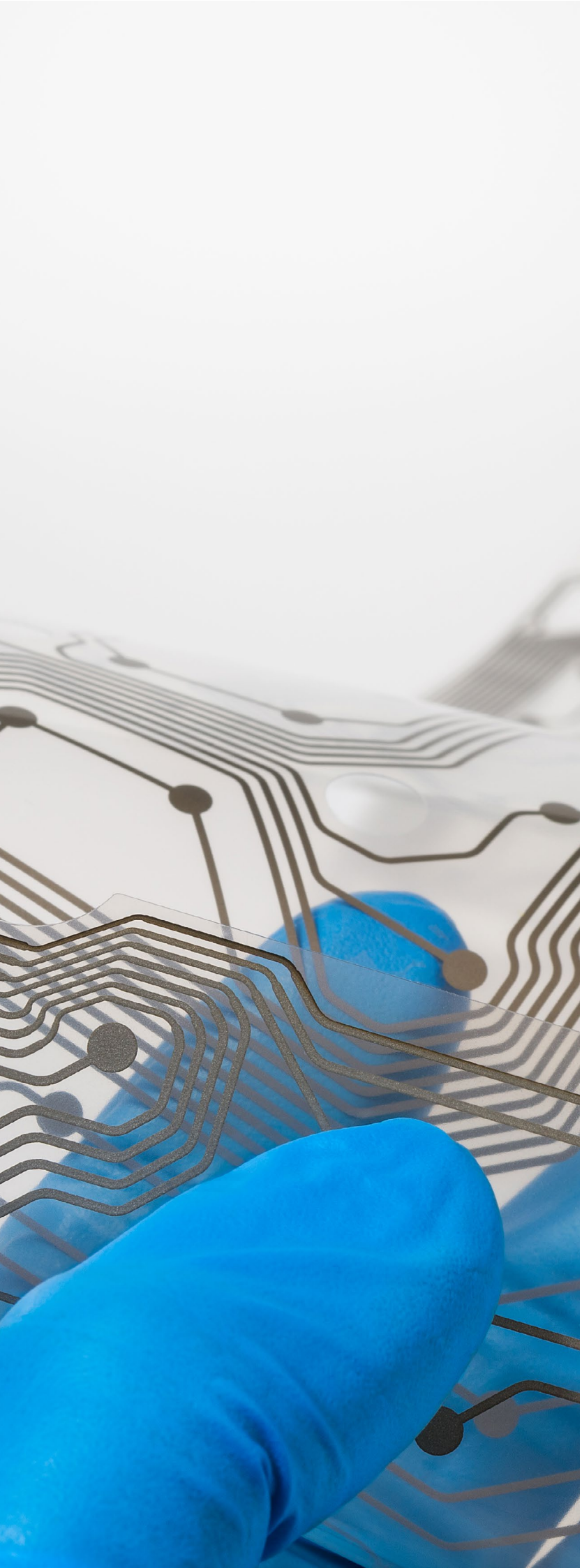

Expert Insights

Avoid the extinction of print management

Building strategies that transcend paper

IBM **Institute for Business Value**

IBM

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Talking points

The traditional Managed Print Services (MPS) market is an endangered species

Margins are narrowing, and demand is shrinking as the market shifts from enterprise-grade printing hardware to smaller commercial and consumer models. Without quick action, MPS organizations won't be able to sustain industry competitiveness.

MPS organizations must leverage existing capabilities to create new revenue streams

The right digital strategy empowers MPS companies to provide cloud initiatives, server management, help desk, application, and other productivity-enhancing services. They can also offer security solutions that address concerns related to user authentication, encryption, and the secure disposal of hard disk drives.

Build on existing technologies to create new MPS market models

MPS must expand upon Internet of Things (IoT)-connected office equipment and productivity solutions fueled by artificial intelligence (AI). A broader infrastructure enables the exploration of innovative areas offering fresh opportunities, such as the use of multifunction printers as data ingestors, printed electronics, additive manufacturing, and 3D biomedical printing.

Reinvest today's MPS revenue in tomorrow's innovations

Managed Print Services (MPS) organizations risk becoming as disconnected as your home telephone. Growth is slowing to a crawl, if not declining. With digital technology driving down the use of printers, hardware sales are not going to make up the difference.[1] Looking forward, a dwindling market might not support current players.

Undeniably, the landscape is changing, but there's good news: MPS companies still reap sufficient revenue to support the development of new solutions. The challenge? Taking advantage of this window while it exists. We propose a three-step roadmap to reinvigorate your MPS organization:

1. *Start where you are.* Balance current offering investments to support only high-priority activities. Designate a portion to expand into new architectures and solutions.
2. *Welcome to the connected office.* Leverage Internet of Things (IoT)-linked equipment and AI-driven capabilities to facilitate data ingestion, mobile print, meeting management, and extended office management services.
3. *Move past paper.* Use core printing and optical technology to expand into growth segments, such as printed electronics and additive manufacturing.

As MPS enterprises build solid technical foundations, they increase their ability to pivot quickly to lucrative new revenue streams.

