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ANALYSIS

WHAT IS SMART MANUFACTURING?

A Quick-Start Guide for Print Service Providers

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Introduction

If you are among the many companies charting a course toward operational excellence for your business, it may be time to consider adding Smart Print Manufacturing (SPM) to your plans. Smart Print Manufacturing provides a framework for moving toward workflow automation that helps you to create quality products and services by adding value throughout the supply chain.

The Next Industrial Revolution

Over the past four decades, the printing industry has transitioned from a craft to a manufacturing process, driven by an endless stream of enabling technologies. The communication landscape continues to shift and evolve, leaving print to compete against the speed, cost, and targeting capabilities of digital channels. Competition also remains stiff within an industry that remains focused on reducing costs through automation. The next decade will be about redefining print manufacturing to make it even smarter as we transition to the next industrial revolution.

What is Smart Print Manufacturing?

Smart Print Manufacturing (SPM) starts with streamlining inputs (customers, job onboarding, and production resources) to optimize every stage of production. It serves to eliminate or minimize manufacturing inefficiencies and errors while maximizing uptime and execution.
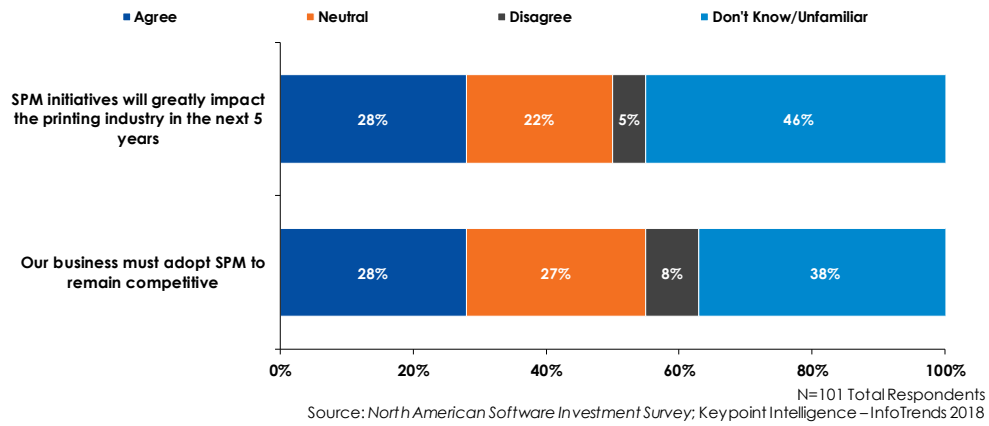
SPM combines manufacturing methods with industrial technologies to optimize all stages of print production. Many print service providers have already implemented lean and just-in-time manufacturing techniques to optimize their supply chain and minimize waste. Mass customization and autonomous production, however, are still bubbling up.

- **Mass customization** is creating customized, and in some cases personalized, products in small quantities while not increasing manufacturing costs.

- **Autonomous production** refers to the use of data and networked communication to connect machines to management and information systems and other machines to decide and execute the most efficient manufacturing process.

According to recent research from Keypoint Intelligence – InfoTrends, 28% of print service providers agree that smart print manufacturing initiatives will greatly impact the printing industry within the next five years. The same share of respondents agree that their businesses must adopt SPM if they hope to remain competitive.

Figure 1: PSPs' Perspectives on Smart Print Manufacturing

■ Agree　■ Neutral　■ Disagree　■ Don't Know/Unfamiliar

SPM initiatives will greatly impact the printing industry in the next 5 years	28%	22%	5%	46%
Our business must adopt SPM to remain competitive	28%	27%	8%	38%

0%　20%　40%　60%　80%　100%

N=101 Total Respondents

Source: *North American Software Investment Survey*; Keypoint Intelligence – InfoTrends 2018

The Smart Print Manufacturing Ecosystem

The Smart Print Manufacturing ecosystem is illustrated in the Figure below. The outer ring identifies a variety of processes that can be applied to building your workflow automation. Every business should be looking at business intelligence dashboards and laying the groundwork to feed data from the print shop floor to dashboard systems. That may involve IIoT (Industrial Internet of Things), connected devices, and sensors—some of which are already embedded in your print and finishing equipment that create cyber-physical networks. Data provides the best guidance when it is put through analytics processes to generate actionable information for the business, which may involve pushing data to and from the cloud that gets aggregated from your print sites. It might even mean accessing anonymized data from businesses like yours to provide real-time comparisons of throughput and efficiency. Systems that use Artificial Intelligence to learn and self-correct may be able to add operational efficiencies, and the addition of robotics has already proven effective in many print shops, whether it involves paper moving robots or pallet handling arms that free up human capital from repetitive tasks. That's a powerful outer circle!

