Mitigating Library Budget Cuts with Automated Materials Handling

At the Murrieta (Calif.) Public Library, soaring circulation and plummeting financial support led to a huge backlog of unshelved books and a number of repetitive motion injuries. Following the installation of a 3M™ Intelligent Return and Sorter System, the backlog was eliminated, injuries are down, and patron satisfaction is up.

Investing in productivity almost always requires discipline.

When times are good, there’s a temptation to apply resources to new services or new markets. When times are tough and productivity is desperately needed, most organizations—in both the public and private sectors—either don’t have the funds to invest or are reluctant to spend them.

Today, many libraries are facing the latter (tough times) situation. The demand for library services is soaring at the same time that library budgets are being slashed. Staff reductions are commonplace; services are being curtailed or eliminated; patron and employee satisfaction are at risk. If there was ever a scenario that called for labor-saving automation, this would be it. But some library boards and local governments are reluctant to make any capital investments.

Despite this understandable reluctance, a number of libraries have decided to invest in automated materials handling (AMH) equipment and their boards have reacted warmly to the spending plans. In part, the boards have acknowledged that libraries cannot continue to satisfy their role in the community without the additional investment; also, in part, they have been persuaded by evidence that AMH will often pay for itself (and begin generating a return on the investment) within a year or two.

Southern California’s Murrieta Public Library is a good case in point. It illustrates both the difficult economic circumstances facing libraries and the potential rewards of investing in productivity-enhancing technology.
The Problem
Even without the turmoil of a severe recession, the rapid growth of the Murrieta Public Library would have presented significant challenges.

The City of Murrieta was incorporated just two decades ago, in 1991. Since then, the community has grown dramatically. The public library, which was formed in 1999, moved from its original quarters to a new library building in 2007.

Between 2006 and 2009, the library’s circulation jumped from 160,000 to over 500,000. This tripling of its circulation was paralleled with an unbroken series of budget reductions between fiscal years 2006/2007 and 2011/2012, largely due to the recession. (Eighty percent of the library’s funding is tied to property taxes, which have been reduced as valuations have dropped.) Some reductions were double-digit, including a recent 11 percent cut from 2010/2011 to 2011/2012. Overall, the library’s budget was reduced 27 percent between 2006/2007 and 2011/2012.

The mix of rapid growth and deep budget cuts had a predictable impact on the library’s ability to serve its patrons. Staff was reduced: 140 weekly full-time equivalent hours were eliminated from the library’s workforce in the years after 2008. The library was able to fill some of the gap with volunteers and temporary workers, but high turnover in these groups created a continual need for training.

The library is dedicated to maintaining its hours of operation but for budgetary reasons was forced to reduce staff hours by two hours per person per week. As a result of this furlough, by 2010, library administrators estimated that an additional 24 work hours per week were lost. When added to the original 140 lost weekly hours, this totaled 164 hours per week of reduced staffing.

The reduced staff and budgets forced the library to eliminate some services (such as passport processing) and temporarily suspend popular programming, such as a children’s story time. “Story time was huge in our community,” explained Loretta McKinney, Director of Library Services.

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The library’s core functions were also affected. The most glaring impact was a massive backlog of items that needed to be reshelved; once an item had been returned, it was not reshelved for five to seven days. The wait for a requested item was typically five to 10 days.

To assist the overwhelmed circulation staff, all library staff, including the library director and associate director dedicated approximately one hour a day to sorting and shelving books; even these extraordinary methods were insufficient to keep the turnaround time from edging over a week. To maintain that minimal standard, the library twice in two years shut its doors for a full day, during which the entire staff was assigned to sorting and shelving.

The increased work load was also reflected in a significant increase in staff injuries. At one point in 2010, as a result of repetitive motion injuries, three circulation library assistants were on reduced hours or had been redeployed to other functions. These injuries also added to Murrieta’s budget woes: the library spent $55,000 to cover the injury claims over two years, set aside an additional $30,000 from its already depleted budget to handle ongoing and anticipated future claims due to repetitive motion injuries and had to hire four temporary part-time staff to assist with the workload.
The Response

Library staff experimented with new procedures for minimizing the impact on service. “We looked at all our processes to see what could be changed,” explained Elise Malkowski, who is the Principal Librarian. “For example, we set up a holding area for unshelved returns that we called ‘recent reads.’ The only thing that wasn’t on the table was more staff. We knew we had a freeze on new hires.”

Piecemeal changes in procedures were helpful but couldn’t address the central issue, which was the sheer physical effort required to sort and shelve the 1,100 items that were checked in every day.

“There were days when we had as many as 75 crates stacked up, with approximately 35 books in each.”

- Loretta McKinney, Director of Library Services

The Murrieta Public Library’s collection was already equipped with radio-frequency identification (RFID) tags for shelf maintenance and self-service checkout. McKinney was confident that an RFID-enabled AMH system would allow the persistent backlog to be eliminated and ensure that items would be reshelved more efficiently.