Start where you are: Build on your current offerings and expand your infrastructure

How should MPS organizations develop the offerings they need to meet today's market opportunities—and solutions that drive future success? MPS organizations must carefully cultivate their digital strategies to expand cloud, data, IoT, analytics, and especially AI. This amps up their current portfolios—and explores innovations that fuel growth in server management, help desk and application services, and new cloud strategies. Consider this statistic: 42 percent of US offices use cloud-based solutions to manage documents and content.[2] Using multicloud management approaches, MPS organizations can integrate mobile printing into their customers' operations.

Another example: MPS helps organizations make the most of their proprietary data, using cloud-based cognitive platforms as a service (PaaS) to apply machine learning, predictive analytics, and data visualization to aggregated data. This facilitates improved decision making and enhanced processes for MPS customers.[3]

Security is a considerable concern for both devices and data. Among organizations that use MPS, 65 percent cited at least one data loss incident in 2018.[4] And 68 percent have experienced a malware attack or denial of service (DoS) on a print device.[5] In response, MPS companies need to offer security solutions that address concerns related to user authentication, encryption, and the secure disposal of hard disk drives.[6] For instance, Xerox's MPS for the US government provides security assessment, authorization, and monitoring in the cloud. Their "do once, use many times" framework saves up to 30 percent in government costs.[7]

Embrace near-term opportunities. Utilize IoT and AI to automate maintenance, repair, replenishment, and warranty services—and use voice commands. The key to value here is using AI to personalize the user experience and improve productivity. Envision printers that use an employee's badge or biometric authentication to provide a personalized list of suggested actions based on AI insights. For example: "Would you like to print your notes from your management review?" Or, "Here are the action items for this afternoon's team meeting."

By leveraging smart printer capabilities, "print as a utility" brings a new commercial model to the masses. It helps penetrate the small and medium business (SMB) market in a cost-friendly manner and could even be included in a building's lease agreement.

These approaches are fine for right now, but MPS organizations must plan for the long term. At a high level, here's how it goes: A well-executed digital portfolio pays off in short-term revenue, buying time to build the MPS portfolio of the future. Such a portfolio encompasses niche solutions such as "connected offices" powered by AI and IoT, and AI-linked optically driven ingestion to enable workflow automation. It could also include printed electronics for smart labeling, and additive manufacturing, including biomedical 3D printing.

These markets may still be in their infancy, but the growth opportunity is considerable (see Figure 1). As MPS enterprises build solid technical foundations that support both current and future ventures, they increase their ability to pivot quickly to lucrative new revenue streams.

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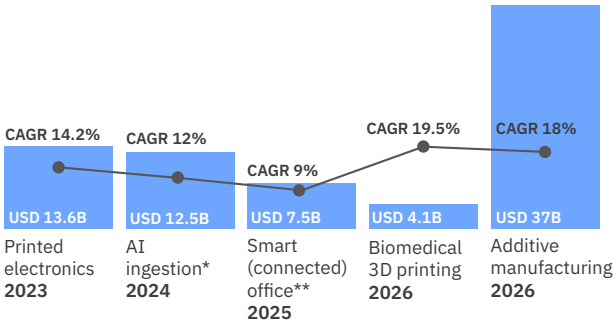
Figure 1

The MPS portfolio of the future



* Share of market estimated conservatively. Separated from overall AI forecasts which include broader service portfolio.
** Share of market estimated conservatively. Separated from overall smart building forecasts which include broader service and hardware portfolio.

Sources: See details at endnote 8 at back of this report.[8]

Create a connected office through IoT- and AI-enabled equipment

Global companies—for that matter, any organizations with multiple offices or mobile workforces—need *a seamless, consistent, interactive user experience across locations*. Imagine AI transforming connected equipment into productivity assistants, ones that facilitate mobile print, meeting management, and office management services. Printers, digital virtual assistants, connected buildings, and even robots are often already part of the IoT. They enhance collaboration across geographies and languages, and within systems by using AI and cloud solutions.

Consider intelligent whiteboards driven by device operating systems and applications. They provide real-time markups, manipulations, and more, giving MPS organizations a unique advantage over the network equipment companies and consumer electronic organizations that also play in this space.

What's more, instead of simply using multifunction printers to export data in a visual format, their scanner and copier components can be used as "ingestion points" for unique, valuable information. With the right expertise, scanned or onscreen documents are preformatted in a way that instantly adds them to a corpus of knowledge within a company or ecosystem. This creates accessible data for use in AI, analytics, or applications. For example, optical character recognition (OCR) recognizes text as it is being printed, with AI reading and classifying the information, as well as automating subsequent workflows.[9] Using these devices as data ingestors is especially useful to large organizations and gives MPS companies an edge over AI providers that compete in this area.

