NOTES ON OPERATIONS

Migrating Collections Materials Purchasing from a Legacy Payments Workflow to the Campus E-Procurement Platform

Gregory Ferguson

This article examines the experience of a large research library when it migrated its collections materials purchasing onto its university's outsourced e-procurement platform. Previously, the library used a homegrown legacy workflow to export invoice data directly from the integrated library system (ILS) to Accounts Payable to initiate payments to suppliers. Adopting the procurement platform has produced benefits for both the university and the library by bringing the library into alignment with standard campus workflows and improving visibility into collections materials spending. The move has also posed challenges for the library, which has had to adapt to new tasks in another system running parallel to its ongoing acquisitions work in the ILS. The article describes the legacy workflow, the campus platform, the migration project, and the library's continuing efforts to optimize its workflows to meet the campus platform's requirements while completing work in the ILS as efficiently as possible.

Since the last decade of the twentieth century, universities have increasingly adopted outsourced enterprise resource planning (ERP) systems and electronic procurement (e-procurement) platforms such as SAP, Oracle, Banner, and Jaggaer to manage a wide variety of functions, including accounting and purchasing. ERPs are used to "integrate and coordinate information" to help "manage company-wide business processes using a common database and shared management reporting tools."[1] E-procurement platforms perform a similar function specifically for purchasing workflows, usually with options for integrating with suppliers' systems.[2] Developers of ERPs and e-procurement platforms analyze their customers' common business functions and build "best practice" workflows to standardize those processes and complete them as efficiently as possible. These systems offer options for customization, but an organization adopting one typically finds that it needs to adapt at least some of its practices to fit the new software.[3] An organization may choose a single ERP to control all of its business processes, or it may select a combination of systems for specific functions and integrate them together.[4]

When an academic library adopts its institution's outsourced ERP or e-procurement platform for its collections materials purchasing, the new system can produce major changes within the library. This may be the case when moving for the first time to an outsourced system from a local legacy workflow or when moving from one outsourced system to another as part of an institution-wide migration. Despite the significance of these systems for library acquisitions workflows, they are rarely mentioned in library science literature. This article intends to help fill that gap by discussing the experience of New York University's (NYU) Bobst Library when it moved its collections materials purchasing from a legacy

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Library Resources & Technical Services | June 2025
https://doi.org/10.5860/lrts.69n3.8499

payments workflow to the university's outsourced e-procurement platform, Jaggaer, in 2022. Jaggaer (branded as "iBuy" at NYU) is integrated with the campus ERP, which together hold the university's purchasing and accounting functions. Using iBuy for collections materials purchasing has provided major benefits for the university and for the library by improving visibility into this part of the library's spending in the university's central systems. At the same time, iBuy has also posed challenges for the library by creating considerable new work on top of the acquisitions tasks that must still be completed in the integrated library system (ILS). More than two years after adopting iBuy for collections materials purchasing, Bobst continues to develop its workflows to meet iBuy's requirements and handle its work in the ILS as efficiently as possible.

Literature Review

Although there has been prolific publishing on the uses of ERPs and e-procurement platforms for business, literature is sparse on their applications in higher education generally and in academic libraries specifically. Rowland analyzed ERP adoptions at US universities and reported that 76 percent of PhD-granting institutions had implemented outsourced ERPs by 2006.[5] Previously, many universities handled their business processes with a combination of paper records and their own locally developed information technology (IT) infrastructure. This homegrown IT infrastructure was typically modified and re-modified over the years at each institution, making it increasingly difficult to maintain.[6] In the meantime, schools faced increasing requirements to demonstrate accountability to their funders and students, which in turn required timely and accurate data that their legacy workflows could not provide.[7] Adopting ERPs allowed universities to automate their financial processes, produce better reporting, and outsource the long-term design of complex IT infrastructure.[8] Rowland observed that adopting an ERP was an ongoing process of implementation (rather than a one-time act of installation) due to the fact that a new ERP's functionality rarely lined up perfectly with a university's existing practices.[9] Rowland proposed the concept of "fit-gap work" to understand a university's process of analyzing the gaps that appear between the ERP and previous workflows and then enacting solutions to fit the gaps. In some cases, the university was able to fit the gaps by customizing the ERP, whereas in other cases it had to adjust local procedures to match the ERP.[10] After these implementations, schools typically shifted support staff to higher-level work from previous tasks that were now automated, such as manual data entry and rote compliance monitoring. This allowed universities to provide additional value with the same staffing levels.[11]

Breeding observed in 2012 that an ILS can be thought of as an ERP for a library and identified the creation of interoperability between the financial functions of the ILS and the campus ERP as a major challenge for academic libraries. He envisioned a future in which developments in cloud computing, software-as-a-service (SaaS), and APIs could allow the ILS to function as a node of the campus ERP, rather than as a siloed separate system. Breeding saw these possibilities in the context of an ongoing trend toward outsourcing of university IT functions to reallocate resources to tasks that are closer to higher education's core mission.[12]

Brandshaug offered a case study of a library's adoption of an e-procurement system at the Norwegian University of Science and Technology (NTNU). In 2010, NTNU's library embarked on a project to migrate its collections materials purchasing into the university e-procurement platform, Basware. By 2013, the catalogs of two of the library's main suppliers for print materials were integrated directly with Basware. The library could use inventory data from the suppliers' websites to create purchase orders in Basware via a seamless workflow that also generated metadata to load into the ILS. At the time of writing in 2014, Brandshaug reported that print purchasing using the new workflow was very successful, although NTNU had not been able to integrate e-resources acquisitions due to gaps between the supplier's system and Basware.[13]

Seago described the University of Kentucky (UK) library system's integration between its ILS and ERP in the context of a project to overhaul its fund structure in Alma after migrating from Voyager in 2016. Changes to the fund structure were necessary to maintain the library's ability to export invoice data from the ILS to the campus ERP running on the SAP system. UK found that Alma's simpler fund structure could not accommodate all of the required data that had been contained in their Voyager fund architecture. Librarians adopted a combination of funds and reporting codes in Alma to help build a new integration for transmitting invoice data from Alma to the ERP.[14]

Midgley and Mundle reported that the University of Illinois at Chicago (UIC) faced a similar problem in their migration from Voyager to Alma in 2020. Like UK, UIC had implemented a workflow to export invoice data from their former ILS Voyager to the campus ERP Banner. UIC's workflow had relied on Voyager's reporting funds to provide data necessary for categorizing the transactions in Banner. When UIC migrated to Alma, the new system's simpler fund structure put this process in jeopardy. UIC also devised a new workflow using Alma's reporting codes, allowing them to maintain their integration with Banner while simplifying their fund structure in Alma.[15]

Institutional Context

NYU is a private, not-for-profit Carnegie R1 research university with its main campus in New York City and additional degree-granting campuses in Abu Dhabi and Shanghai. The university has a student body of more than 60,000 (split approximately evenly between undergraduates and graduate students) and employs more than 5,000 full-time faculty. NYU has an annual budget of $3.7 billion, excluding NYU Langone Health, which contains the School of Medicine and hospital system. NYU has libraries across all three campuses, with its main location, Elmer Holmes Bobst Library, situated on Washington Square in Manhattan. Bobst contains the system's central technical services office, known as Knowledge Access & Resource Management Services (KARMS). KARMS provides acquisitions and metadata services for the physical collections at Bobst, supports acquisitions and metadata activities at other libraries, and handles e-resources maintenance and systems administration for the entire system. Within KARMS, the Resource Management Department (RM) is responsible for acquisitions and participates with other departments in shared workflows for copy cataloging and e-resources maintenance. RM consists of one manager, four supervisors, sixteen full-time staff organized into

three units, and approximately twenty student workers. In NYU's fiscal year 2024, the department handled approximately 4,250 invoices for Bobst, 60,000 physical items, and 2,000 e-resources tasks such as activations, product audits, and troubleshooting requests. RM collaborates closely with Bobst's Collection Development Office and Office of Budget and Finance (Budget Office) on acquisitions processes. Bobst used Aleph as its ILS before migrating to Alma in January 2024. These systems will be referred to interchangeably as "the ILS" in this paper when the distinction between the two is not significant in relation to iBuy and its workflows.

