

AN Apparel  
THOUGHT-LEADERSHIP  
REPORT

# The SMART APPAREL FACTORY of the Future



From our household appliances to autonomous cars, it seems everything is becoming smarter. How does this trend translate into one of the most traditional bastions of labor-intensive production: the apparel plant? How is next-generation shop-floor control technology, integrated with modern enterprise solutions, enabling fashion factories to become more connected, more efficient and smarter? Read on.

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# THOUGHT LEADERSHIP REPORT

## FACTORY OF THE FUTURE

“The factory of the future — the smart factory — is a paradise of efficiency where defect and downtime, waste and waiting are long forgotten issues of a long forgotten age. In it, plant managers and CIOs scheme together in a seamless blend of data and production, of IT and manufacturing, to illuminate every turn of every machine, every cut of every blade, every move of every piece in its global dance to delivery.”

That is how a visionary *IndustryWeek* article, “The Dawn of the Smart Factory,” described the factory of the future back in early 2013, going on to say, “It’s a nice dream, that future. And it is a dream that, however fantastic, is much closer to reality than you think.”

Apparel factories, both in the United States and globally, now have technologies within their reach to help them bring core elements of this dream into real-world practice. Many IT solutions and manufacturing advances are changing the way fashion comes to market, including RFID, digital printing, 3-D product development and more. This report focuses on how modern shop-floor control (SFC) technology enables the apparel factory of the future to be more connected and digitally engaged in the concept-to-consumer supply chain.

In the old days, SFC required considerable infrastructure investment. Every sewing machine and workstation had to be hardwired to the plant’s computer system. Once everything was plugged in, it could be a major ordeal to reconfigure the workflow. Also, legacy SFC software was almost always proprietary. It could only be used by people within the factory’s four walls. And like a lot of older software, data from one shift was captured only at the end of the day, delaying response time.

By comparison, now next-generation SFC can be set up as a wireless mobile app, designed to run through off-the-shelf mobile devices and easily integrated with enterprise solutions. For instance, mobile tablets can be wirelessly enabled to collect information from factory workstations. Operators can scan QR codes, barcodes or RFID tags to alert the system they are starting work on a piece or bundle. They can use these new solutions to clock in, clock out for breaks or notify mechanics or quality control personnel about problems. Associates and managers can interact with each other with the ease and familiarity of texting and using a mobile app. Everyone has a much clearer view of productivity as well as problem areas.

Newer SFC also is cloud-based, which means factories only need an Internet connection to access it and start collecting and analyzing real-time plant floor information. Decision-makers worldwide with access to the system can glean insight into what is happening at owned or third-party factories within a moment’s notice. With such a low barrier to entry, small-, medium- and large-sized apparel businesses all have an opportunity to run smarter factories.

### Smarter Productivity

Before, managers at many apparel factories would have to rely on visual observations to spot workflow bottlenecks or to notice a worker who was not performing at her best, whether because of fatigue, illness or other challenges. Even those with legacy SFC systems might spend hours reviewing production results in spreadsheets, or worse, analyzing hundreds of gum sheets or time cards.

Now managers can simply look at the SFC app on their smart phones or a dashboard summary on their PCs to see that throughput has picked up or slowed down, a machine is down or work is piling up on one sewing line vs. another. Then they can address issues and perhaps more importantly, workers can see their performance metrics on their tablet. This can be self-motivating and also a performance pacing tool. This responsive feedback loop has been proven to motivate workers to increase productivity and improve morale on the shop floor.

With legacy SFC terminals, operators and managers were limited to viewing information on small screens. These screens were only capable of displaying a limited range of basic alphanumeric characters. Today, modern SFC solutions give employees access to visual, content-rich communications at their workstations. For example, on mobile touch screens, sewing operators can track their progress against goals and view images or videos about garment construction details. Managers also have real-time visibility into production status, off-standard events and other issues, enabling them to conduct more data-driven analysis and take action faster.

This caliber of responsiveness was important for military uniform producer Tullahoma Industries. The company has implemented Shopfloor Support LLC’s Shopfloor Eye™ data collection and real-time production control solution at two manufacturing plants, a centralized cutting facility and its Tennessee headquarters. A factory in Puerto Rico went live with the technology earlier this year. That facility experienced almost immediate improvements in both individual and plant productivity, according to Tullahoma Industries CEO Richard Davenport. “The system provides production workers with real-time feedback that helps them monitor and pace themselves to reach higher productivity and incentive earnings,” he said in a press release. “Plant managers and supervisors have gained better control over production bottlenecks, quality issues, and time and attendance issues. At the corporate level, it enabled us to monitor results at multiple locations and the movement of goods from cutting through production, finishing and packing.”