The staff researched potential suppliers and conducted site visits at five regional libraries that had already installed AMH systems. “We did our homework,” said McKinney. “We wanted to see what their experience had been, what the pros and cons were, how much maintenance each system needed, the affect on staffing and so on.”

The Expectations

Library staff anticipated specific benefits from an investment in AMH:

- **Systemic efficiency improvements:** The manual sorting system required five moves and six touches by library staff. (“And in some instances, we might touch an item as many as 12 times,” said Circulation Supervisor JoLene Vert.) It was anticipated that the AMH equipment would streamline the system, resulting in a single move and about half the number of touches.

- **Backlog:** With this improvement in efficiency, staff expected that the significant backlog of returned items would be eliminated.

- **Turnaround:** With the installation of AMH equipment, staff anticipated that returned items (from other libraries or from patrons) would be checked in the day of the return and reshelved within 24 hours.

- **Holds:** Similarly, hold requests should be filled within 24 hours (instead of the then-typical five to 10 days).

- **Staff injuries due to repetitive motion:** Staff expected that the equipment would help lead to a reduction of injuries but this effect was not quantified.

- **Compatibility with multiple circulation systems:** Interlibrary loans typically account for 16 percent of the Murrieta Public Library’s circulation (and at times can approach 25 percent). For an AMH system to be truly useful, it would have to be capable of reading RFID tags from other libraries, which might reflect any of several data tag standards.

- **Acceptance:** Staff and patrons were eager for (and yet concerned about) change. Because they have been receptive to new technology in the past, staff and patrons were expected to embrace an AMH system that was quiet, reliable, efficient and easy to use.
The Decision
After completion of their research, the staff selected a 13-bin 3M™ Intelligent Return and Sorter System FX from 3M Library Systems. This decision was guided by several criteria:

- **Size and flexibility**: The library had limited space that could be dedicated to AMH equipment. (When the new building was being planned in 2006, McKinney said, the library decided to invest in RFID “but automated materials handling wasn’t on our radar. We knew we’d be growing significantly but we thought we’d have the staff to cover it.”) Because there wasn’t a large space for the AMH equipment, the size and flexible configuration of the 3M system were primary considerations. The preferred location for the AMH equipment was an underutilized conference room directly behind the circulation desk. Even though the 3M system incorporated two induction points and 13 bins, it could be configured and installed in this limited space without major remodeling.

- **Aesthetics**: The equipment’s appearance also weighed heavily in the decision-making. Because the system was to be installed behind the circulation desk, where it would be visible to patrons, staff paid close attention to both the appearance and operating noise of the equipment they reviewed. “I love that the 3M system looks like it belongs and not like an erector set, the way some of the other systems do,” McKinney said. “I like for people to see it.” She added that the system’s quiet operation meant that additional soundproofing was not required.

- **A separate staff induction unit**: A convenient staff induction unit was deemed to be very important. “The circulation staff takes all the books that come through the outdoor book drop and puts those into the sorter through the staff induction unit,” explained Vert. “The staff induction unit means, first, that we don’t have to handle an item more times than is necessary. Also, it means that we had a separate area where we can work. When you are sharing a work area with the public, people will often interrupt your flow of work. With our separate unit, we can see them and we can help them if they need it, but we aren’t in their way and they aren’t in our way.”

- **Return on investment**: “We knew it was going to be a huge help, given our experience and what we saw in our research of bin sorter systems,” McKinney said. “We could figure that out very quickly.”

- **Maintenance requirements**: “One of my great concerns was maintenance,” McKinney said. “I wanted to know if we needed to have the oil can right next to it, like the Tin Man in The Wizard of Oz. It seemed like some systems were more high maintenance than the 3M model. The cost of maintaining and repairing all our equipment comes from the library’s annual budget, and we have to watch those funds very closely.”

- **Compatibility with multiple circulation systems**: Because interlibrary loans account for so much of the Murrieta Public Library’s circulation (typically about 16 percent), the 3M system’s ability to read the varying data standards used by other library systems’ RFID tags was a particularly attractive feature (and one that was not available on the other systems that were considered).

A final consideration was the existing relationship with 3M, which is the supplier for the library’s RFID tags, a 3M™ Digital Library Assistant, self-service checkout kiosks, staff workstations and detection gates. “You know you’re going to get a great product and great service with 3M,” said Director of Library Services McKinney.

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Results
The 3M Intelligent Return and Sorter System FX was installed in early 2011. Installation required a modest remodeling effort, during which the library made additional changes to the configuration of its command center and self-service checkout area. (The total cost of all remodeling was approximately $25,000.)

A number of important expected results were achieved in a very short time:

• **Systemic efficiency improvements**: As anticipated, the AMH system streamlined the library’s work flow, resulting in a single move and three touches for each returned item. (Previously, the manual sorting system required five moves and six touches for each item; in some cases, an item would be touched as many as 12 times.) “Everybody on the staff recognizes that it has really increased our productivity,” Malkowski said.

• **Backlog**: The demoralizing backlog (often nearly 40 crates, at times over 70 crates) of unshelved items was eliminated almost immediately.