The university's purchasing workflows are set by the central Procurement and Payables Office (P&P), whose mission is to oversee "the process of purchasing, receiving, paying for, and accounting for goods and services and managing travel & expense management."[16] Bobst interacts frequently with the Procurement and Accounts Payable (AP) units at P&P in relation to collections materials purchasing. Procurement facilitates purchasing processes from onboarding suppliers through ordering and receiving. AP makes payments for the goods and services obtained through Procurement's workflows. NYU's ERP runs on Oracle and is referred to locally as "FAME." FAME holds the university's general ledger and accounting functions. Purchasing processes are mostly carried out within a separate system outsourced to Jaggaer, a company specializing in e-procurement software. (Purchases made with university payment cards use a different outsourced platform and are the only exception to Jaggaer.) Jaggaer's platform is known as "iBuy" at NYU and is integrated with FAME to exchange data on a regular basis. Data from FAME is reported via the University Data Warehouse+ (UDW+), a reporting tool that runs on Oracle Business Intelligence. Units across campus can grant their staff appropriate permissions for iBuy and UDW+, although the university tightly controls access to FAME.

P&P provides a variety of workflows in iBuy for purchasing different types of goods and services. The details of different workflows will be described in more detail later on, but a general outline of the purchasing process is as follows: a unit (such as the library) creates a requisition (purchase request) in iBuy with a description of the purchase and a quote from the supplier. iBuy automatically routes the requisition for approval by the appropriate staff at Bobst and at Procurement as determined by the university's signature authority policy, which defines how spending authority is delegated. Once the requisition has been approved, iBuy creates an official university purchase order (PO) and emails it to the supplier. The funds necessary to pay for the purchase are encumbered on (committed to) the PO, which should typically be completed by the end of the fiscal year. After the goods or services have been delivered, the library confirms this in iBuy by entering a record of receipt on the PO. (Some purchases, such as subscription payments made in advance and small one-time POs, do not require receipts in iBuy.) The library then sends a PDF copy of the invoice with the PO number on it to an AP email alias. The PDF is ingested into the university's systems and attached to a voucher (a request for payment that AP can approve or reject). AP performs a three-way match on the invoice, which is a standard procurement process to confirm that the details on the invoice (1) match to an open PO (2) in the university's systems with the necessary record of receipt (3). If the invoice passes the three-way match, AP will approve its voucher to initiate payment. Data on the voucher (including the PDF invoice) is

ingested back into iBuy, allowing library staff to track its progress to payment and providing an easily accessible, long-term audit trail.

Legacy Workflow

From 2014 to 2021, Bobst and AP used homegrown automation (referred to hereafter as the "invoice export workflow") to pay most of Bobst's collections materials invoices using data from the ILS. In the invoice export workflow, the library was responsible for initiating its own ordering and payments without university POs and kept paper copies of its invoices as the official audit trail. RM carried out ordering, receiving, and invoicing workflows in the ILS, performed the three-way match using the paper invoice and the data in the ILS, and then routed the paper invoice to two staff members who specialized in payments processing. These two staff reviewed the paper invoice again against the ILS and then flagged the invoice in the ILS with a status indicating that it was ready for payment. A weekly job run by the library's systems administrator extracted a file of data from the ILS on the flagged invoices and delivered it securely to AP. AP uploaded the file into FAME to create vouchers that were processed for payment. RM filed the paper copy of the invoice after reconciling the payment data from FAME against the ILS. Bobst considered the invoice export workflow to be an improvement over the previous process, which had involved extensive manual work at the library and AP. The university had a procurement system called eReq at this time, but the library's collections materials purchasing bypassed its workflows. The 2015 edition of the campus procurement manual included language identifying library materials as an exception to standard purchasing practices.[17]

In 2016, the university replaced eReq with iBuy as its procurement platform containing all of its standard purchasing processes except payment cards. At that time, Bobst was allowed to keep the invoice export workflow and remain outside iBuy, in line with the language in the procurement manual. Over the following years, the library became very comfortable with the simplicity of the invoice export workflow. Figure 1 illustrates its efficiency for RM, where the steps to initiate payment for collections materials invoices proceeded in a straight line through the ILS' workflows and on to FAME. RM did perform a small amount of work in iBuy related to collections materials during this time. RM helped new vendors complete iBuy's onboarding process so that they would be registered in the university's systems as authorized suppliers who the library could do business with. RM also put a small number of requisitions into iBuy for collections materials that could not go through the invoice export workflow. At first, these consisted of purchases to be paid via wire transfer, for which PDF copies of the invoices were necessary to confirm the supplier's bank details. In 2020, RM began entering requisitions in iBuy for Amazon orders after P&P added Amazon as a "punchout" supplier whose inventory and workflows are integrated directly with iBuy. All told, however, purchases going through iBuy never added up to more than 5 percent of the invoices RM handled for Bobst during this period.

In early 2021, Bobst underwent a routine audit by the university's internal audit unit that included a review of its acquisitions workflows. The auditors' report in spring 2021 identified several drawbacks to the invoice export workflow and recommended that Bobst adopt iBuy for its collections materials

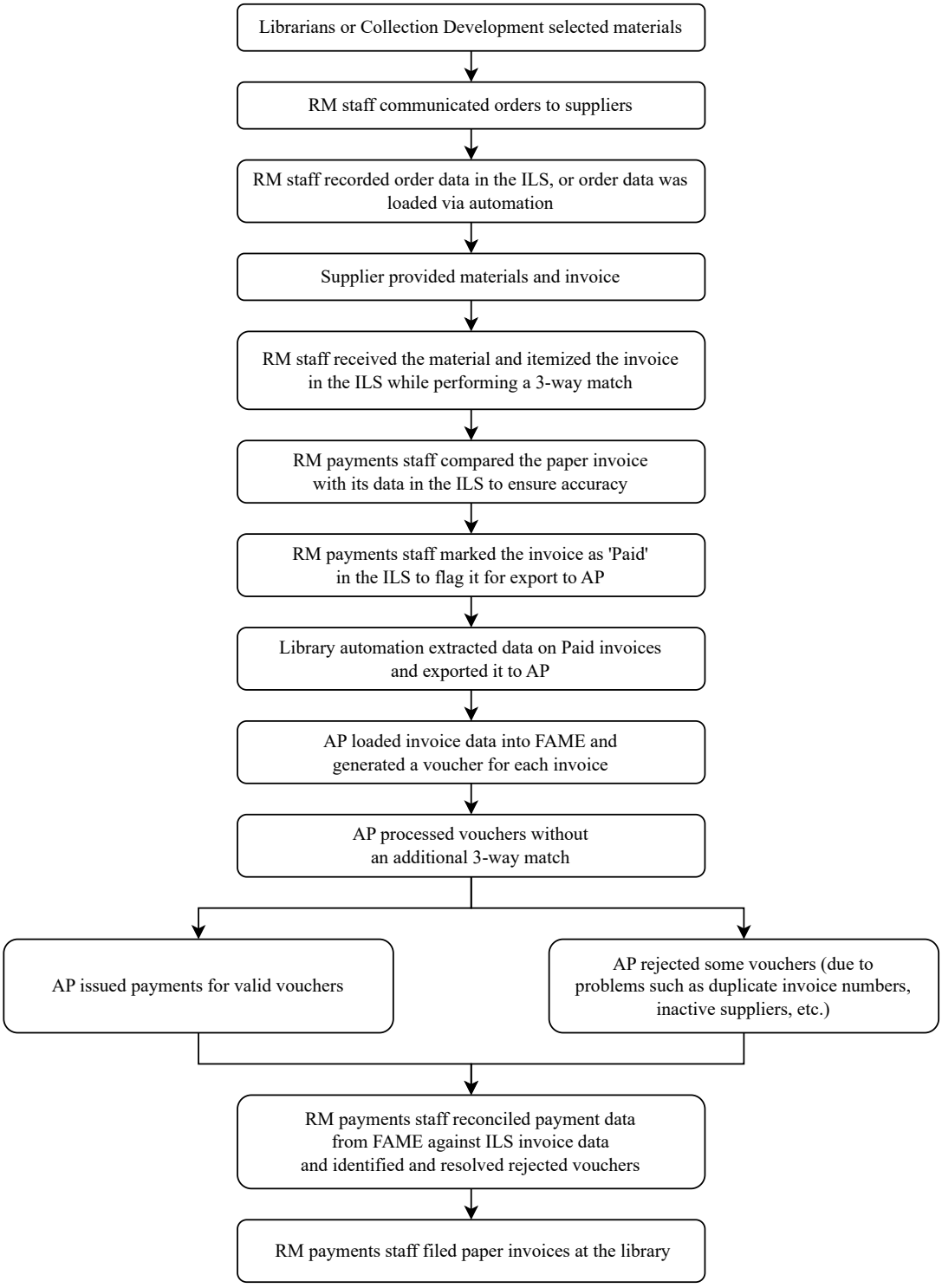

FIGURE 1. Invoice Export Workflow. This diagram depicts a purchase of one-time materials (such as books) where payment was made after receipt. Subscription purchases followed the same workflow, with the exception that material was supplied and received after payment.