Grand Forest Inc., a manufacturer of protective apparel, recently rolled out a next-generation SFC solution from Simparel. The implementation was part of a broader installation of Simparel’s ERP technology. The company’s president Carrie Bovender says her business wanted a fully integrated SFC



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## Ready to Scale Your Business?

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Globalization, omnichannel, and other seismic industry shifts are presenting fashion companies with significant potential for growth. Scaling the business without increasing operating times, costs and complexities is clearly the biggest obstacle to seizing these opportunities.

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**ROBERTO MANGUAL**  
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**In this era of “smarter” phones, appliances, cars and the list goes on, how can the apparel shop floor become smarter and more connected, regardless of size or location?**

The latest shop-floor control (SFC) technology, which leverages wireless Internet access and off-the-shelf mobile devices, has made it much simpler and more cost-effective than ever before to achieve real-time transparency and visibility. Armed with simply Wi-Fi, mobile tablets and a next-generation SFC app, a factory of any size can be well on its way to delivering best-in-class customer service. Whether you are a small contractor or major brand, any business can use this technology to provide customers with an instant view into order status, work-in-process and productivity, among many other metrics.

This is the Internet of Things (IoT) applied in a very pragmatic way to connect the apparel plant, wherever it is located, to decision-makers who need better real-time visibility and control of their products and supply chains. This connectivity can extend across all factory operations, such as the cutting room, sewing room, inspection, finishing/packaging and shipping. It can provide factory workers, plant managers and customers with information they need to make more informed decisions. For example, customers can get quick status updates on orders as they progress through the factory. Even if they don't have direct access to the SFC solution, they will

receive fast, accurate answers from the factory customer service team. Communications are streamlined because of the immediate availability of the shop-floor information.

In addition, smart apparel factories empower their work forces when they make modern SFC an instrumental part of the work environment. Via user-friendly touchscreens at their workstations, operators can access real-time feedback on their performance against standards, view product and construction details and directly message a supervisor, quality control (QC) associate or mechanic. Managers and supervisors receive real-time data feeds regarding individual, team and overall plant performance. They can use this information for production line balancing, addressing bottlenecks and resolving off-standard events such as machine downtime, QC issues and out-of-work situations. In the past, it could take many hours or days of administrative work to compile shop-floor data, run reports and analyze it. Now the data is available instantly, freeing managers to act on it, minimize production issues and make improvements.

**How can a smart factory, leveraging the latest SFC technology, perform better amid the complexities of omnichannel retail and more frequent fashion collections?**

Omnichannel retail has put new pressure on retailers and brands to have a hyper-accurate, real-time view of their inventory position. When you can extend that visibility beyond the store and warehouse

and into your supply chain, it can be a distinct competitive advantage. Some apparel businesses have integrated their SFC data to their enterprise solutions. This enables them to share information with customers about not only warehouse inventories but also WIP inventories in the pipeline, including projected ship dates.

Beyond order tracking benefits, next-generation SFC technology can support omnichannel objectives by way of better line management and balancing. As their omnichannel plans change dynamically, retailers need suppliers who consistently meet expectations. A highly efficient factory will be able to streamline delivery times and improve its track record for delivery of 100 percent completed orders. With a clearer view of production, these factories are better able to keep orders moving forward toward completion. For example, they can quickly address quality issues on a bundle that otherwise might have fallen behind the rest of the order and held up a full shipment.

It's also important to note that in the age of the connected consumer, individual fashion shoppers could potentially track the progress of their orders or see images or videos of their product being made. There is some interest surfacing for this type of transparency in the luxury goods segment.



Simpapel Inc. is the leader in next-generation business software for fashion and consumer goods brands, manufacturers and retailers. Simpapel® solutions empower apparel, footwear, accessories, home and other soft goods companies to reach their full potential by accelerating and improving performance across the entire business and global supply chain. The Simpapel Enterprise Solution provides global process visibility, control and collaboration by combining traditionally independent Enterprise Resource Planning (ERP), Product Lifecycle Management (PLM), Supply Chain Management (SCM), Materials Requirements Planning (MRP), Shop Floor Control (SFC), Warehouse Management (WMS), Electronic Data Interchange (EDI), Wholesale Marketplace (B2B) and other productivity tools into a single, fashion-focused business system.