• **Turnaround**: With the elimination of the backlog, items were checked in the day they were returned and available to patrons within 24 hours.

• **Holds**: Hold requests were also filled within 24 hours. This achievement affected patron satisfaction as well as staff productivity, McKinney explained: “The holds issue was critical for our patrons. If we couldn’t get a requested item on the shelf in a reasonable period of time, the patron would lose interest. When we finally got it on the shelf, they wouldn’t bother to pick it up. Eventually, those items become what we call a dead hold. We have to retrieve those dead holds and reshelve them. Today the holds are on the shelves quickly and patrons are picking them up in time. We don’t have all those dead holds anymore, so we’re not spending a lot of time responding to a request, moving the item to the holds shelf and then reshelving it. This isn’t a matter of what we believe or feel, it’s a fact. It’s very tangible. All of it can be documented.”

• **Staff injuries due to repetitive motion**: McKinney stated that the library can already demonstrate a reduction in repetitive stress injuries. “Again, this is not a case of what we feel or believe,” she said. “We can already see an actual cause-and-effect relationship between the installation of the sorter and the reduction of staff injuries. We were getting staff complaints regularly. We would send them off to urgent care for their wrists, elbows and hands. Sometimes, we would lose a couple of people a day. Several of them had surgeries. Since the 3M sorter was installed, that’s stopped. We haven’t sent anyone to urgent care. That’s documented.”

Vert added that the equipment is not a panacea, but its ability to lighten the staff’s workload was obvious: “You can have some repetitive motion injuries in any activity, but this equipment really helps minimize the physicality of what we do. We’re not moving four 50-pound crates of books on a dolly. We still handle items, but we handle them one to three times, whereas before it might be up to 12 times. That’s a huge difference.” In addition, staff spends less time repeating the same activities, which allows greater recovery time.

• **Compatibility**: To achieve full compatibility with other tags in use in the county, the system needed to access the county library system’s security firewall. The county library was slow to grant this access, but the issue was resolved and the system is now able to read tags that are attached to items received through inter-library loans.
Return on investment: The 3M AMH system already allows staff to be re-allocated to activities other than check-in and sortation; it is expected to result in positive savings by year two. Speaking about six months after the installation was completed, McKinney said, “We feel like our money was extremely well spent. When you consider the cost versus the benefits—including the impact on injuries, worker’s compensation and salaries—we’ve already got our money’s worth.”

Acceptance: Staff and patrons have embraced the new AMH system.

Staff find the system to be reliable and intuitive. McKinney added that staff members feel “almost a personal connection” to the equipment. “It’s like having another person back there,” she said. “If it ever shuts down, we kind of panic because we’ve come to rely on it so much. We don’t want to handle the materials in the old-fashioned way. When we say it would be painful to go back, it’s both a figurative and a literal assessment. Without this, we’d be back to the days of handling and lifting and staff injuries.”

Patrons have also responded well to the new system. They were particularly pleased with the system’s receipt function, which provides verification that items have been recognized by the library information system. “Our patrons are very vocal,” Vert said. “They tell us when they like something and when they don’t. Once they get how the system works and how it benefits them, they love it. They tell us it’s wonderful. The kids love it and they love to watch it work. The main negative is that people have a perception of the machine as something that will make their interaction with the library less satisfying, that they won’t be interacting with a human. Then we reassure them we’re still here and they can still talk to us.”

The staff also pointed to benefits that hadn’t been detailed in their expectations for the new system. “For example,” Vert said, “the accuracy of the machine helps raise the accuracy of the library. We are juggling so many balls all the time and when you’re doing that, it’s just human nature that you’ll drop one.

Because the sorter eliminates one of the balls we have in the air, it’s improved our accuracy in other areas. We’re less likely to shelve an item that hasn’t been checked in. That used to happen with some frequency. We were making more errors because of the sheer volume of what we were handling every day.”

McKinney noted that overall patron satisfaction was up “because the books are on the shelves now. They used to be loaded on carts in the back room and not accessible to patrons. When a patron wanted a book that had been checked in but wasn’t shelved yet, we’d have to go to the back room and find it on one of the carts, which could take a long time... and meanwhile people are waiting at the desk for service. That’s not happening now. The carts are empty. The books are on shelves.”

Vert concurred and added that staff morale had also improved. For the circulation staff, some of the change in satisfaction can be traced to the greater variety in their daily activities and the much higher rate of self-service checkouts. (During the remodel, the self-service checkout area was revamped; as a result of the reconfigured traffic flow and enhanced presentation, the self-service rate has nearly doubled, from 39 percent to 75 percent.) This increase in self-service frees up staff for other tasks.

The improved staff satisfaction can also be attributed to the system’s ability to help reduce the stress on employees. “It was demoralizing to walk in every day past the stacks of crates filled with unshelved items,” Vert said. “We kept falling behind with no hope of catching up. We were always the ones asking for help. Now I feel like we’re accomplishing something and it’s nice to be able to help out the other areas for a change.”

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