purchasing, despite the carveout in the procurement manual. The report noted that the invoice data exported to AP included no record of who had authorized the spending, no metadata about what was purchased, and no copies of the actual invoices. Staff looking in the university's central systems FAME and UDW+ could see only the amounts that had been paid to each supplier for each invoice number, with no further details on any particular purchase. A full picture from ordering to payment could be obtained only by combining data from FAME/UDW+ with acquisitions data from the ILS and the paper files at the library, which only KARMS had easy access to. Adopting iBuy would make data on the library's collections materials purchasing visible to the staff inside and outside the library with the appropriate permissions, record which staff with spending authority had approved each order, and provide easy long-term access to digital copies of the invoices. Managers at the library were apprehensive about replacing a mission-critical workflow that had seemed to be functioning well with new processes that would require additional work from library staff. Despite those concerns, library managers also recognized that the opacity of the invoice export workflow made it untenable compared to the university's standard workflows and saw that the library itself would benefit from the increased visibility iBuy would provide. The library agreed to move to iBuy and embarked on a migration project with the goal of going live in January 2022.

Migration to iBuy

After the agreement to migrate was made, Bobst immediately assembled a team from RM, Collection Development, and the Budget Office (referred to collectively hereafter as "the library team") to begin the effort to overhaul the library's workflows in time to meet the January deadline. All three units recognized the urgent need to collaborate with each other and with P&P to adapt quickly to iBuy to avoid disruption to the library's collecting. In August 2021, the library team began meeting on a weekly basis, while also holding regular calls with P&P.

It was not obvious at the outset how Bobst should use iBuy for collections materials. The available documentation described general scenarios and did not provide the library team with a clear sense of how the platform's workflows could be applied to library-specific purchasing such as e-journal packages or approval plans. The team agreed that its most immediate task was to explain Bobst's different kinds of acquisitions to procurement managers so that they could provide appropriate recommendations. The team collaborated on a document that organized Bobst's acquisitions into eleven general categories based on criteria such as print versus electronic, monograph versus serial, and the frequency of the purchasing. Table 1 provides an overview of these eleven categories. The full document provided a concise description of each type of material, typical ordering and billing workflows, and representative examples of actual purchases. Knowing that Procurement would not be familiar with library acquisitions, the team took care to spell things out in plain language and avoid jargon. This document ensured that every type of purchasing was accounted for, helped Procurement assign each category to the appropriate iBuy workflow, and let the library team flag potential areas of concern for discussion.

Table 1. Categories of Collections Material Purchasing Presented to Procurement

Category	Characteristics	iBuy Workflow
One-time Print Purchases		
Approval plans and blanket orders	Suppliers select and ship books, scores, and A/V according to criteria provided by Bobst.	Standing order
Large firm order suppliers	Bobst orders books, scores and A/V one title at a time. Items ordered at different times are invoiced and shipped together as the supplier fulfills them.	Standing order
Small firm order suppliers	Occasional orders for titles not available from Bobst's usual print suppliers.	Non-Catalog
Special collections	Rare or unique materials such as antiquarian books and archival collections. Archival purchases have signed contracts, may be purchased from individuals, and/or may require payment over multiple years.	Non-Catalog or Bid Waiver
Print Continuations		
Standing orders for monographic series	Distinct from subscriptions in that invoices are sent with the materials and payment is made after receipt.	Standing Order
Library of Congress Cooperative Acquisitions Programs	One invoice annually for each of the library's memberships in programs to acquire material from regions of the world where it can otherwise be difficult to collect at a large scale. Payment is made in advance for the expected cost of the year's materials, including serials, books, and A/V.	Memberships/Subscriptions
Subscription agents	Serials subscriptions placed with suppliers who manage many orders for the customer with a variety of publishers. Payment is made in advance and materials are shipped from the publishers (not the agent).	Membership/Subscriptions
One-off serial subscriptions	Serials titles not available from subscription agents. Ordered directly from publishers. Payment is made in advance.	Memberships/Subscriptions form
Electronic Resources		
E-resource subscriptions	May be packages or single titles. May include perpetual access for new content issued during the time period covered by the invoice, or may simply provide access for the time period covered by the invoice. Licensed for all of NYU. Costs may be shared with other NYU libraries. Payment is made in advance.	Memberships/Subscriptions (except first-time orders, which use Non-Catalog or Bid Waiver POs)
E-book packages	Purchases to add new ebooks, typically from publishers who the library buys from regularly. Each purchase is for permanent access to a discrete set of standalone titles. May include multi-year agreements. Licensed for all of NYU. Costs may be shared with other NYU libraries.	Non-Catalog or Bid Waiver
One-time e-resource purchases	Purchases of standalone perpetual access e-resources such as video collections or newspaper archives. Licensed for all of NYU. Costs may be shared with other NYU libraries.	Non-Catalog or Bid Waiver

Note: This table summarizes the document describing the library's collections materials purchasing that the library team presented to Procurement during Bobst's migration to iBuy.

From October through December 2021, the library team met regularly with P&P to exchange information about their respective processes. Using the document, the library team described Bobst's

collections materials purchasing and answered questions from Procurement and AP managers. In turn, Procurement and AP outlined iBuy's standard workflows for submitting requisitions to be turned into POs, recording receipt of goods in iBuy, and submitting invoices to be matched and paid by AP. Procurement identified the best iBuy process for each type of purchasing in the document and took questions from the library team about workflow details.

After receiving this guidance from Procurement and AP, the library team spent November and December preparing to go live on iBuy in January. RM and Collection Development entered a small number of requisitions in iBuy while continuing to consult with Procurement, who were able to provide more nuanced instructions based on live examples. RM stopped shipments with Bobst's largest print suppliers (who generate the majority of its invoices) to give RM staff time to reconcile statements and make sure open invoices were paid via the invoice export workflow before December 31. This pause also provided time to obtain quotes from the same suppliers and enter requisitions for the POs that would be necessary to resume purchasing in iBuy.

Training staff and distributing assignments in the new system were major considerations in RM. The library team knew that ultimately many staff members in RM would need to be involved in handling the large volume of ordering, receiving, and invoicing work expected in iBuy. But during the migration project, the library team also knew that its understanding of the platform was still developing, while two of RM's three supervisor positions at the time happened to be vacant. With limited capacity to write documentation and deliver training, RM's manager and remaining supervisor decided on a temporary process retaining elements of the invoice export workflow. For this interim process, RM trained only the two staff members who were already familiar with the department's previous iBuy work in the new full set of procedures. After going live, the manager, supervisor, and these two employees were responsible for creating all requisitions. RM's receiving staff continued to receive and invoice material in the ILS first and then used Google Drive to route PDF copies of invoices to these employees, who recorded the necessary receipts in iBuy and emailed the invoices to AP. Restricting the number of staff working in iBuy was not a requirement of the system, which is intended to open up procurement work as broadly as possible[18]—but it was a crucial part of RM's successful launch on the platform. Keeping the structure of the staff assignments from the invoice export workflow minimized the early training burden, limited initial disruption for most RM staff, and gave the department time to learn from using iBuy at full scale before deciding on how to spread the work out more broadly.

During the migration project, the library team chose not to investigate integrations between the ILS and iBuy. It was not immediately clear how the two systems could be connected given that the ILS was missing data that would be necessary in iBuy's processes. Redesigning workflows in the ILS to hold new data and then proposing new automation to P&P would have been an uncertain venture using up valuable time during the short migration project. The library team also knew that Bobst would soon be undertaking a migration from Aleph to Alma, meaning that any potential integration between Aleph and iBuy would be obsolete in less than two years. The library team decided to postpone any work on integrations until after the Alma migration, when Bobst would have better understandings of both iBuy and Alma.

