

Decision-making considerations for automated sortation equipment

Logistical

Intended outcome(s)

- Clearly articulate the benefits and efficiencies expected for both customers and staff as a result of installing the equipment.

The project triangle

- Small, cheap, complex: Pick any two.

Bins and sort matrices

- Determine the break-even point, balancing the number of bins and sorts that will make a difference against equipment costs and the availability and cost of the physical space the equipment requires. This calculation will vary from service point to service point and is tied in to the intended outcome(s) for the installation.
- Each service point will need to determine its optimal sort matrix based on local needs such as the intent of sorter operations (e.g., to speed shelving locally, to speed returns to other locations, to fill holds) and physical conditions (e.g., number of floors, organization and constituent items of collection).
- Sort matrices will differ for single and multi-floor locations.
- Install the maximum number of bins possible: the more bins, the finer the sort and the greater the available options.

Floating or static collections

- Whether or not the collection floats will have an impact on the number of bins desired and the types of sorts you select for them. Floating items reside where they are returned rather than being shipped to a “home” branch, so even with an identical volume of materials returned, a floating collection will result in bins that fill faster and more materials requiring local shelving, faster, than would a static system. A floating collection will require more staff time for shelving materials as well as equipment such as book trucks and spare bins than a non-floating collection.

Available equipment and manufacturers

- Investigate *all* available vendors and options. Have other models and/or manufacturers come onto the market since the initial sorter installation with greater functionality than existing sorters?
- Off-the-rack sorters will be less expensive, and also less flexible, than a custom system.
- Budget and physical space will dictate choice(s).

Financial

Cost per manual check-in vs. cost of equipment

- Express the difference in FTEs, representing the number of staff positions that could be moved and/or changed.
- Compare the cost of a sortation unit plus monies saved through staff reduction/changes to the cost of a SmartChute.
- During initial stages of sorter implementation, it may be advisable to “staff up,” possibly through temporary positions, to ease the transition in workflow and to have adequate support available to troubleshoot initial challenges.
- EPL generally assumes a 30% increase in facility use following a renovation project.

Space cost per square foot

- Calculate cost of additional land/leasehold space plus all aspects of required construction.
- Be aware of the limitations, if any, that installing a sorter will place on future spatial reorganization and development of the service point at which it is installed.

Total cost of ownership, including maintenance

- Include purchase cost and ongoing costs for maintenance and upgrades.
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Maintenance/support

- Weigh the benefits and liabilities of in-house vs. outsourced/vendor-provided tech support.
- Whether or not support is provided in-house, will additional FTEs and/or staff training be required as a result of installing sorters?
- Will vendor-supplied maintenance and support be timely enough to meet the Library’s needs, particularly as more sorters are installed? What is the turnaround time for response to service calls?
- How many service technicians are trained in library sorter operations and are available to call upon? What geographical territory do these technicians cover? As more machines are installed in the territory, demand for technician time will increase. Is the vendor prepared to expand the number of available technicians as you expand the number of sorters and/or the number of sorters in their territory increases?
- Evenings and weekends are traditionally the busiest times for libraries. Does the vendor provide service coverage during traditionally non-business hours? If so, at what additional cost?
- What is the frequency of the preventative maintenance schedule? How long will preventative maintenance procedures take, i.e., how long will the machines be unavailable for use due to scheduled service?

Workflow

Staff complement

- Automating returns may affect the FTE requirement at new locations. Review any standard staffing calculations for new branches to reflect the inclusion of sorting equipment.
- Automating returns will mean a redistribution of the work required for check-in and may not result in FTE savings. While staff will not be checking in materials themselves, it may not be possible to repurpose the time spent on check-in prior to sortation to public service. Instead, the time may be required for other administrative tasks associated with the sorter such as monitoring the equipment, preventing uneven distribution of material in bins, removing items from bins, changing bins, shelving returned items, etc. Automating returns may facilitate making changes to the composition of branch staff complements: e.g., fewer positions in clerical-level classifications, more positions in paging positions.
- Sortation equipment may require a “machine expert” portfolio, assigned to one or more staff members and affecting their availability to do other work in the branch. The impact of this role may be greater initially, and lessen over time as all staff members become familiar with the equipment and its operation.

Independent operation of sorter

- In high-volume locations it may not be possible to leave the sorter unattended. In lower volume locations (or at lower-volume times of day), it may be possible to leave the sorter to operate without an attendant. The sorter’s alarm system needs to be configured so that staff are alerted when issues occur during unattended times.

