

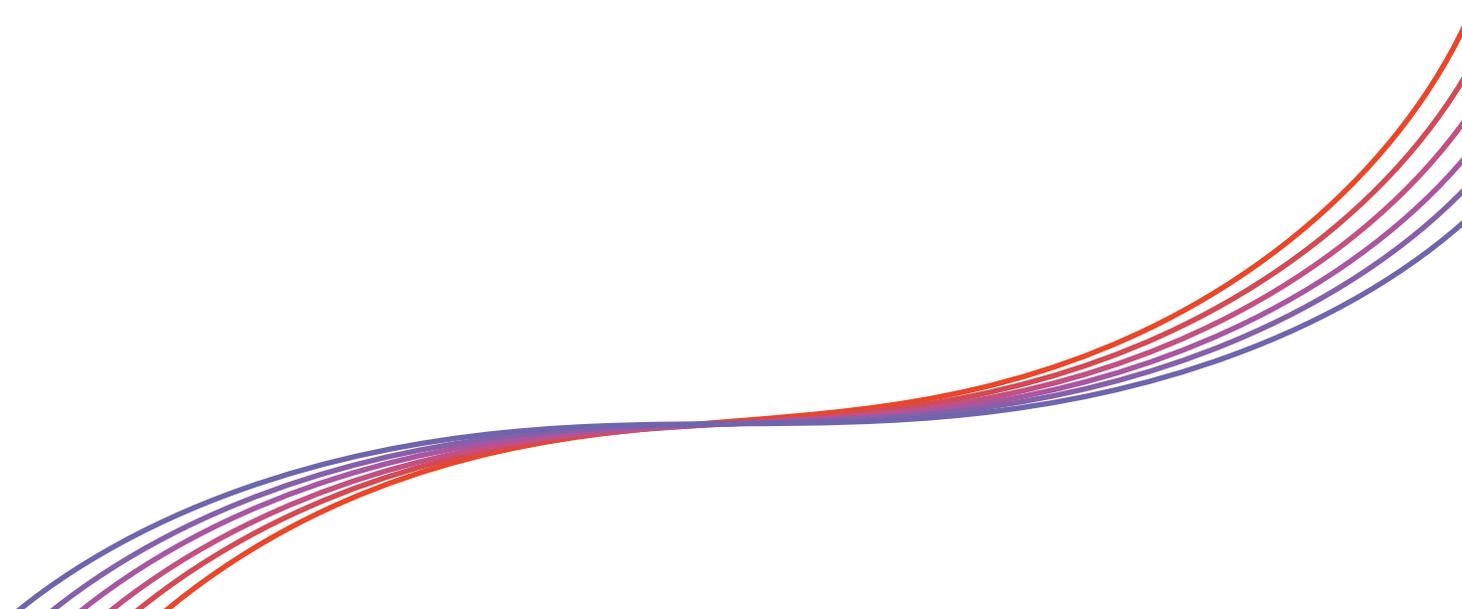
White Paper

The Output Maturity Model



Contents

Executive Summary	3
The Opportunity Defined	4
Cost Containment and Strategic Solutions	5
Infrastructure and Technical Aspects of Printing	6
The Role of AI and Predictive Capabilities	7
Elements of a Highly Optimized Print Environment	8
The Output Maturity Model	9
Moving Through the Model	11
Conclusion	19
About Ricoh	20





Executive Summary

This paper provides strategic guidance for achieving immediate cost savings, strengthening security, improving efficiency, and enhancing visibility across the enterprise print environment. As organizations navigate heightened security threats, hybrid work models, cloud adoption, and sustainability expectations, the role of printing is evolving. This white paper outlines the key components of a modern print ecosystem—fleet security, standardized workflows, AI-driven automation, and organizational readiness for change.

The Output Maturity Model helps organizations assess their current state, establish a long-term vision, and define the actions needed to progress toward higher levels of efficiency and digital readiness. By understanding where your organization stands today, you can identify opportunities for cost reduction, improved governance, and streamlined operations.

For most organizations, printing represents 5-10% of total revenue, yet is often unmanaged or inconsistently monitored. Implementing a structured output strategy aligned to your maturity level can deliver measurable savings of 10-30% while strengthening security, sustainability, and business agility.

The Opportunity Defined

The financial burden of enterprise print environments is often considerable and difficult to manage. Costs may span multiple budget lines and cost centers—supplies, IT, help desk support, hardware leases, supply chain, facilities, finance, mail and offsite storage—leading to inefficiencies and unplanned expenditures. Aggregating and managing these costs can be daunting for organizations of any size.

Insights from recent clients include:

“

We need methods to monitor our associates' printing habits, addressing the disconnect between ingrained behaviors and the push for sustainability.”

—IT Executive, Retail Operations

“

Modernizing your print infrastructure is a strategic opportunity to streamline workflows, reduce costs and enhance security in an increasingly digital world.”

—IT Executive, Global Financial Institution

“

The path to digital maturity is paved with cultural agility.”

—CEO, Global AI Automation Co.

“

There's no silver bullet solution with printer fleet security; a layered defense is the only viable defense.”

—Senior Analyst, Institute for Critical Infrastructure Technology



“

It is not the strongest or the most intelligent who will survive, but those who can best manage change.”

—Charles Darwin

Cost Containment and Strategic Solutions

Some organizations have successfully contained costs through recent technologies and operational efficiencies; others have faced setbacks. Managed Print Services (MPS) are gaining attention for their ability to reduce costs and improve efficiency. However, variability in offerings makes it essential to assess your position on the Output Maturity Model. This ensures the right solution design and contract type to maximize benefits from MPS and digital transformation initiatives.