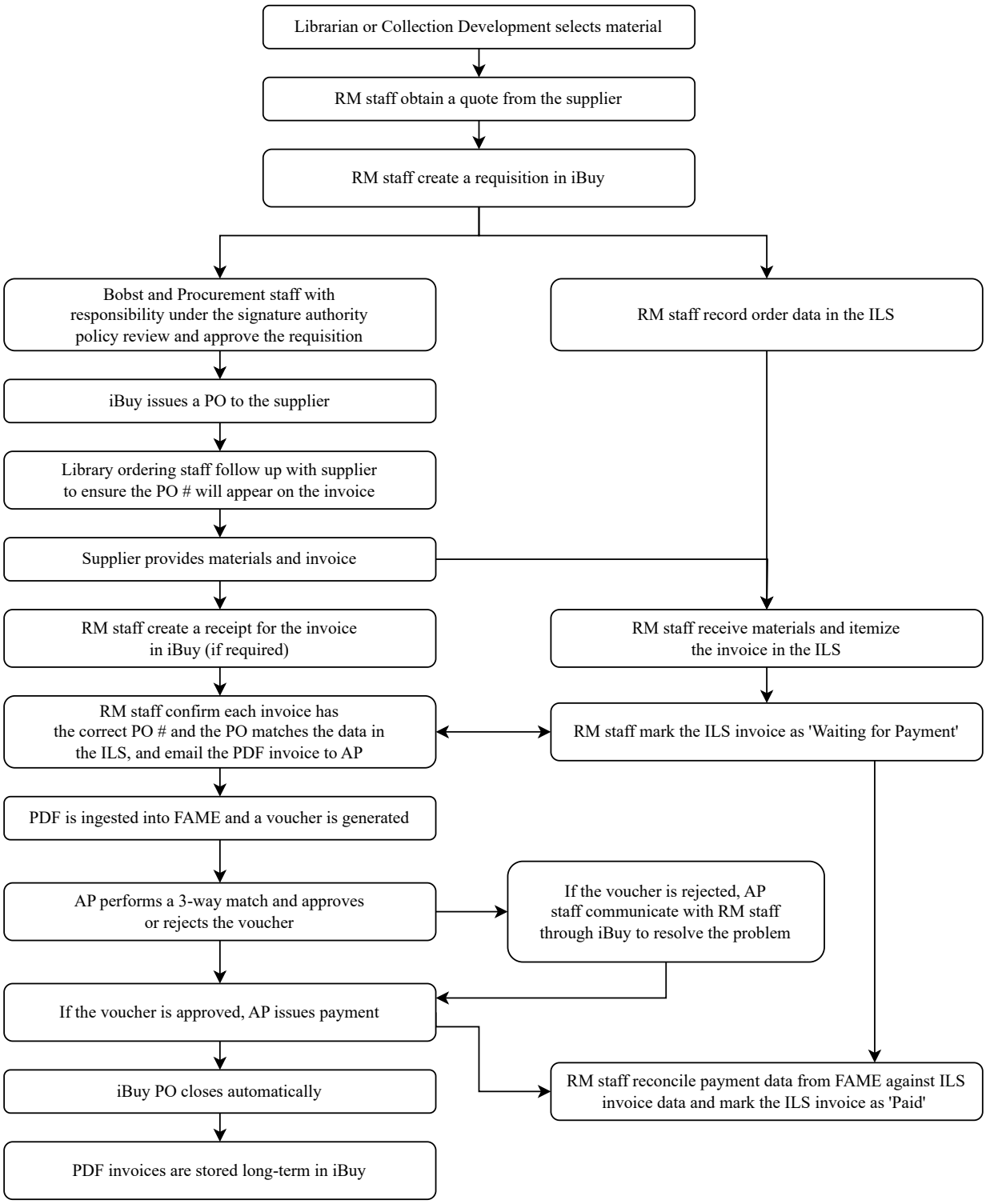

FIGURE 2. iBuy Non-Catalog/Bid Waiver Workflow. The Non-Catalog workflow is used for one-time purchases of up to $10,000. The Bid Waiver workflow is used for one-time purchases of $10,000 or more. The workflows are identical, with the exception that a Bid Waiver requisition includes a written request to Procurement to treat the supplier as a 'sole source' or 'preferred' supplier who can bypass the usual process of bidding large purchases out to multiple suppliers.

On January 1, Bobst ended its use of the invoice export workflow as scheduled and began paying all of its collections materials invoices against iBuy POs according to the standard campus workflows. This was a major accomplishment that resolved the problems with the invoice export workflow that had limited access to information about the library's collections materials purchasing. With iBuy, this activity is now fully visible in campus systems to appropriate staff inside and outside the library, just like the rest of the library's spending. At the same time, adopting iBuy also opened new workflow gaps for the library. Without the invoice export workflow leveraging the data already in the ILS to pay invoices, RM has faced a significant increase in manual work for each new purchase.

iBuy Workflows

RM uses five of iBuy's workflows for its collections materials purchasing: the Non-Catalog and Bid Waiver workflows, the Memberships/Subscriptions workflow, the Standing Order workflow, and the Punchout workflow.

The Non-Catalog and Bid Waiver workflows (see figure 2) follow the basic one-time purchasing process outlined above in the "Institutional Context" section. These workflows are used for one-off purchases such as a single order of books, an archival collection, or a one-time perpetual access e-resource package. Non-Catalog requisitions are used for purchases less than $10,000 and need no justification for the choice of supplier, whereas a requisition above that amount requires a Bid Waiver request accompanying the requisition. A Bid Waiver allows a requisition to bypass the university's normal practice of bidding out large purchases to multiple suppliers. This bidding process is not relevant for library collections materials suppliers, who typically offer unique selections of inventory and/or customized services (such as approval plans, metadata, etc.) that would not be easy for other suppliers to replicate. RM uses the Bid Waiver process to request that Procurement treat Bobst's vendors as "sole source" or "preferred" suppliers who do not need to submit bids to do business with the university.

The Memberships/Subscriptions process (see figure 3) allows the library to make payments in advance for renewals of print and electronic continuing resources. In these cases, the library confirms the renewal with the supplier, receives the invoice, and submits it as an attachment to a Memberships/Subscriptions requisition. Once the requisition is approved, iBuy creates a PO for internal use but does not send it to the supplier, and the invoice is attached to a voucher that proceeds straight to AP for processing. No record of receipt is required because the goods will be delivered after payment. First-time orders for e-resource subscriptions do not use the Memberships/Subscriptions workflow and are instead placed on Non-Catalog or Bid Waiver requisitions so that Procurement can review the initial purchase.

RM uses the Standing Order workflow (see figure 4) for rolling purchasing of books and other one-time physical items such as scores or audiovisual materials via approval plans and firm order accounts with booksellers such as Casalini and Harrassowitz. At the start of the fiscal year, the library requests a quote from the supplier for the amount of material the library plans to purchase. The library uses this quote to generate a single PO that can be used for all invoices throughout the year. Receiving staff enter

