, increase compliance and product safety by executing targeted recalls. Another area where blockchain technology can facilitate supply chain collaboration and transparency is streamlining international trade. This SAP solution, which will be released in 2022, will enhance visibility for all parties involved, reduce shipment delays and effort spent in after-the-fact reconciliation of discrepancies.



IBM Sterling® Control Tower gives you end-to-end visibility across the supply chain, particularly into unforeseen external events. It leverages advanced technologies, such as AI with machine learning, to consolidate data across multiple siloes, reduce or eliminate manual processes, and capture actionable intelligence from unstructured data. This smarter control tower enables collaboration across teams and trading associates while preserving organizational knowledge to improve and accelerate decision-making and outcomes. Ultimately, this helps you better predict disruptions, improve resiliency, manage exceptions and respond to unplanned events.

IBM Sterling Control Towers give you actionable insights into potential disruptions, delivered in personalized dashboards. You can get a complete end-to-end view, or drive particular focus on logistics and transportation, fulfilment, inventory or supply assurance.



Cognitive manufacturing with IBM Watson® unites millions of data points across systems, equipment, and processes to analyze data on machine or process performance. It uses AI and machine learning to create predictive insights, preventing unplanned downtime. This degree of AI-powered analysis of IoT-derived data informs everything from product design to operations to customer support. It discovers patterns and answers questions across the factory about users, equipment, locations, streaming sensor data and more. Cognitive manufacturing extends beyond the production line. IBM industry teams have enhanced existing supply chain and warehouse systems to become intelligent, predictive, and transparent. This facilitates cognitive demand management, cognitive asset maintenance and increased supplier trust.

Beyond cognitive and AI, IBM's unique big data and analytics capabilities, augmented with IBM Watson®, SAP Business Technology Platform and SAP Data Intelligence, provide major competitive advantages by improving business decisions and lowering the total cost of technology ownership. What's more, we make it faster and easier by helping you deploy reference architectures within an efficient integrated analytics ecosystem. Line of business key performance indicator (KPI) standards make it simpler to benchmark results.

IBM's hybrid cloud technology solves a problem that has been building up over time at many companies: the difficulty in integrating and coordinating systems that may exist on multiple different public cloud platforms as well as a company's own private cloud and on-premises infrastructure. Hybrid cloud combines and unifies public cloud, private cloud, and on-premises infrastructure to create a single, flexible, cost-optimal IT infrastructure. It provides orchestration, management, and application portability across those different environments. This helps create a single, unified and flexible distributed computing environment where an organization can run and scale its traditional or cloud-native workloads on the most appropriate computing model.

For semiconductor manufacturers—or manufacturers with similar processes like liquid crystal display (LCD) or solar cell companies—IBM SiView provides a custom-fit MES precisely tuned to your manufacturing processes. This helps get your semiconductor line up, running and stabilized early, while improving supply chain management through a unified system. Our solution offers fully automated, single-wafer control, and lets you build a line to handle multiple lots in a carrier. IBM SiView can improve your strategic sourcing, collaboration and ERP to support manufacturing processes. It integrates with SAP S/4HANA systems to facilitate tighter supply chain and manufacturing linkages, so you can leverage economies of scale and respond quicker to market changes.

Only IBM can deliver and integrate all these unique and powerful additional capabilities into your SAP S/4HANA instance.

06.

Digital transformation in the wild: How IBM's unique industry expertise and SAP's process and technology solve real-world problems

As we've said throughout this paper, IBM is uniquely positioned to make the journey to SAP S/4HANA a transformative experience for high-tech manufacturers. We can help you deliver a project that increases competitiveness, reduces costs, and gets on top of the industry's very specific challenges. IBM combines decades of experience as an SAP integrator, and its own extensive history and experience as a high-tech manufacturer, to provide a uniquely sophisticated and deep SAP S/4HANA value proposition to high-technology manufacturers. IBM is also able to leverage its unique organization that combines global functional capabilities with local and regional project staffing, to coordinate SAP roll-out even when a client's headquarters and manufacturing and distribution sites are on different continents. With the strength of its consultants around the world who are accustomed to maintain a high level of coordination, IBM barely missed a beat in shifting to virtual program delivery when the COVID-19 pandemic closed borders and prevented face-to-face meetings. Further, IBM's long experience and deep expertise in systems and application management assist clients that need to maintain a hybrid SAP ECC and SAP S/4HANA environment for a period of time to manage risk and cost.

This is illustrated in a "rapid discovery" project that IBM led at a major semiconductor manufacturer. IBM won the project by demonstrating SAP expertise and real industry experience in every discipline, especially the unique challenges of an industry with a manufacturing cycle time measured in months yet a business model built on customer responsiveness often measured in days. IBM was able to demonstrate, for example, SAP's Multi-level Subcontracting capability, which permits a client to manage a series of Outsourced Semiconductor Assembly and Test (OSAT) subcontractors under a single purchase order. Additionally, IBM's unique industry knowledge enabled the identification of numerous areas where the client's existing ECC system had been improperly customized. It showed the client that it could implement a highly standard SAP S/4HANA system configured to its specific needs.

IBM used SAP S/4HANA technology to design a management system tuned to the needs of Yangtze Memory Technologies, a semiconductor integrated device manufacturer (IDM). The company needed to improve cost management. IBM was able to leverage SAP S/4HANA's capabilities to improve data accuracy, consistency, and timeliness so that management could make faster and better decisions. The system is based on best practices in the LCD and integrated circuit (IC) industries, and covers budgeting, procurement, subcontracting and production.

A similar challenge at Xianyang CaiHong Optoelectronics focused on the huge volumes of process information distributed across its ERP, warehouse management system (WMS), MES, and other systems. IBM used its specific knowledge of the nuances of LCD manufacture to manage the complexity of the integration between systems, delivering end-to-end process oversight to the client so it could achieve full process control.

At Royole, a leader in producing flexible displays and sensors, and one of the fastest-growing technology startups in the world, IBM installed an SAP S/4HANA-based management that standardized business management and moved the company from largely manual processes to system-based processes. By integrating with Royole's MES and WMS systems, the SAP S/4HANA instance has improved the accuracy and standardization of data and improved information transparency. This allows meticulous cost control, and provides strong and accurate data to support management decisions.

These are some of the high-tech manufacturers that have benefited from IBM's unique blend of skills, experience and processes to transform their business through implementing SAP S/4HANA.

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Route 100
Somers, NY 10589
Produced in the United States of America
November 2021