When engaging with Chief Financial Officers (CFOs), two areas of concern consistently arise:



1. Cost Efficiency and Reductions

- Lower overall printing costs
- Predictable budgeting
- Streamlined, centralized print services
- Enhanced efficiencies through automation and transformation



2. Security and Risk Management

- Protecting confidential documents
- Ensuring compliance
- Reducing potential risks

CFOs prioritize solutions that cut unnecessary expenses, improve efficiencies, and mitigate risks tied to compliance and document security.

Infrastructure and Technical Aspects of Printing

Today's print infrastructure is evolving rapidly.

Key technical aspects include:



Cloud-Based Print Management

Centralized control of print resources via cloud solutions, enabling remote access and management while reducing on-premise hardware complexity and costs.



Integrated Workflows

Seamless integration with document management systems and enterprise resource planning (ERP) platforms, reducing manual intervention and increasing operational efficiency.



Smart Devices and IoT

Multi-functional printers equipped with IoT enable real-time monitoring and diagnostics, improving uptime, and enabling predictive maintenance. When integrated with output fleet management and AI, they enhance efficiency, security, and digital transformation opportunities.



Security Protocols

Layered measures such as secure print release and user authentication help protect sensitive data and ensure compliance. A robust security strategy enhances compliance, reduces risk, and strengthens operational performance.



Mobile Printing Solutions

As remote work grows, mobile printing allows employees and guests to print securely from various devices, improving productivity and reducing waste.



Sustainable Practices

Energy-efficient printers, paperless workflows, and recycling programs reduce environmental impact while boosting efficiency and reinforcing corporate responsibility.

The Role of AI and Predictive Capabilities

AI technologies are transforming how organizations manage printing.

Key applications include:

- **Predictive Toner Fulfillment**

AI-driven analytics monitor toner levels in real-time, predicting when supplies will run low based on usage patterns. This proactive approach automates replenishment, reducing downtime and ensuring operational continuity.

- **Break-Fix Management**

AI predicts potential equipment failures by analyzing historical data and usage trends. Organizations can proactively schedule maintenance or dispatch support, minimizing business disruptions.

- **Process Digitization and Automation**

Advanced software solutions powered by AI identify opportunities to digitize and automate paper-based processes. By analyzing workflow efficiency, these tools help organizations streamline operations, reduce costs, and enhance adaptability. Supplier solutions infused with AI can pinpoint legacy processes suitable for digitization. Trained consultants can then recommend improvements that transform document management into seamless digital workflows. This not only simplifies daily operations and reduces delays, but also lowers costs tied to physical storage and document handling.

By automating repetitive tasks and enhancing workflows, AI-driven solutions increase employee productivity and organizational agility. Teams can respond more quickly to evolving market demands while focusing on higher-value activities.

What You Will Learn

By applying the Output Maturity Model alongside modern technologies, you will learn how to:

- Assess your current state
- Define your organization's goals for cost containment, security, sustainability, and efficiency.
- Build an actionable framework to achieve measurable results.

This approach equips you with tools to align strategy, people, and vendors into a unified output strategy that supports **cost control, risk reduction, and digital readiness**. Leveraging AI and predictive capabilities enhances visibility, service responsiveness, and cost control across the enterprise.

Elements of a Highly Optimized Print Environment

To create an effective print ecosystem, several elements play a critical role:



1. Output Efficiency

- Automating routine tasks reduces delays and manual intervention.
- Cloud-based print management enables centralized oversight and secure fleet management.
- Streamlined processes cut waste, optimize costs, and improve productivity.



2. Security

- Robust security protocols for printers protect sensitive information from breaches.
- Key measures include multi-factor user authentication, secure print release, and encryption for data in transit and at rest.
- Compliance with regulations (e.g., GDPR, HIPAA) helps avoid legal risks.
- Regular audits identify vulnerabilities (e.g., outdated firmware, unsecured network connections) and enable timely remediation.