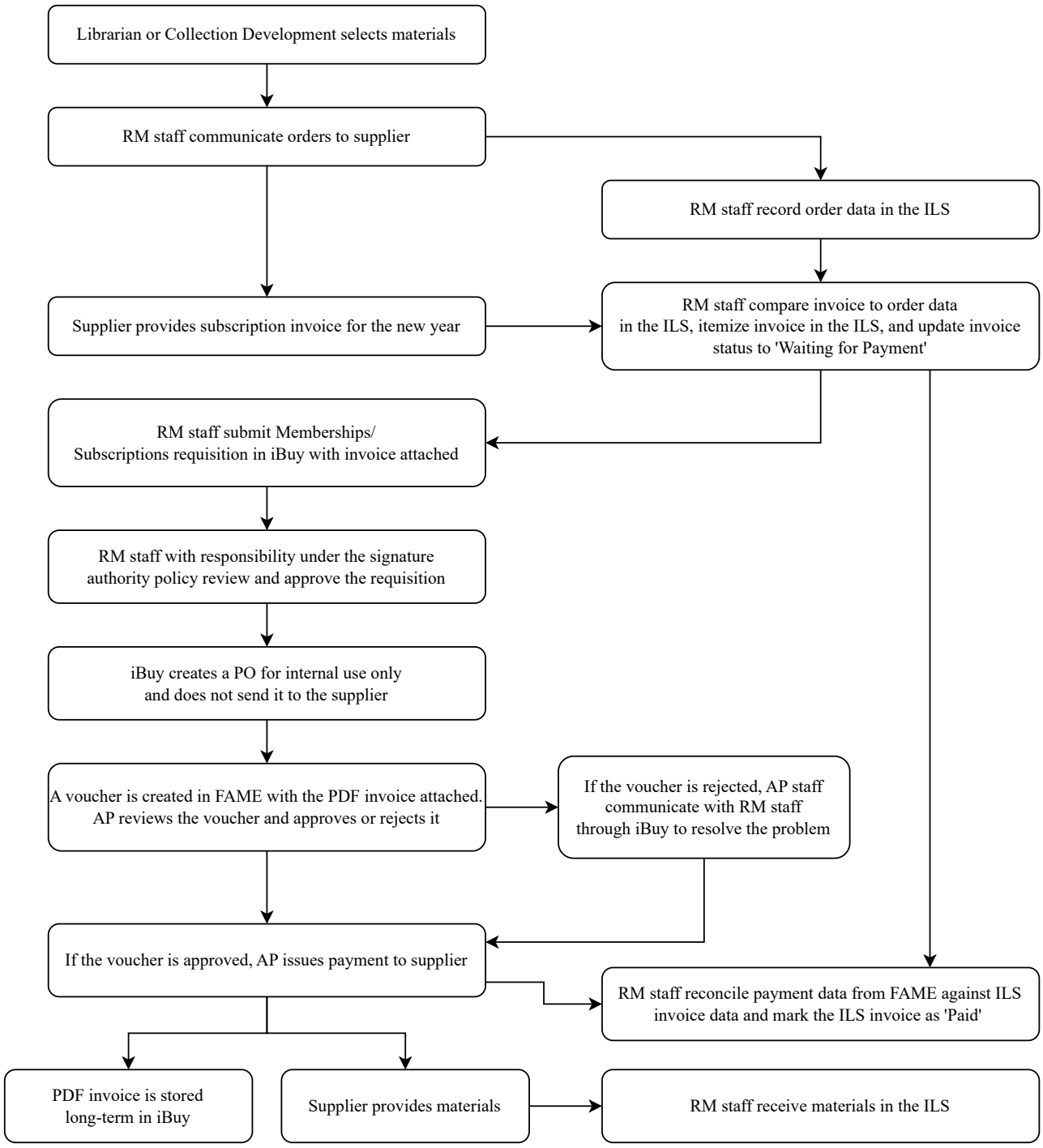

FIGURE 3. iBuy Memberships/Subscriptions Workflow.

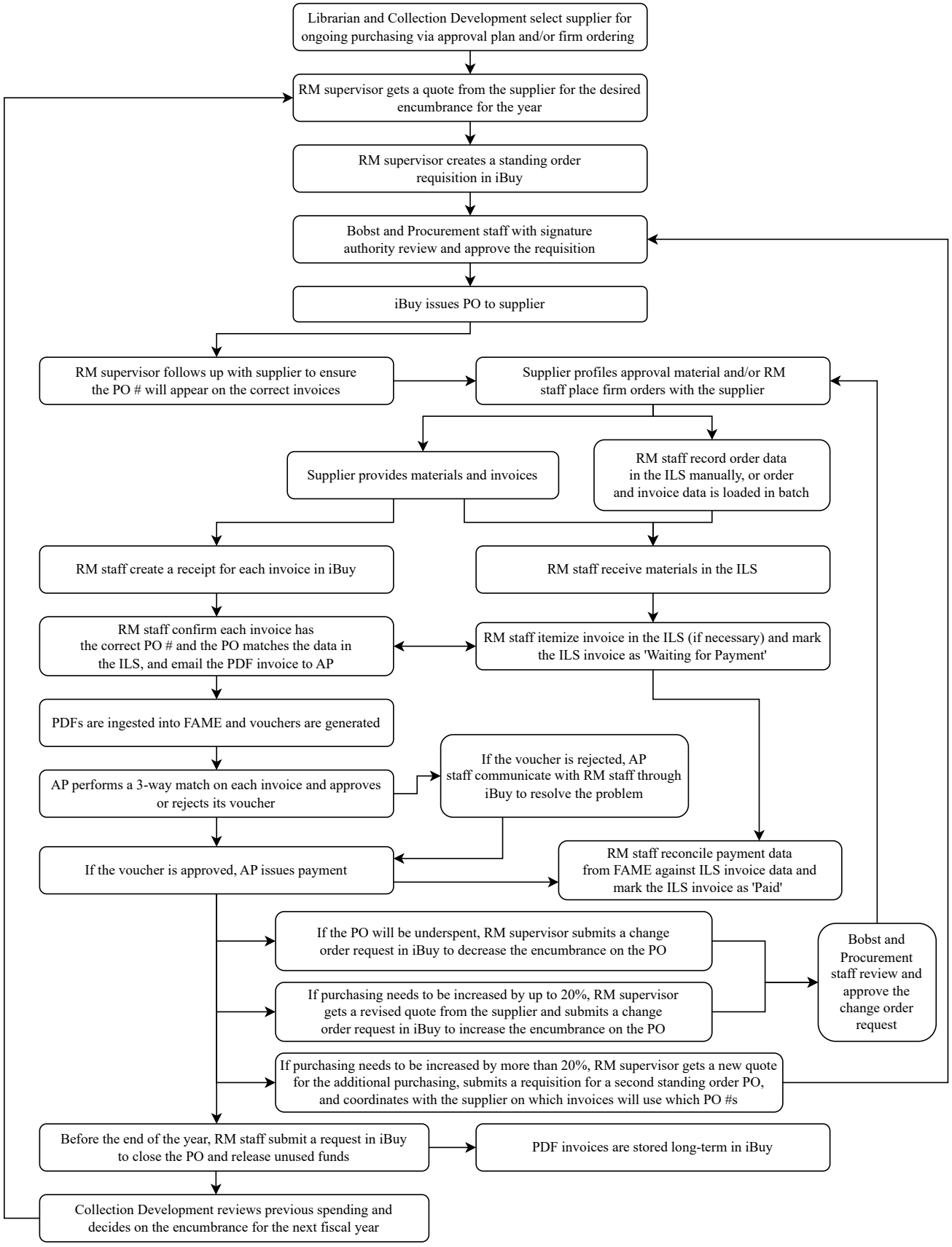

FIGURE 4. iBuy Standing Order Workflow.

a receipt for each shipment on the PO in iBuy, which AP uses to complete the three-way match for the corresponding invoice. This process prevents the need to issue an individual PO for every invoice, but it still generates considerable work of its own. Standing order POs require substantial effort to create and manage, while the many invoices that are supplied against them each need their own processing work in iBuy in addition to the ILS. The full implications of standing order purchasing are discussed below.

The Punchout workflow (see figure 5) applies only to RM's ordering from Amazon. NYU has negotiated with Amazon to integrate its systems directly with the university's so that they seamlessly exchange order, shipment, and invoice data in a process called "punchout" ordering. RM can create a cart on the Amazon website and import it directly into iBuy as a requisition. After the requisition is approved, iBuy automatically transmits the PO to Amazon, which sends back data on the resulting shipment and invoice. Because the library's Amazon POs are low-dollar orders that do not require a receipt in iBuy, automation at P&P completes the match for the invoice and initiates payment. Because library staff do not need to handle the invoice before it is paid, RM records the full invoice data in the ILS after payment as part of its reconciliation process.

iBuy's Effects in Resource Management

As anticipated, iBuy has created a significant amount of new work for RM. Figures 2 through 5 illustrate the multiple complex workflows now required in place of the single straightforward invoice export workflow shown earlier in figure 1. Each of these workflows requires new steps moving through an additional system in parallel to the ILS. The lack of integration between iBuy and the ILS means RM must now double-enter data in two systems. The need to match most invoices to university POs requires RM staff to carefully review thousands of invoices annually against their data in the ILS as well as the data on their POs before submitting them to AP. Table 2 shows that RM has completed thousands of additional tasks in iBuy related to collections materials purchasing since adopting the platform's workflows in fiscal year 2022. The practical effects of these new tasks have differed across the various iBuy workflows described above, and by extension across the different units in RM that use those workflows.