Staff acceptance

- Your mileage may/will vary. As with most technology, there will be early adopters, those who take longer to accept and support it, and those who will maintain a negative attitude toward it for long periods. With time, attitudes can change.
- Prolonged and/or repeated downtime will negatively affect staff attitudes towards, and acceptance of, sortation equipment.
- Staff “ownership” of new technology and willingness to tweak, themselves, before making a service call, will develop over time as their understanding of the machines and their operations grows and their confidence/competence/understanding of the technology develops.

Ergonomics

- Staff may experience soft-tissue injuries, even with sorters. The nature of check-in work will change, but there are many opportunities for repetitive strain injuries, including (but not limited to):
 - Lifting materials to place them in the staff induction unit
 - Moving/manipulating bins full of material
 - Bending and reaching into bins to remove materials to be placed on book trucks
- Noise control may be an issue – even if the machine itself operates quietly, other controls may be necessary, such as pads or mats inside bins to dampen the noise as materials fall into them.

Physical

Size of location

- Install sorters in larger facilities initially: these are generally locations with larger collections and higher circulations, serving larger populations than smaller locations.

Renovations to accommodate equipment

- Where does the branch fall on the capital projects roster? If a project is upcoming, consider accelerating the timeframe; if it is not slated for renovations or has recently been renovated, another service point may be a better candidate.
- How extensive are the renovations required to accommodate the equipment? Service points with minimal required renovations are stronger candidates for those requiring large projects.
- How extensively will the facility need to be physically reorganized, if no renovations are necessary, to accommodate the equipment? Will movers be required?
- Will electrical and/or network ports need to be relocated? Will additional ports be required?
- Will the electrical load capacity for the service point need to be upgraded to prevent blown fuses/overloaded circuits?
- What changes will be required to the HVAC system to offset the heat generated by the machine during standard operation? The equipment gives off a great deal of heat and greater cooling capacity and busy staff trying to keep up with the sorter tend to work up a sweat doing so, so increased HVAC capacity and localized HVAC control in the sorter area is recommended.
- Will the installation of the sorter affect compliance with applicable building codes?
- In leasehold installations, consider what renovations are acceptable to the landlord, and the restrictions of the existing rental/lease agreement, e.g., encroachment of equipment upon common space, requirement to provide refuse containers for bags and printouts.
- Will installation of the equipment require a change in flooring? Bins move most easily on hard-surface floors; carpeting adds to friction and makes bins more difficult to manipulate.

Customer interface location

- The return port(s) used by customers must be located in logical, visible, convenient, obvious, and spacious locations; they must also be visible from, and convenient to, the service desk to allow staff to help customers quickly and reduce/eliminate potential customer frustration with the technology.
- Install alternative return port(s) adjacent to the sorter to accommodate customers who are not willing or able to use the sorter, and to provide alternative return mechanisms when the sorter is not operating. Ideally, the alternative return port(s) should feature Smart Chutes so that materials are checked in upon return, regardless of when staff are able to process them through the sorter.
- If the alternative return port(s) location is not adjacent to the sorter, consider the impact on branch operations – such a set-up would require staff to move material through the building or duplicate processing facilities.

- At locations where customers are not required to enter the building to return items, their visits will not be recorded by the Library.

Proximity to key work areas

- How close is the available space for the sorter to the area(s) where materials are handled by staff, such as the delivery area and the staff workroom? Will it require materials to be transported from one place to another for processing? If so, renovation or construction may be required, or another location may be a better choice for the equipment.
- Locate the office of the supervisor responsible for the staff members working most closely with the sorter near the equipment, so that s/he can easily sense stress levels and help out with jams or failures. Staff members are more likely to ask for help when it is nearby than when they have to seek assistance from someone elsewhere in the facility.

Visibility

- Consider making sorter operations visible to customers: they often find behind-the-scenes activities and equipment to be fascinating, and enjoy seeing “their tax dollars at work.”
- Be aware when designing this visibility, however, that staff may not appreciate being visible to the public while in a staff-only area, though they quickly become accustomed to it.

Customer training

- Staff time will be required, both initially and ongoing, to train customers in the use of the new equipment and the new procedures for returns. The load will be higher at the time of installation and will diminish over time.
- Customers and staff are more likely to accept changes to return procedures when the branch is new or has been extensively renovated than if the facility has changed little to accommodate the sorter. In a new or substantially renovated building, the sorter is just one of many procedures and likely all physical pathways through the facility that have changed and that customers and staff will need to re-map. It can be harder for them to let go of “old ways” if the facility has remained largely or completely the same following sorter installation.