3. Future-proofing

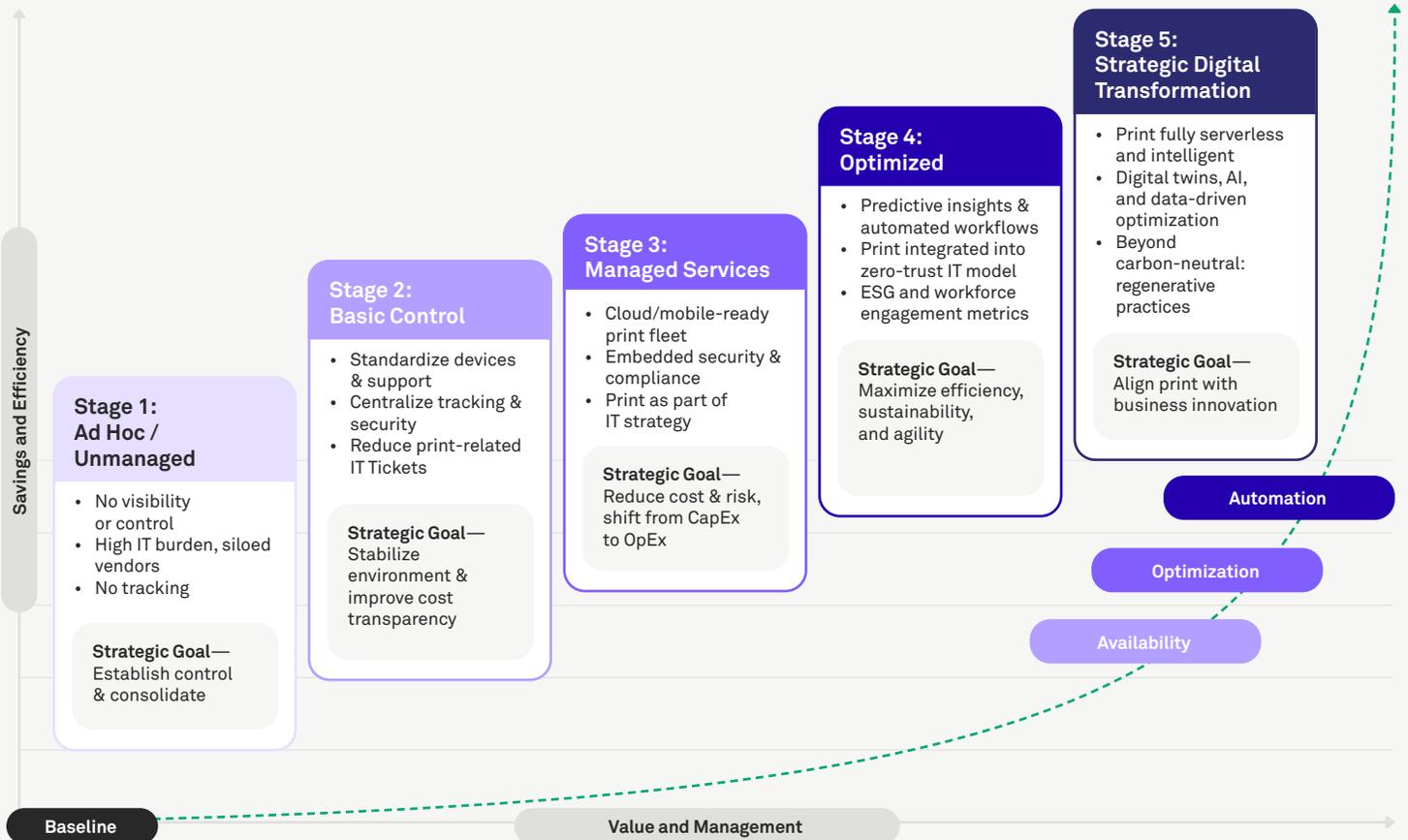
- Investing in adaptable, scalable technologies ensures printing, scanning, and workflow environments remain relevant.
- Smart devices, IoT, and process automation help organizations meet evolving digital demands.
- Regular capability evaluations help identify emerging technologies that support long-term innovation and competitiveness.

By focusing on workplace efficiency, security, and future readiness, organizations can significantly improve cost management productivity and their competitive edge.

The Output Maturity Model

The Output Maturity Model helps organizations assess their current print environment and determine a path toward greater maturity, efficiency, and cost savings. It evaluates four key areas: **print infrastructure & security, sustainability, process transformation, and cultural change management.**

The model defines five stages, each representing a stage in operational and strategic development.



Stage 1 Decentralized and Multi-Vendor Environment

At this stage, departments independently procure devices to meet immediate operational needs. The result is a mix of makes, models, and functions, with inconsistent procurement practices and unmanaged supply inventories. Users often perceive devices as owned by their department, overlooking total operational costs. Utilization rates are low and inefficiencies are high.

Stage 2 Centralized Standards & Strategic Vendors

Organizations begin to gain control by consolidating devices, centralizing purchasing, and introducing fleet inventory. Basic usage tracking and departmental reporting support more informed budgeting. Security improves with initial measures like password protection or user authentication. Sustainability efforts—such as duplex printing or recycling programs—are introduced. IT teams experience fewer reactive support requests, freeing time for higher-value initiatives. This level sets the foundation for Managed Print Services (MPS).

Stage 3

Right-Sized and Consolidated Environment (Managed Services)

At this stage, organizations transition to a professionally managed print environment, often via an MPS provider. The device fleet is standardized and optimized, with multifunction printers (MFPs) deployed for specific workloads. Centralized monitoring and reporting improve cost visibility and control. Security advances with features like secure print release and document tracking. Sustainability is measurable, with programs targeting paper use and carbon footprint reduction. IT is relieved from day-to-day print management, allowing focus on strategic initiatives. Organizations shift from reactive print operations to proactive, service-based management.

Stage 4

Optimized and Leveraged Platform

A highly efficient, secure, and data-driven print environment emerges. Devices are strategically deployed based on actual user needs, minimizing device-to-user ratios, and waste. Real-time analytics enable precise cost tracking and smarter decision-making. Security becomes robust and compliance-focused, with encryption, audit trails, and policy enforcement aligned to GDPR or HIPAA. Sustainability initiatives are mature and measurable, targeting reductions in energy, paper waste, and emissions. Most infrastructures are automated or self-service, minimizing IT involvement, and enabling resources to shift toward digital transformation efforts.

Stage 5

Strategic Digital Transformation

Print is fully integrated into the organization's digital workplace and enterprise strategy. No longer just an operational utility, it becomes a value-driven service aligned with workflows, mobility, and cloud-first initiatives. IoT-enabled, mobile-ready devices are enabled within enterprise systems. Print usage is evaluated against ROI and organizational impact. Security is seamlessly integrated into enterprise cybersecurity frameworks with continuous compliance monitoring. Sustainability is at the forefront, with measurable KPIs driving carbon-neutral or net-zero targets.

At this stage, MPS providers act as strategic advisors, aligning output strategies with innovation, agility, and enterprise-wide transformation.