RM uses the Memberships/Subscriptions workflow for subscription invoices for print serials. Table 3 shows that RM handled relatively few (302) of these invoices for Bobst in fiscal year 2024. With a low volume of invoices moving through iBuy's simplest process, RM's unit that handles print serials has seen only a modest increase in new work, which it has absorbed without major disruption to its operations. RM estimates that each of these invoices takes on average two minutes to process in iBuy through the Memberships/Subscriptions workflow. Taken together, these invoices represent approximately ten hours (or a day and a half) of work for RM.

E-resources purchases use the Memberships/Subscriptions workflow when they are renewals, or the Non-Catalog and Bid Waiver workflows when they are not. Regardless of the workflow they follow, e-resources requisitions are often complex and require close attention. RM staff receive information and documents about upcoming payments from Collection Development, which negotiates packages

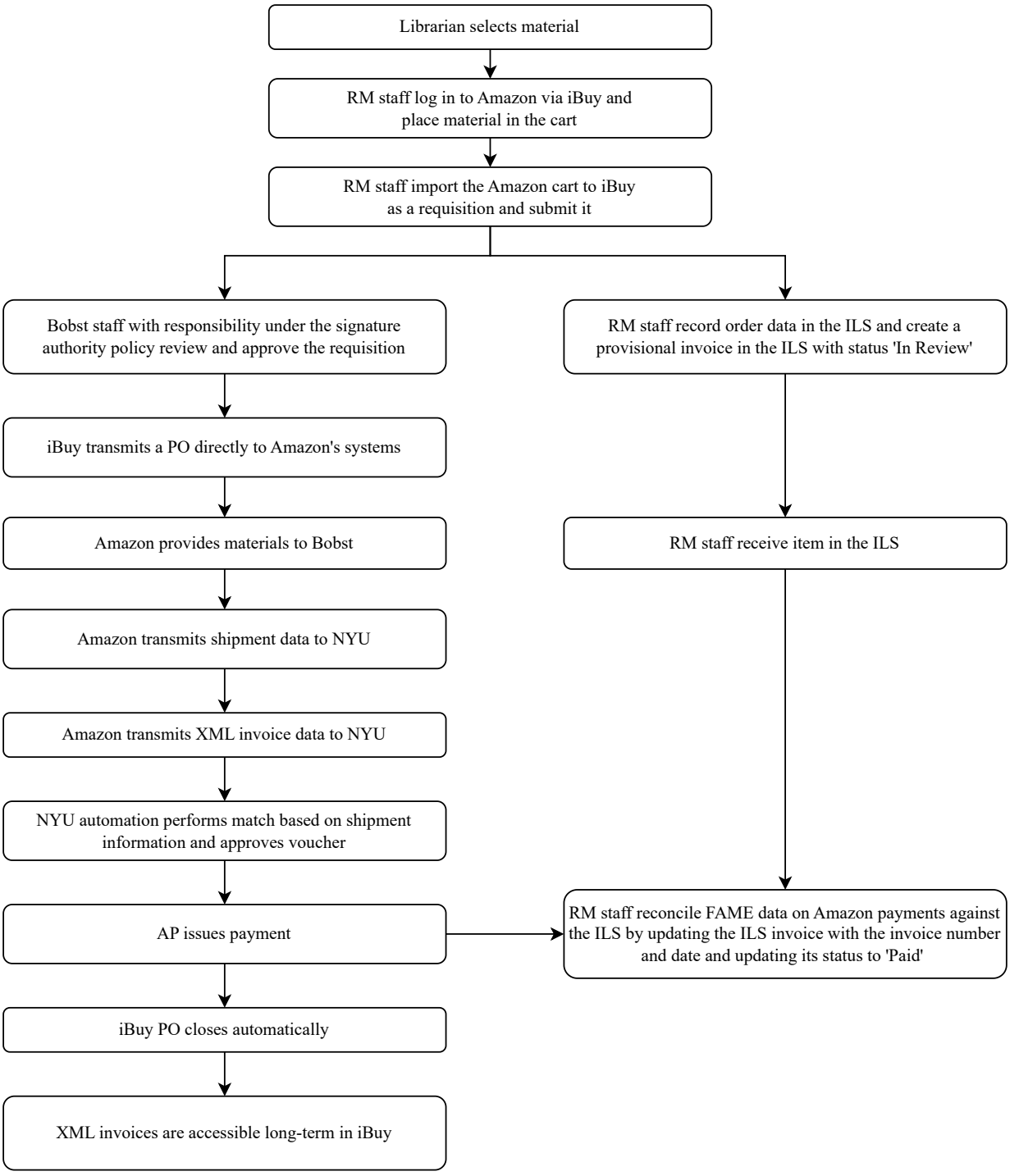

FIGURE 5. iBuy Amazon Punchout Workflow. Punchout requisitions typically do not require approval from Procurement or receipts in iBuy because they are low-dollar purchases that fall below the required thresholds.

Table 2. Total amount spent and number of books received on approval by subject.

Fiscal Year	2019	2020	2021	2022*	2023	2024
	While Using the Invoice Export Workflow			While Using iBuy		
Completed requisitions						
Bid waiver	0	0	0	74	92	94
Memberships/subscriptions	51	54	43	556	637	751
Standing order	0	0	0	57	65	55
Non-catalog	0	0	0	80	100	90
Amazon punchout	0	1	120	171	122	291
Subtotal	51	55	163	938	1,016	1,281
Receipts						
Standing orders	0	0	0	1,834	3,167	2,763
Other POs	0	0	0	99	144	140
Subtotal	0	0	0	1,933	3,311	2,903
Completed vouchers						
Standing orders	0	0	0	2,296	3,320	2,765
Other POs	51	55	210	1,182	1,242	1,288
Subtotal	51	55	210	3,478	4,562	4,053
Total iBuy functions	102	110	373	6,349	8,889	8,237

Note: This table presents all tasks recorded in iBuy related to work performed by RM on collections materials purchasing for all of the NYU Libraries locations it serves. Work performed in iBuy by staff at other NYU Libraries locations is not reported here.
*The count of vouchers for fiscal year 2022 is significantly lower than the corresponding number of invoices reported from the ILS in Table 3 because RM used iBuy for only eight months out of the fiscal year.

with suppliers and cost sharing with other NYU libraries. RM and Collection Development must communicate frequently to ensure RM staff understand each purchase before it is entered in iBuy. E-resources requisitions often need additional detail-oriented work rarely required in RM's other purchasing to split charges correctly between multiple libraries or across multiple fiscal years. Non-Catalog and Bid Waiver requisitions also require work after the invoice is supplied to verify the invoice against the PO and the ILS, record the receipt of the materials, and submit the invoice for payment. Table 3 shows that RM handled 958 e-resources invoices for Bobst in fiscal year 2024, each of which needed its own requisition in iBuy. RM estimates conservatively that each of these requisitions took an average of ten minutes to complete in iBuy. Based on this, RM estimates its e-resources unit spent 160 hours, or 4.5 work weeks, on iBuy tasks in fiscal year 2024.

Standing order POs in iBuy have had a similar effect on RM's unit that handles purchasing of books and other physical one-time resources. Table 2 shows that only 55 (4.3 percent) of the 1,281 requisitions

Table 3. Bobst General Collections Materials Invoices Recorded in the ILS

Fiscal Year	2019	2020	2021	2022*	2023	2024
	While Using the Invoice Export Workflow			While Using iBuy		
Electronic continuation invoices	463	444	477	448	469	538
Electronic one-time invoices	374	429	539	484	457	420
Print continuation invoices	504	332	422	409	356	302
Print one-time invoices	5,195	2,738	2,575	3,758	3,251	2,992
Total	6,536	3,943	4,013	5,099	4,533	4,252

Note: Data from the ILS is presented here to provide a sense of the scale of RM's work before adopting iBuy. ILS data also allows for distinguishing between print and electronic purchasing. Only data on RM's work for Bobst is included. Acquisitions work for other locations is shared between RM and the staff at those locations, and the data that distinguished which staff performed which tasks was not migrated from Aleph to Alma. This table includes payment card purchases, which are not recorded in iBuy and can no longer be systematically separated out due to data lost in the migration to Alma.

from fiscal year 2024 are for standing orders, but 2,765 (68.2 percent) of the 4,053 vouchers are associated with those standing order POs. RM estimates that processing one invoice on a standing order PO requires on average four minutes. This includes reviewing the invoice against its PO in iBuy, verifying that the data recorded in the ILS matches the PO, confirming that a receipt and voucher are not already present in iBuy, and finally, creating the receipt and emailing the invoice to AP. Across the 2,763 standing order vouchers processed by RM in fiscal year 2024, this works out to 184 hours, or 5.25 work weeks.