Equipment

Total physical space requirement: equipment, maintenance, daily operations

- Adequate clearance is required on *all* sides of the equipment to allow staff/maintenance access and easy manipulation of components (e.g., receiving bins), both empty and full. Consider vendors’ stated “minimum” requirements as starting points only.
- All components of the machine must be easily accessible. They must not require people to crawl on the floor to reach them.
- All components of the machine must be easily accessible for cleaning: the sorting equipment attracts and collects a great amount of dust.
- The area around the sorter must accommodate more than one staff member to work with the equipment at a time.

- Full bins can be more difficult to move and turn, requiring more space for manipulation than empty ones.
- Include adequate space nearby to store additional equipment, e.g., book trucks, empty sorter bins, delivery bins.
- Include adequate space nearby for admin computer stations to serve as backup support when the system is not working.
- Consider the equipment's future expansion/modularity at the project's outset: many sorters can be enlarged by adding components. Allocate space enough for expansion initially if the intention is to add to the equipment at a later time.
- The customer activity monitor and any warning lights should be visible from all areas of the room in which the equipment is installed. Audible problem alarms should be installed wherever possible.

Maintenance access “sidedness”

- Sorter equipment may require greater clearance on one side than another to access components for routine or emergency maintenance.
- Inquire with the vendor: it may be possible to adjust the equipment to suit the available space, particularly in custom builds.

Straight lines

- Straight-line sorters are preferable to those with more complex conveyor belt paths: a straight-line installation will be simpler and less expensive than one requiring curves or turns in the path that materials take through the machine.

Environment

- Determine whether the equipment requires specialized temperature, climate and/or dust control during normal operation. Check the equipment's noise levels during operation, ideally in person at an existing installation, to determine whether noise controls are required, and their required extent.

Reliability/robustness

- New installations will experience growing pains. Downtime will be high initially and will decrease over time.
- For true 24/7 operability, equipment must be fail-safe. Be aware of the sorter's inherent limitations: under what conditions does it stop accepting returns? At what point does a return bin register “full” and need to be emptied for the sorter to continue working? Under what circumstances does the sorter stop accepting returns?
- Ensure that there are fallback tools available for times when the system goes down, e.g., manual book drops, downtime procedures that are understood by all staff members.

Operational

Hours of service

- Install sorters first at service points with the greatest number of public service hours.

- Wherever possible, install sorting equipment with customer access on the exterior of the facility to permit 24/7/365 operations, potentially reducing the need for staff to clear bookdrops when the library is closed to the public, e.g., statutory holidays

Circulation and visit volume

- Install sorters first at locations with the highest return volumes, likely the branches with the largest collections and greatest number of customers.
- Install multiple customer interfaces at higher-volume locations to accommodate high return volumes and requirements of sortation equipment (one-at-a-time returns; slower operation than standard gravity-fed bookdrops).

Customer goodwill

- Will customers be willing to wait in line to use the self-service check-in? What is the “critical mass” at which customers will choose to bypass the sorter and return their material as quickly as possible through a standard bookdrop?
- Customers will notice large/repeated downtime incidents and will ask why the library bothered to install the equipment.

Population/population density of catchment area

- Place sorters in locations where the greatest population is served and the facility is convenient to the largest number of people.

Expected growth in catchment area

- Place sorters in locations serving neighbourhoods in which population and development are trending upwards rather than experiencing plateaus or declines.

Proximity to other service points with sortation

- It may or may not be worthwhile to have two sorter facilities near one another.
- Consider moving an existing sorter from existing branch to a new/renovated branch rather than installing another unit, if more space is available, higher volume of return is expected, etc., at the newer facility.

Proximity to other service points (new facilities)

- Investigate the effect that the new location will have on traffic at existing locations nearby. Service points with greater expected “pull” are stronger candidates for sortation.

Location and surroundings

- Consider the service point’s proximity to other draws and anchors in the community, e.g., malls, community centres, major roads/intersections; the availability of free parking; and the library’s general visibility. All of these factors will affect library use and circulation, and therefore the argument for or against installing sortation equipment.

Other considerations

Collective Agreement/job descriptions

- Existing documentation may require adjustment following the implementation of sortation equipment to reflect the changed nature of work for some job classifications.

Blueprint accuracy

- Check for complete accuracy early on and throughout planning/building process.

Centralized vs. multiple installations

- Weigh installing multiple individual sorters in multiple locations against concentrating sortation monies at a centralized facility or several “hub” facilities (e.g., one for each quadrant).
- Such installations would require significant changes to work procedures at the branch level, and would incur increased cost and effort to transport materials between facilities.