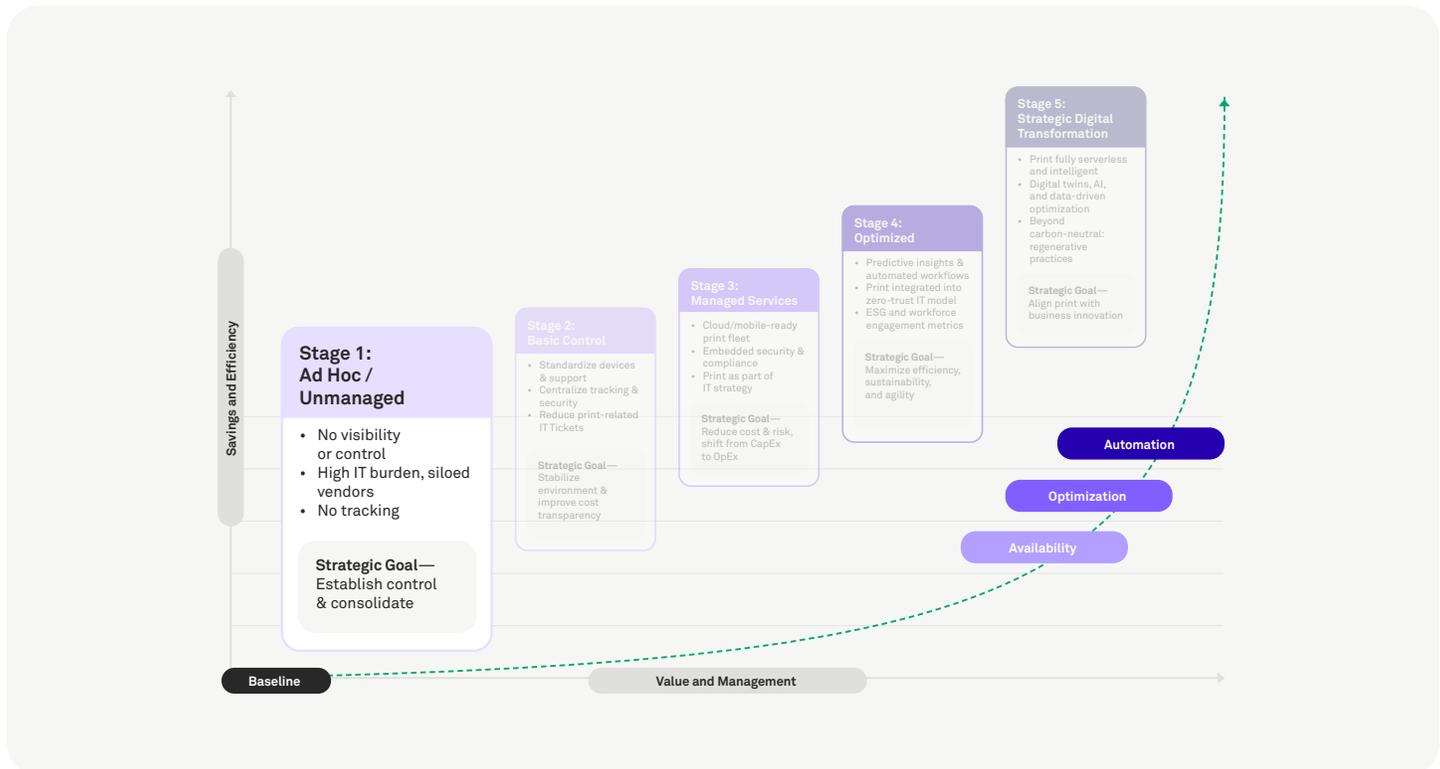
Transition Considerations

Not all organizations progress at the same pace. Size, readiness for cultural change, and the urgency of cost or compliance challenges influence speed. Moving through the stages requires addressing challenges across **technology, processes, people, and governance**. Each transition builds maturing, driving toward a fully optimized and strategically aligned print environment.

Moving Through the Model

From a Decentralized System to a Standardized Environment

Many organizations start at the first stage of the model. Local ownership of devices can be hard to change and in many cases, organizations do not even have a full inventory of what assets exist. This discovery phase can feel daunting, but the opportunity for **savings, efficiency, and improved utility is substantial.**



Growing Pains in Stage One

The transition from **Stage 1 (Ad Hoc / Unmanaged)** to **Stage 2 (Basic Control)** introduces foundational challenges:

- **Lack of visibility and oversight** leads to multiple printer brands and models, driving inefficiencies.
- **Costly supply management and maintenance** overwhelm IT, diverting resources from strategic initiatives.
- **Resistance to consolidation** arises as departments accustomed to autonomy resist shared standards.
- **Print costs remain invisible across departments**, with little to no centralized tracking.
- **Security risks** increase without consistent policies for protecting sensitive documents.
- **Sustainability efforts are minimal**, often leading to excessive paper waste and high energy use.

To overcome these challenges, organizations must begin by securing executive sponsorship, building an accurate asset inventory, centralizing responsibility for print-related data and introducing baseline compliance and sustainability measures.



Top Priorities

- Gain visibility into all print assets, usage, and costs
- Begin standardization and vendor consolidation
- Build executive sponsorship and cross-department alignment



Vendor Checklist

- Assessment tools that map devices, usage, and costs
- Standardization expertise to reduce device sprawl
- Transparent cost visibility and reporting dashboards
- Proactive support (remote monitoring, supply fulfillment, help desk)



Key Actions

1. Conduct a comprehensive print environment assessment
2. Standardize devices and centralize purchasing
3. Implement basic monitoring and cost-tracking tools