For RM, which operates on a lean staffing model relative to the scale of its duties, the estimated ten weeks spent on these iBuy tasks in fiscal year 2024 constitute a significant amount of work that has cut into the department's capacity to carry out its other functions. This ten weeks of work does not include all of the tasks that must be done around iBuy—it is only the work that can readily be quantified using the data available. There is also significant work to create requisitions for one-time and standing order requisitions for print materials, manage standing order POs, and produce regular reporting on encumbrances and vouchers, which all take additional time away from other duties. But even so, iBuy has not been as disruptive as the library might have expected. Table 3 shows that the number of collections materials invoices RM handled for Bobst has declined 34.9 percent between fiscal years 2019 (the last fiscal year before COVID-19) and 2024. The number of invoices for one-time physical items (the large majority of which are purchased via standing order POs in iBuy) has fallen even farther, by 42.4 percent, while e-resources invoices have increased slightly. This decline in invoices processed has occurred even as the library continued to spend out its annual acquisitions budget. Investigating the factors behind this drop is outside the scope of this article. It is important to note here simply that the addition of iBuy to RM's responsibilities has taken place during a time when the number of payments to be made has fallen significantly and that this in turn has helped RM accommodate the substantial new work required by iBuy.

Benefits and Gaps Resulting from iBuy

RM's new work in iBuy provides vital benefits for the university and the library. iBuy's automation integrates data and invoices for the library's collections materials into campus systems and preserves them there long term. This work has not merely checked a new box required by the university. It has also brought important improvements for Bobst. The library now has better, more detailed reporting from iBuy and UDW+ on its expenditures, as well as easy access to digital copies of paid invoices. These benefits align with Rowland's findings about the benefits that ERPs brought to universities.

But unlike those ERP adoptions, iBuy's automation has not reduced manual data entry for the library. Instead, the library achieves iBuy's benefits by performing *new* manual data entry in a second system. With the exception of vouchers issued against membership/subscription and punchout POs, every task recorded in table 2 represents a new manual action taken by RM. In the meantime, the department continues all of its previous workflows for recording order, receipt, and invoice data in the ILS. The only difference in the ILS is the fact that updating the ILS invoice's status no longer initiates payment at AP. All of this work in the ILS continues to be necessary to meet the library's own needs for managing its inventory, preventing unwanted duplication, and producing reporting on spending that can be related to copy-level data in the ILS such as location, subject classification, and usage. iBuy is not designed to hold this data and cannot replace these functions of the ILS. In addition to producing new benefits, adopting iBuy has also opened a major workflow gap for the library between the ILS and iBuy, which has resulted in the additional work RM now performs to complete its purchasing.

Bobst has not yet been in a position to close this gap by pursuing integrations between the ILS and iBuy as envisioned by Breeding. Now that the library has completed its migration to Alma and had time to get to know it, RM has ideas for projects that might connect Alma and iBuy. These potential integrations will be discussed in the conclusion. In the meantime, RM has worked to minimize the gap between Alma and iBuy by adapting its own practices and workflows in four areas: spreading work out to more staff, maximizing automation in the ILS, building a process to coordinate work across the ILS and iBuy using the Airtable app, and creating an interdepartmental workflow for managing PO encumbrances. Some of these new efforts have been successful, although one of them has produced mixed results. As Rowland reported about university ERP adoptions, understanding and addressing the gaps between the new system and the library's existing workflows has taken ongoing time and effort at Bobst.

Distributing iBuy Work in Resource Management

Late in 2022, after the arrival of new supervisors and almost a year's experience using iBuy, RM began to train additional staff to distribute iBuy work more broadly within the department. Each of RM's units has taken its own approach based on its own needs and workflows. Speaking broadly, however, many employees across the department are now able to enter requisitions and receipts, verify invoices against their POs, submit invoices to AP, and monitor the status of the resulting vouchers. Achieving

this was a major effort that involved providing training in a variety of formats over an extended period to help each staff person achieve proficiency in the new system. RM's manager and supervisors wrote documentation, provided training in group settings and one-on-one, and followed up with frequent check-ins about proper procedures. The library's Budget Office also contributed documentation and provided refresher training of its own for RM staff. Bringing frontline unit staff onto iBuy has had several benefits. Employees are now more knowledgeable about the university's financial processes and have a better understanding of the relationship between the data in the ILS and the data in the university's central systems. RM has redundancy and flexibility around mission-critical purchasing workflows, allowing the department to cover gaps during absences and vacancies. RM's time-consuming manual tasks in iBuy are now spread out across the department, instead of having only a few people responsible for a large volume of repetitive but highly sensitive data entry.

Expanding Automation in the ILS

Now that many staff are working in iBuy, RM has used new automation in the ILS to free up time for them to spend on the department's new procurement tasks. Before adopting iBuy, RM already relied heavily on automated processes built by KARMS' systems department Data Analysis & Integration (DAI) to load a variety of bibliographic, inventory, and acquisitions metadata for both physical and electronic resources. Automating this data entry is especially important for the large quantities of print and electronic books that Bobst purchases, which would be prohibitively time-consuming to process otherwise. When the library moved to iBuy, DAI was early in a project to develop automated processes to generate records for the ILS by scraping data off of PDF invoices from print booksellers who do not provide MARC records. With the new work required in iBuy to purchase these materials, RM and DAI prioritized this automation. DAI worked quickly to expand the PDF scraping process to fourteen additional suppliers during the first six months on iBuy; this eliminated the need for staff to manually add data title-by-title to the ILS for their books. Around the same time, DAI also developed new processes to automate the ongoing work of comparing e-book holdings in the ILS against the library's lists of its entitlements and retrieving the correct records from OCLC WorldShare to load into the ILS. Previously, this was labor-intensive work that e-resources staff performed on one e-book collection at a time. The new automation was a significant project intended to achieve major benefits across multiple areas—but one of its most crucial results for RM has been opening up time for staff to spend on the new work necessary in iBuy to complete the library's e-book purchasing.

Using Airtable for Task Management for Standing Orders

With the proliferation of tasks required for standing order POs, RM became interested in finding a tool to coordinate all of the combined work necessary for their invoices and materials in iBuy and the ILS. The books and other materials supplied on these standing orders already required complex, time-consuming processing in the ILS, and the addition of a parallel workflow in another system felt almost overwhelming. Bobst's legacy ILS, Aleph, did not provide overviews of all of the invoices and

items in various stages of processing, which made it poorly suited as a tool for managing the large volume of this work continuously moving through the department. RM was familiar with the cloud collaboration platform Airtable from its use in KARMS' metadata department Knowledge Access (KA) to manage surrogate cataloging work for branch and consortia partner libraries. KA customized an Airtable instance in which other technical services units use an online form to submit images of materials needing cataloging, which are then turned into tasks that can be assigned to staff and tracked. This suggested the potential for a similar workflow in RM to collect PDF invoices and organize their receiving and invoicing work across both the ILS and iBuy.

RM met with KA to understand their use of Airtable and investigated the platform's options for integrating with other apps and for customizing automated processes. After extensive design work, RM implemented a workflow in Airtable that ingested PDF invoices from supplier emails, assigned the invoices to staff using automated rules, and let staff update the invoices' entries as work progressed in the ILS and iBuy. RM also integrated Airtable with an email application called Zapier so that staff could click a single button within Airtable to send an automated message to AP with the PDF invoice. RM understood that using Airtable would create its own work but proceeded in the hope that the platform would reduce the gap between iBuy and the ILS by providing a unified overview of work in both systems while also simplifying the process of routing invoices to AP.

In the end, however, the Airtable workflow has produced mixed results. First, unexpected problems arose with the email integration. During the design phase, RM had used Airtable and Zapier to send test emails with invoices that were all successfully ingested as vouchers. But when working at full scale, receiving staff found that many emails from Airtable were blocked by spam filters at AP, and the invoices were not turned into vouchers. Lengthy troubleshooting with campus IT did not resolve the problem, and receiving staff have had to resume manually handling the department's PDF invoices for standing order POs. For the period when Bobst was still using Aleph, its lack of functionality for tracking work meant that Airtable remained useful even without the email integration. Since then, the library has migrated to the next-generation platform Alma, which includes capabilities for monitoring queues of receiving and invoicing work and for storing PDF invoices. RM's initial analysis is that Alma may be able to fill some or all of the same needs as Airtable using data already in the library's system. Airtable has been an important part of RM's first two years on iBuy, but the department is now planning to reassess its use in the coming year and may retire it.