Figure 2: Keypoint Intelligence – InfoTrends' Smart Manufacturing Ecosystem
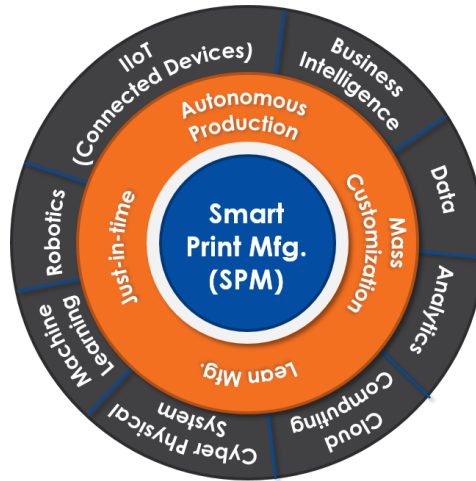
SPM relies on a stack of technology that is constantly changing and evolving. The Table below list the technology, description, and industry examples available today.

**Table 1: Smart Print Technologies Available Today**

Technology	Definition	Sample of Industry Solutions
Analytics	Software to interpret and visualize data that can be customized to individual users	Canon PRISMAlytics, EFI Fiery Navigator, Kodak Prinergy Analytics, ONYX HUB, SpencerMetrics Connect
Big data	Massive sets of data, often from multiple sources, that requires advanced software to capture, store, and analyze	Heidelberg (PTC Machine Cloud) and Pitney Bowes Clarity (GE Predix)
Business Intelligence	Software that combines production data with financial data; often an add-on module to a print MIS or ERP system	Avanti Executive Dashboards, EFI BI, Tharstern BI
Cloud Computing	An evolution of IT to pool and share resources (network, servers, storage, applications, and services) often via the Internet	Most cloud-based offerings in the print industry use cloud computing services, such as Amazon Web Services and Microsoft Azure
Cyber-physical systems	Smart machines that translate data into actionable information to interface with other machines, systems, and people	Autonomous robots for material movements
Industrial Internet of Things	A subset of the Internet of Things specific to manufacturing for increasing revenue through improved productivity, workforce transformation, and new business models. IIoT encompasses many other technologies in this list.	No specific examples, although many industry solutions are necessary parts of IIoT
Robotics	The use of robots to perform tasks, often repetitive, that were previously handled by a person	Several vendors use robotic arms for material movements (e.g., from palette to cutting table) from suppliers like KUKA Robotics

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What Does SPM Mean for Print Service Providers?

When it comes to implementing SPM, start at the beginning by consolidating your production workflow processes with an automated workflow. Whether you are starting from a completely manual, spreadsheet and sticky note-driven environment or already enjoy islands of automation, the goal is an automated workflow that begins at the point of estimation, continues through job onboarding, and ends with delivery to the customers. Automated workflows free human capital so they can focus on adding value outside of repetitive tasks.

Figure 3: The 5 "Cs" of SPM
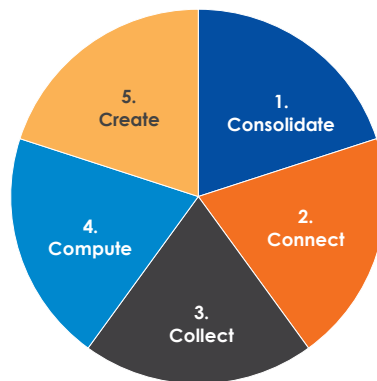
Source: Keypoint Intelligence – InfoTrends

Connecting all hardware and software, as well as the business processes, and collecting relevant data and information from sensors builds the infrastructure that enables multiple streams of data, like the status of the printer and incoming order volumes, to make real-time decisions that lead to optimized production.

The result is the ability to create quality products and services while adding value throughout the supply chain. In an SPM environment, costs should be optimized and revenue margins should be maximized.

Regardless of how automated your business is today, take some time to walk through your workflow with the 5 "Cs" of Smart Print Manufacturing in mind. It can help you build a path to operational excellence.

opinion

InfoTrends' Opinion

Print service providers of all shapes and sizes need to prepare, plan, and take steps to implement their own version of Smart Print Manufacturing. SPM is not just for the largest printers. Although some technologies are out of reach for certain printers due to cost or expertise (e.g., robotics), others are not (e.g., cloud computing). PSPs that delay the implementation of SPM will find it increasingly difficult to compete as the efficiencies of competitors trickle down to their cost structure and market pricing. At the end of the day, all companies should be charting a course toward operational excellence. Smart Print Manufacturing provides a framework for moving toward workflow automation that helps you to create quality products and services by adding value throughout the supply chain.

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Comments or Questions?