Common Missteps to Avoid

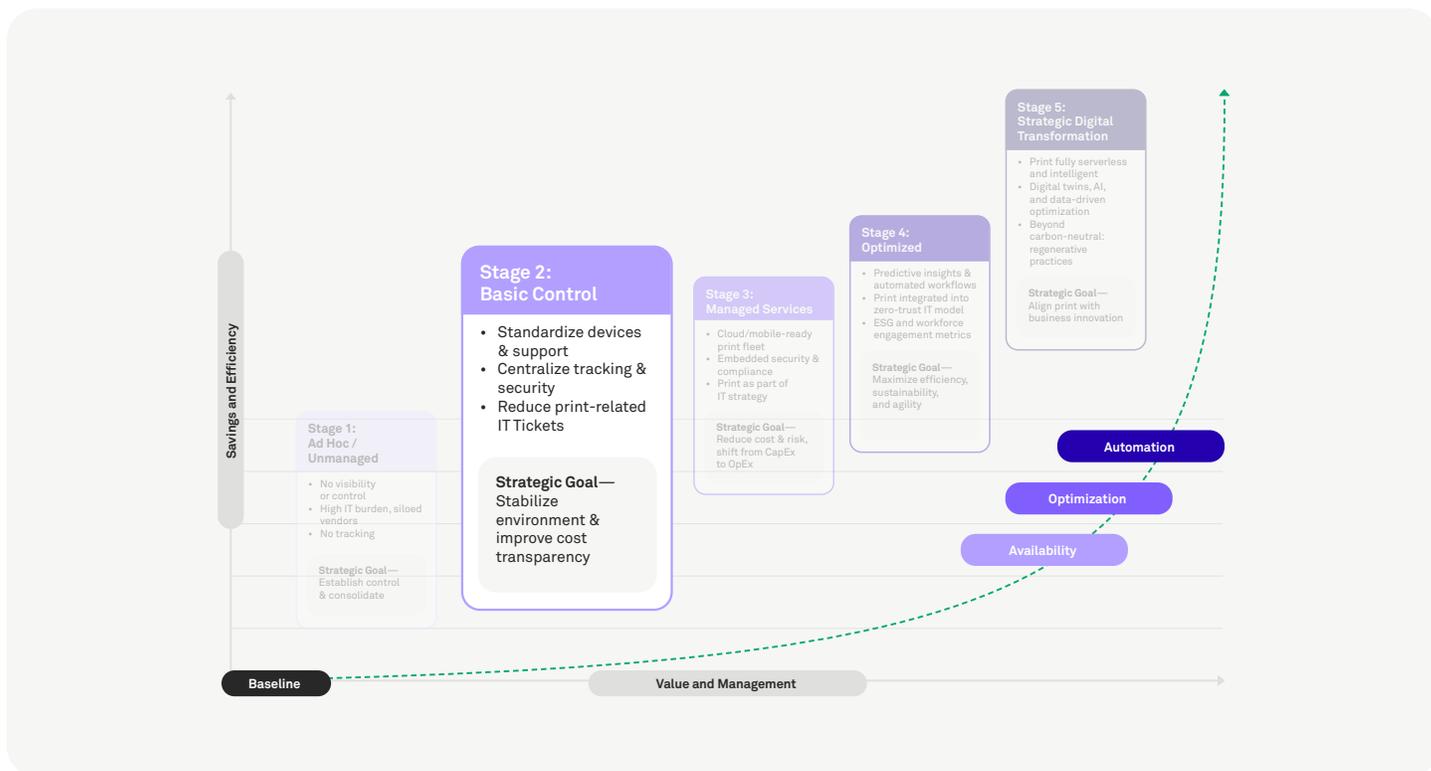
- Jumping to cost-cutting without visibility
- Excluding IT, finance, or key stakeholders from the process

What This Means for Your Organization:

Moving from **Stage 1 (Ad Hoc / Unmanaged)** to **Stage 2 (Basic Control)** gives your organization foundational visibility and oversight into print usage, costs, and device sprawl. Departments gain awareness of true operating expenses, IT teams see fewer reactive disruptions, and the organization establishes a standardized, efficient environment required for future optimization. This shift sets the groundwork for meaningful cost control and enterprise-wide accountability.

Building a Standardized Environment to a Consolidated Footprint

Organizations at this stage commit to structured rules and policies for device deployment. Device counts can be reduced by 40-75%, with little to no loss in productivity.



Growing Pains in Stage Two

Transitioning from **Stage 2 (Basic Control)** to **Stage 3 (Managed Services)** creates new challenges:

- Departments may resist further centralization, fearing loss of control over access or service responsiveness.
- Aligning IT, finance, and organizational units around a shared MPS strategy requires careful stakeholder management.
- New monitoring tools and service models demand change management and training.
- Trusting a managed services provider requires clear SLAs, governance, and robust performance oversight.



Top Priorities

- Optimize and standardize the device fleet (consolidate devices, reduce sprawl)
- Centralize cost visibility and reporting
- Enforce secure print workflows and compliance policies



Vendor Checklist

- Proven MPS experience in fleet optimization and deployment
- Centralized dashboards with real-time monitoring and analytics
- Automated supply management and proactive service delivery
- Strong security capabilities (authentication, document tracking, secure release)



Key Actions

1. Engage and onboard a Managed Print Services (MPS) provider
2. Consolidate and right-size the fleet using standardized multifunction devices
3. Deploy centralized monitoring, reporting, and billing tools