Encumbrance Management

Like other aspects of iBuy, PO encumbrances have brought benefits to the library while also creating new work that has required significant workflow adjustments. During the time the invoice export workflow was in use, the large majority of Bobst's collections materials purchases did not use university POs, which meant that most acquisitions funds were not encumbered before they were expended. The library managed its collections materials budget by monitoring expenditures and using spreadsheets to tabulate upcoming expenses. These spreadsheets required work to assemble, but this scenario also gave

Bobst considerable flexibility when it needed to change its spending plans. For example, if a supplier sent less approval material than expected, then the library simply paid for what was provided, used the unspent money on other materials, and worked with the supplier to address the drop in material.

With iBuy, however, funds are encumbered as soon as a PO is issued, meaning the money is committed in advance and cannot be used for anything else without a request to alter or cancel the PO. Encumbrances have simplified reporting on future spending, which can now be easily generated by using iBuy or UDW+ to produce data on all the library's open encumbrances. At the same time, the library has learned that encumbrances require active monitoring and maintenance throughout the year to make sure that funds are not tied up in incomplete or underspent POs. Any situation where a PO hits a snag, or where a standing order PO will not be fully spent down, must be identified and addressed promptly to complete the payment or release the unused funds. Standing order POs in particular generate a significant amount of work over the course of the fiscal year. Figure 4 illustrates how changes to spending on a standing order PO must be managed by making a request to change the encumbrance or even open a second standing order PO (if spending will be increased by more than 20 percent). RM must also now communicate with each supplier to cut off shipping on their POs approximately ten weeks before the end of the fiscal year to complete receiving, reconcile statements, have all invoices paid, and release unspent money with time left over to use it for something else. With more than fifty standing order POs to reconcile and close at the same time new ones need to be opened for the new year, this creates a crush of work for the affected supervisors at the end of the fiscal year. At the time of going live on iBuy, the library team knew that encumbrances would be a part of using the platform but did not anticipate all of their implications or the full scale of the work they would create.

After two years of experience in iBuy, the library has filled the gap with its previous workflows by building new internal processes to use encumbrances for the library's benefit. In Bobst's first annual cycle on iBuy, the library team was focused on training and assignments for the work of entering requisitions, receipts, and invoices. There were no specific workflows to establish who should produce reporting on encumbrances, when to request a decrease or increase to a standing order's encumbrance, who should communicate when with suppliers, or what scenarios constituted serious causes for concern. As a result, there was a constant churn of questions about how to handle specific POs that were too numerous and granular for the existing meetings where Collection Development, the Budget Office, and RM reviewed overall expenditures. In spring 2023, these three units began a separate cycle of regular meetings dedicated to reviewing PO encumbrances and addressing problems as they arose. Out of these meetings, a set of practices has developed for generating reporting, deciding on encumbrances for each new year's standing order POs based on collecting goals and past spending, communicating with suppliers, and resolving problems. These tasks have created considerable overhead on top of the day-to-day work of receiving and invoicing in iBuy, but the effort has paid off at the end of the fiscal year when POs are closed out on time, unused funds are available again, and Collection Development has accurate data on the remaining budget to be spent before fiscal close. At the time of writing, the library team is producing written guidelines that will codify these practices into a well-defined framework for ongoing interdepartmental management of this new and complex aspect of the library's purchasing.

Conclusion

More than two years on from Bobst's move to iBuy, the library has adapted to the platform and successfully spends out its annual collections materials budget through its workflows. As in the university ERP adoptions Rowland analyzed, Bobst has undergone a lengthy implementation lasting well beyond the original go-live date. iBuy has produced significant new benefits compared to the library's legacy payments workflow, which exported limited data from the ILS to the ERP and was opaque to staff outside technical services. Using iBuy has brought the library's collections materials purchasing into alignment with standard university workflows, integrated crucial data into campus systems on what has been purchased and who authorized it, and ensures digital copies of invoices are available long term. These are major improvements for the university and also for the library, which now has better access to information on its own spending while being relieved of its responsibilities for keeping a paper audit trail and maintaining the custom automation for the legacy invoice export workflow.

In other ways, Bobst's adoption of iBuy for collections materials purchasing has diverged from Rowland's findings. Rowland reported that new ERPs automated tasks that university employees were previously doing manually, freeing up their time for higher-level work. But at Bobst, iBuy's automation has not replaced the existing processes in the ILS. Instead, RM continues to carry out all of that work to meet the library's internal workflow and assessment needs, with the result that the library now does additional work to record each purchase twice in unintegrated systems.

Addressing this new work has required ongoing effort at the library to analyze problems, prioritize them, and develop solutions. Because using iBuy is a necessity, and Bobst has not yet been able to close workflows gaps through integrations between the two systems, the library has instead focused on updating its own workflows around collections materials purchasing. In some situations, this has taken the form of customizing its own processes to streamline and organize work, whether by adding new automation to reduce manual data entry in the ILS or by building a workflow in the Airtable app to simplify invoice handling and coordinate work between the ILS and iBuy. In other cases, Bobst has adapted itself to iBuy by training more staff in the university's standard processes and by building new workflows to manage PO encumbrances. This experience has aligned with Rowland's finding that an adoption of an outsourced system entails an extended process of filling gaps between the new system and the organization's past practices.

Even after these efforts, it remains the case that each new acquisition requires more time and work with iBuy. RM continues to do its same work in the ILS and now performs additional work on top of that to push the library's purchases through iBuy. This new work has added up significantly at scale, in particular for complex e-resources requisitions and for the large number of receipts and invoices that need to be processed for physical materials on standing order POs. Coincidentally, over the same time that the library has been using iBuy, the overall number of invoices RM handles for Bobst annually has fallen, which has helped RM complete the new work that iBuy requires while keeping a handle on its other tasks. Taking on new purchasing that would return invoicing to previous levels (with the requisite

work in iBuy) would be challenging for RM and could produce workflow bottlenecks, jeopardizing the new collecting goals.

To avoid this scenario, RM plans to investigate potential integrations between the ILS and iBuy over the coming years, as suggested by Breeding. The library team chose not to pursue integrations at the outset for two reasons. The team knew that the ILS at the time was missing crucial data that would be difficult to add and integrate with iBuy during the migration project. The team also knew that Bobst was about to embark on an ILS migration from Aleph to Alma, meaning that any successful integration would soon need to be rebuilt. Now that Bobst is more than three years into using iBuy and has completed its migration to Alma, RM has hopes to export order data from Alma to create requisitions in iBuy and also to hold PDF invoices in Alma and export them to AP as part of Alma's invoicing workflows, rather than emailing each PDF individually. These ideas will require discussion with P&P to determine whether they are compatible with university requirements, but RM is hopeful that new automation can bridge some of the remaining gaps between iBuy and Alma to free up staff time for other work serving the library's users.

A number of lessons that may be applicable to other libraries can be drawn from Bobst's experiences with iBuy. Changing procurement workflows for collections materials requires full attention and cooperation from relevant departments. Whether a library is adopting an outsourced platform for the first time or migrating from one platform to another, it should be prepared for an extended implementation process. Managers should expect gaps between the new system and prior practices that may have significant workflow impacts. These gaps may be apparent ahead of time or may come into focus only after adopting the new system—but either way, they will require time, effort, and collaboration to address. As a result, managers should budget adequate time for testing the system, writing documentation, training staff, and iterating workflows as the library learns from experience. Processes in the ERP or e-procurement system may continue to evolve over time. At the time of writing, NYU's P&P office has just announced new workflows around service-level agreements, insurance, and risk management that may require additional work from Bobst for some of its collections materials purchasing. Effective communication with colleagues in the campus procurement and AP offices is key. Library staff should take care to cultivate these relationships, help university procurement staff understand collections materials purchasing, and discuss any automation in advance (no matter how seemingly simple, such as RM's Airtable emails). Most importantly, library managers and staff should be prepared to embrace the benefits that the new system will hopefully provide, even when achieving them requires new or different work.

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