# THOUGHT LEADERSHIP REPORT FACTORY OF THE FUTURE

solution to drive greater efficiency and transparency in its Summerville, SC, manufacturing operations. “We anticipate SFC will allow us to follow each employee in their growth,” she says. “As a production-based work force, our employees strive to increase their pay. As an employer, it is our job to ensure their success. With SFC we feel we will be able to quickly identify any growth issues and aid our employees efficiently.”

## Smart Factories and Faster Fashion

With a more efficient work force and a real-time read on manufacturing status, smart factories are able to keep pace with fashion trends and work closer to market. With greater productivity and less waste, there is more flexibility to shift course quickly and change over production lines to handle new styles.

Smart SFC also enables factories to help customers meet omnichannel demand. For example, when brands or retailers have real-time visibility into products and work-in-process in the supply chain, they have greater confidence in determining what is available to promise to shoppers. Some may even work directly with factories to drop ship orders straight to stores or consumers’ homes. As the *IndustryWeek* article noted, the factory of the future will have a “digital voice” and a greater role as a data center feeding intelligence to enterprises.

Fast-fashion factories also must have flexible production lines to accommodate rapid style changes. With mobile SFC, engineers and managers can rearrange workstations, and the SFC system moves easily with the new configuration, without any need to rewire devices. When production of new styles gets underway, managers can use SFC visibility to maintain balanced production flow.

“Real-time information has made a huge impact,” says Dan Teel, president of Next Level Consulting and a 47-year sewn products industry veteran. “It’s changed the effectiveness of our processes and helped make factories smarter in so many respects.”

Teel says he sees opportunities for multiple factories and partners to leverage the latest SFC technologies to collaborate on fast-fashion orders. For instance, plants in different locations could stay in synch with each other as they work on coordinates for a collection.

New SFC technology can be a helpful tool to apparel plants whether they are running a traditional bundle system or using a one-piece flow approach. With the latter, operators work together to move a single garment of an order from start to finish before they begin work on the next garment. It has become increasingly popular with growing demand for fast fashion. “With one-piece flow, you’re getting work through in a matter of minutes. It makes a big difference in getting finished product to the customer,

especially with today’s smaller cuts and all of the changes that go through very quickly with fast fashion and quick replenishment,” says Teel.

## SFC and Social Responsibility

Regardless of the production model, operators benefit from real-time access to their productivity numbers and their progress against incentive targets, Teel says. Modern SFC can be an enabler in a plant culture that nurtures open communication and encourages associates to think for themselves and propose ideas for continuous improvement. “You’ve got to empower those operators on the floor,” he emphasizes. “The old way of doing things is over. There was a time when operators were expected to keep their heads down and keep working until a manager told them to stop or change course. Now we want operators to keep their heads up and keep talking,” he says. “Let’s communicate and find better ways of doing things by trying new ideas.”

Industrial engineers can use SFC insights to quickly see where operators may be struggling to meet targets, which could be an indicator that an operation is too complex or should be allotted more time to complete.

These are just a few ways in which smart factories also can be more socially responsible. With greater automation of time-and-attendance and incentive payroll processes, there is less likelihood for making mistakes that shortchange workers. This applies to automated monitoring of time worked and tracking overtime pay. It also controls accurate measurement and treatment of off-standard time, such as when an operator is waiting for a machine to be repaired.

When there is visibility into shop floor data at a high level of granularity, it is easier to identify labor law violations. For example, if a sourcing professional has real-time visibility into production, he or she can quickly notice any unexpected surges in output. This can trigger collaboration with factory partners to confirm proper overtime pay has been issued and maximum daily work hours have not been exceeded. The plant can also provide retail/brand customers with regular or on-demand reporting on hours worked and pay practices (overtime, incentives, etc.).

Smart factories equipped with next-generation SFC can supply customers with a level of transparency not previously available. They can provide detailed reporting on hours worked, pay per operator and quality control. In this way, factories can use SFC to document and market their social compliance.

“The most significant thing to come from having all of this information is the new culture that’s created,” says Teel. “It’s going to be a tool like never before — not just to help you get work done and track it and pay people but to connect all of the supply chain and all of the product’s lifecycle and make it transparent for everyone who is involved. That’s the future.” ■