Common Missteps to Avoid

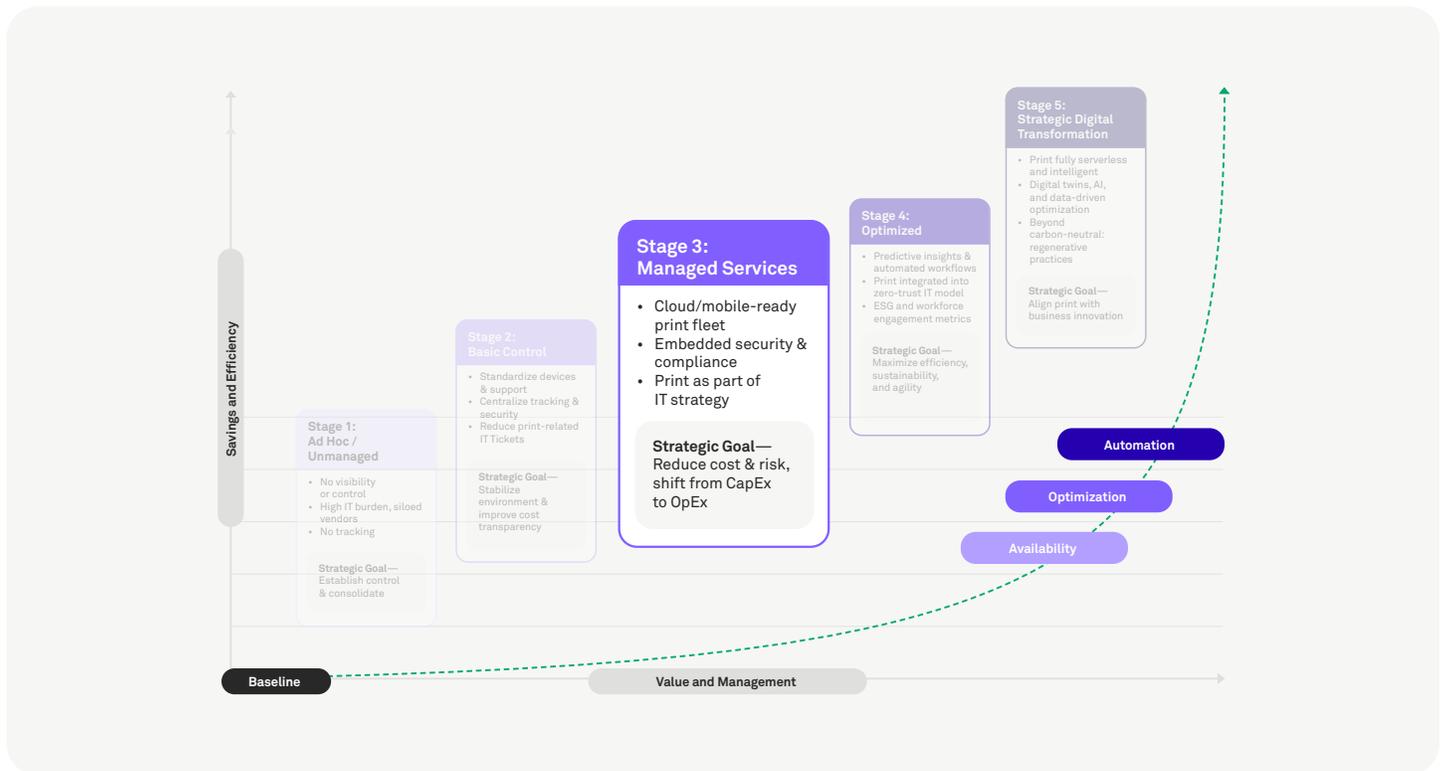
- Selecting a vendor based only on price or brand recognition (without alignment to strategy)
- Skipping user engagement and change management, creating resistance to adoption
- Treating security and compliance as a secondary instead of core requirement

What This Means for Your Organization:

Advancing from **Stage 2 (Basic Control)** to **Stage 3 (Managed Services)** transforms print from a reactive operational burden to a **proactive, service-based model**. Organizations benefit from right-sized fleets, automated monitoring, stronger security workflows, and measurable sustainability improvements. IT is freed from daily print management, enabling greater focus on strategic initiatives, while the organization gains predictable costs and improved service quality through standardized workflows.

From Managed Services to Optimization

At this stage, organizations seek to refine operations further, integrating print with enterprise systems, real-time analytics, and policy-driven security.



Growing Pains in Stage Three

Transitioning from **Stage 3 (Managed Services)** to **Stage 4 (Optimized)** can be difficult due to:

- Increased complexity of integrating print infrastructure with enterprise platforms (e.g., Active Directory, identity management).
- New analytics, security protocols, and compliance controls require cross-functional coordination and training.
- User resistance to stricter authentication or policy enforcement.



Top Priorities

- Enhance data-driven decision making with real-time analytics
- Strengthen print security and compliance controls
- Advance measurable sustainability and ESG performance
- Integrate print with broader IT and organizational systems



Vendor Checklist

- Expertise in enterprise system integration (e.g., IAM, Active Directory, ERP, CRM)
- Advanced analytics and reporting capabilities (usage trends, cost drivers, optimization)
- Comprehensive security and compliance support (GDPR, HIPAA, ISO 27001)
- Sustainability and green print expertise (paper reduction, carbon tracking, eco-certified devices)



Key Actions

1. Integrate print with enterprise systems to streamline workflows
2. Implement advanced analytics and real-time monitoring tools
3. Strengthen enterprise security policies and compliance controls
4. Establish data-driven sustainability initiatives aligned with ESG targets