One example of extracting data from complex, unstructured documents is the Watson Compare & Comply technology from IBM. It uses AI to understand contracts and other governing documents, powering automated business processes, and alleviating errors, costs, and risk. The technology also integrates with Watson's machine learning and natural language processing (NLP) capabilities. Turning documents into machine-readable data helps users check for compliance, facilitate the review process, and get the meaningful data they need for additional business processes. Internal tests indicate that using this tool for automation can yield more than 90 percent time savings compared to using manual processes.[10]

Cloud, AI, and print ingestion: A sweet spot for hidden data insights

Cloud, AI, and leveraging printers as data ingestors are of significant benefit to unlocking the hidden data gems that companies need to differentiate themselves, compete better, and thrive. For financial functions, cloud and AI work together to create forecasts from spreadsheets, sales data, and other *ad hoc* reporting that companies use for decision making. This approach ditches the manual processes that more than 50 percent of financial firms in the US and Canada report using today.[11]

Another promising area: Electronic Data Gathering, Analysis, and Retrieval (EDGAR) filings. EDGAR performs automated collection and validation of submissions from companies required to file forms with the Securities and Exchange Commission.[12] AI and cloud solutions could help migrate data from spreadsheets to EDGAR-specific formats—a significant development.

Printing as a lifeline: Assembling biomedical cells through inkjet systems

Induced pluripotent stem cells (iPSCs) are extracted from skin or blood cells, and "reprogrammed" to facilitate the development of human cells for therapeutic purposes.[13] The potential for regenerative medicine is tremendous. iPSCs are also instrumental in research and development efforts that could find root causes of diseases, create pharmaceuticals, and enhance drug and cosmetic safety.

Exciting–but where exactly in this scenario does printing come into play?

To replicate human biological tissue structures, different types of iPSCs need to be assembled three-dimensionally. Ricoh is researching and developing 3D bioprinters that use an inkjet system capable of precisely arranging cells. The eventual goal is to replicate actual human tissue.[14]

Print that transcends paper: Explore printed electronics and additive manufacturing

A solid technical infrastructure? Check. State-of-the-art MPS offerings powered by IoT and AI? Check. Now for the exciting part—steering an MPS organization into entirely new realms.

Let's start to move past paper with *"printed electronics."* No, it's not an oxymoron. Printing techniques and thin film technology are used to deposit electronically functional inks on substrates, or layers. The subsequent electronics are used on smart labels, displays, posters, and clothing.[15]

Smart labels in particular have high market potential. Less hackable than bar coding and QR codes, they help protect and authenticate brands for businesses, makers, retailers, and others. These virtually undetectable smart labels are scannable with authentication technology, and also detect tampering. They often use Hyperledger Fabric, the standard for enterprise blockchain platforms, to track the supply chain, provenance, and authenticity of just about everything from pocketbooks to seafood. The latest approach harnesses crypto-anchor technology, which creates tamper-resistant digital fingerprints that are embedded into goods and blockchain-linked.[16]

To assist in preventing counterfeiting, luxury goods manufacturers embed smart labels in their products. Other uses include validating special event tickets, and building consumer trust in third-party retailers, such as eBay or Etsy sellers, by documenting authenticity of product sourcing. One promising opportunity for MPS companies is supporting retailers and packaging manufacturers by developing equipment, substrates, and services.

Additive manufacturing and three-dimensional (3D) printing also present sizable growth opportunities. In one scenario, Whirlpool is ramping up the production of its first 3D-printed spare part, a push button made out of nylon with Multi Jet Fusion (MJF) technology.[17] And footwear companies are exploring 3D-printed shoes. Under Armour has partnered with 3D printer EOS North America Inc. to develop advanced laser technology, as well as use EOS's industrialized 3D production capabilities.[18]

Biomedical 3D printing has the potential to eventually print actual organs and tissues.

Biomedical 3D printing uses cells, growth factors, and biomaterials to create biomedical parts that are facsimiles of their human equivalents. Layer by layer, bioinks are deposited on substrates to create tissue-like structures, including joints and ligaments.[19] Biomedical 3D printing has the potential to create personalized tissue engineering scaffolds, resolve defective tissue in situ (that is, in its original location) with cells, and eventually print actual organs and tissue.

In the short term, pharmaceutical research benefits.[20] Surgeons already use manufactured organs for simulated research procedures. Eventually, biomedical 3D printing could contribute to alleviating the global organ donor shortage.[21] In April 2019, researchers in Israel created a biomedically engineered heart using a 3D printer—a breakthrough for transplant medicine.[22] Biomedical 3D printing could also address a market for artificial hips and knees that is expected to grow steadily through 2028.[23] We believe that 3D printing of joints will be monetized within five years.

Medical device manufacturers, pharmaceutical companies, healthcare systems, and well-funded entrepreneurial ventures—many of them small startups—are exploring biomedical 3D printing. Larger MPS companies should seek opportunities to provide guidance, expertise, and equipment to the biomedical companies that are actually doing the research.

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Key questions to consider

» How will you design and navigate your roadmap to engage in the future of MPS—which initiatives drive you to the next generation of sustainable growth?

» In what ways do you plan to use AI, cloud, and Digital Reinvention to create or engage in these new businesses?

» How can you better prioritize your strategic and technology investments today to fund your innovation of tomorrow?

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IBM Corporation
New Orchard Road
Armonk, NY 10504
Produced in the United States of America
July 2019

54026154USEN-03