Common Missteps to Avoid

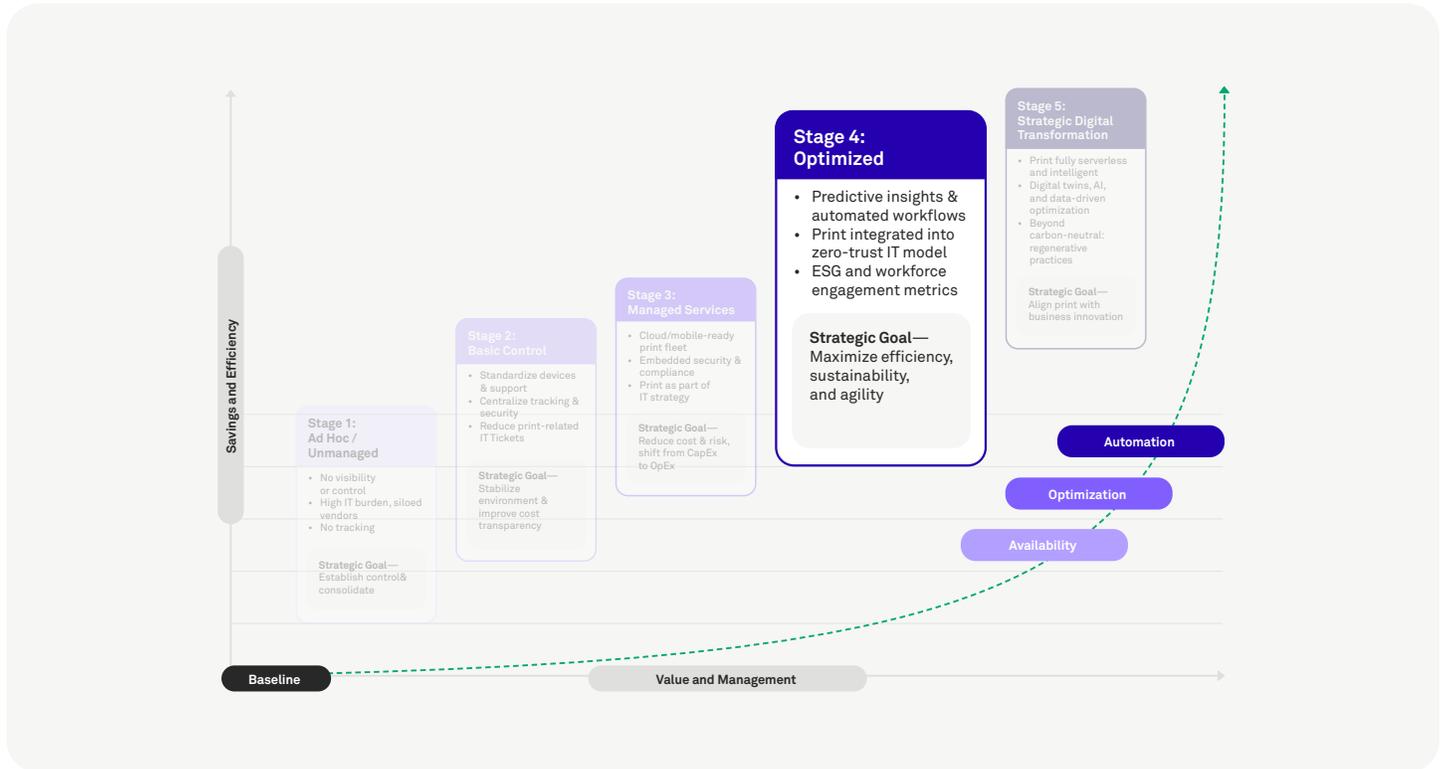
- Neglecting cross-department collaboration (IT, security, sustainability, finance)
- Underestimating integration complexity (identity, access, workflow systems)
- Failing to leverage analytics effectively (data unused or siloed)
- Overlooking security and compliance enhancements during integration

What This Means for Your Organization:

Moving into **Stage 4 (Optimized)** yields significant gains in operational efficiency, risk reduction, and sustainability. Real-time analytics and integrated workflows enable data-driven decision-making, reduce waste, and improve overall performance. Compliance becomes more robust, sustainability programs mature with measurable results, and print infrastructure integrates seamlessly with enterprise systems. The organization gains deeper visibility, enhanced control, and a more resilient ecosystem aligned with broader organizational goals.

From Optimization to Strategic Digital Transformation

The final step shifts print from operational efficiency to **strategic integration with digital initiatives**. Print becomes a seamless part of workflows, supporting mobility, cloud readiness, ESG commitments, and enterprise-wide transformation.



Growing Pains in **Stage Four**

Transitioning from **Stage 4 (Optimized)** to **Stage 5 (Strategic Digital Transformation)** may involve:

- Cultural resistance to new, paper-light workflows.
- Legacy systems that do not integrate easily with modern digital platforms.
- The need for executive buy-in, cross-functional collaboration, and continuous change management.



Top Priorities

- Align print strategy with enterprise-wide digital transformation initiatives
- Enable cloud, mobile, and IoT integration for seamless workflows
- Embed sustainability goals (carbon neutrality, net-zero targets)
- Position print as a strategic enabler, not just a utility



Vendor Checklist

- Demonstrated ability to integrate print into digital workplace strategies
- Proven expertise in cloud print management, mobile enablement, and IoT ecosystems
- Advanced compliance and security frameworks with continuous monitoring
- Support for sustainability metrics and reporting (carbon offsetting, lifecycle analysis)
- Advisory capabilities to align output strategy with organizational transformation



Key Actions

1. Embed print within enterprise digital and workflow transformation programs
2. Implement advanced cloud and mobile printing solutions for agility
3. Establish KPIs tied to sustainability and ESG commitments
4. Position the MPS provider as a strategic advisor within governance structures



Common Missteps to Avoid

- Treating print solely as a cost center instead of a strategic enabler
- Ignoring cultural and behavioral changes required for paper-light workflows
- Failing to align print strategy with broader digital and sustainability initiatives
- Underestimating the need for executive sponsorship and cross-functional alignment

What This Means for Your Organization:

Reaching **Stage 5 (Strategic Digital Transformation)** elevates print into a strategic, value-driving component of the digital workplace. Print is fully integrated with enterprise workflows, mobility, and cloud platforms, supporting scalable, ESG-aligned operations and long-term transformation goals. At this stage, print functions as a strategic enabler—not merely an operational utility—reinforcing enterprise-wide modernization.



Conclusion

The Output Maturity Model provides a clear roadmap for organizations to evolve from fragmented, inefficient print environments (Stage 1) to fully optimized, digitally aligned ecosystems (Stage 5). Advancing through these stages strengthens operational performance, reduces risk, and positions print as a strategic enabler within the broader digital workplace.

What This Means for Your Organization:

As you progress through the model, print becomes more than an operational necessity—it becomes a driver of enterprise-wide value. Each stage unlocks new efficiencies, tighter controls, and stronger alignment with organizational objectives, ultimately enabling a secure, sustainable, and digitally-ready output environment.

Key Benefits of Advancing Through the Model



Cost Transparency and Control

Gain visibility into usage, spending, and device performance, enabling smarter budgeting and improved cost management.



Improved Security and Compliance

Reduce exposure to risks through standardized controls, enhanced authentication, and alignment with enterprise cybersecurity frameworks.



Sustainable Practices Aligned with ESG Cost Transparency and Control

Support corporate sustainability targets with reduced waste, responsible print behaviors, and measurable environmental impact.



Operational Efficiency and Digital Readiness

Streamline workflows, modernize infrastructure, and integrate print with enterprise systems to support broader transformation initiatives.

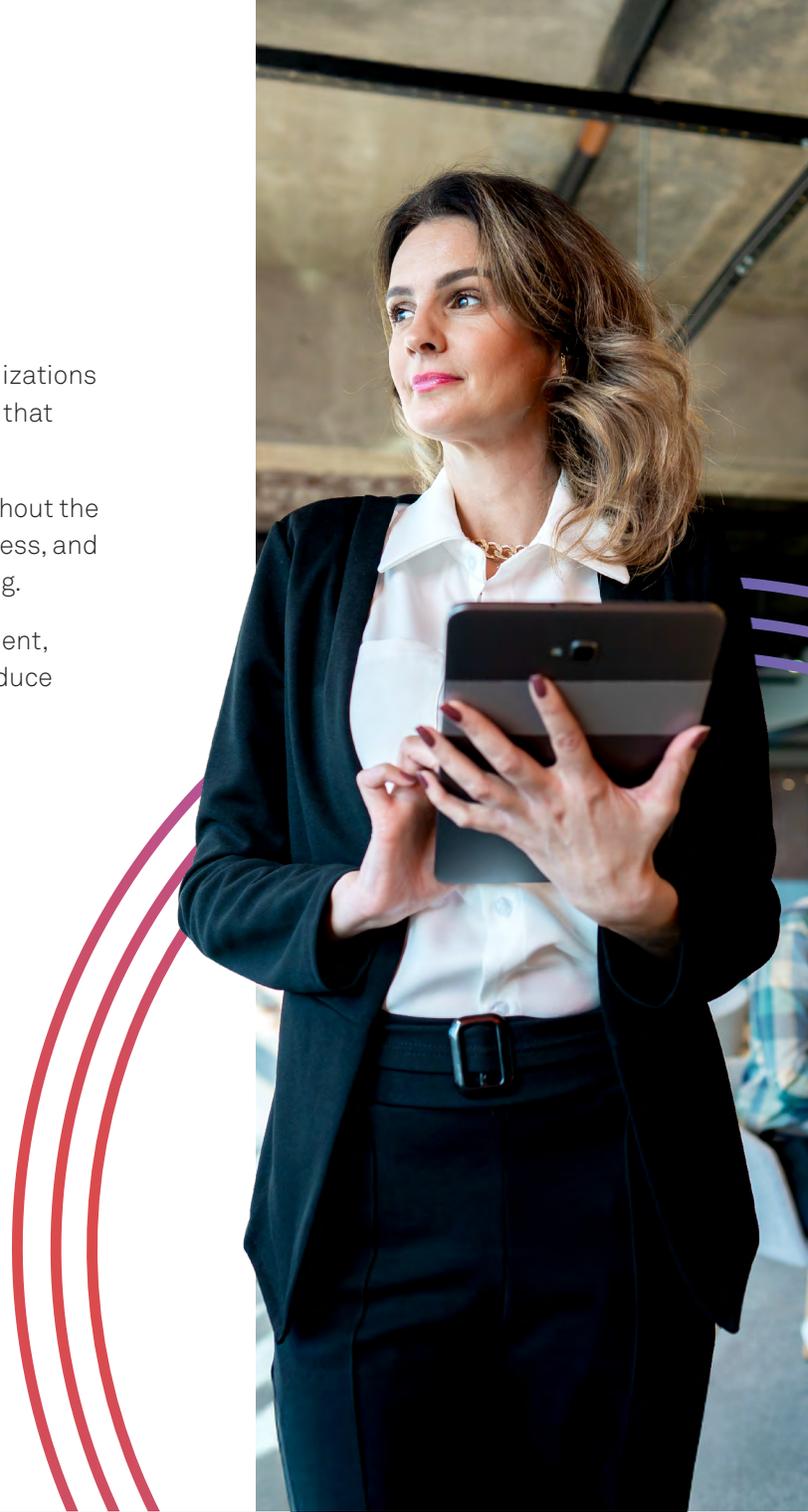
Partnering with a qualified Managed Print Services (MPS) provider ensures organizations have the expertise, technology, and strategic guidance required to modernize infrastructure and align print with enterprise-wide transformation goals.

About Ricoh

Ricoh is a trusted global leader in imaging and information management with over 85 years of innovation. We help organizations build efficient, reliable, and future-ready print environments that adapt to evolving workplace needs.

Our multi-layered security approach safeguards data throughout the document lifecycle by protecting devices, networks, user access, and output through advanced controls and continuous monitoring.

We partner with organizations to assess their print environment, identify inefficiencies, and implement improvements that reduce costs and support long-term operational goals.



Ready to advance your output maturity?



[Contact us](#) to evaluate your print environment and identify opportunities for improvement.



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