Decision-making & decisions in a digital age: EPL’s decision-making model for automated sortation

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“The staffing and material handling benefits of Self-checkin combined with sorting units is dramatic. This backroom work is absolutely necessary, but is invisible, involves no customer interaction and mistakes can create customer service problems. **It is the team’s recommendation that all future renovations or expansions allow for room for Self-checkin and sorting. Ideally the same sorting unit could deal with internal and external returns.**”

EPL’s RFID Investigation Team final report, May 2005
Foch (fōsh), Ferdinand, of France; commander, Allied Armies on the Western Front, World War I.

fo'c's'le (fōk'səl) n. the forward section of a ship, below the forecastle.

focus (fō'kəs) n. pl. fo-cusses or fo-ci (fō'sə) 1. The point to which all light rays parallel to a principal axis converge. 2. The point to which rays of sound parallel to a principal axis converge.
Hard considerations
• Space: available, more required, layout, location?
• Renovations? Reorganization?
• Acceptable leasehold improvements
• Position on capital projects list?
Measuring up
• Activity cost benchmarks
• Anticipated cost savings (if any)
Financial: TCO
• Equipment price
• Additional space
• Renovations
• Installation
• Maintenance
• Upgrades
• Depreciation
• Replacement/life expectancy
Statistics
• Activity levels
• Population/density
• Expected growth
## Financial Calculation Sheet for EPL Sorter Decision-Making Model

<table>
<thead>
<tr>
<th></th>
<th>Candidate Locations</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td><strong>Additional physical space required for sorter</strong></td>
<td>100.00</td>
<td>-</td>
<td>400.00</td>
<td>200.00</td>
</tr>
<tr>
<td><strong>Cost per square foot</strong></td>
<td>$50.00</td>
<td>$60.00</td>
<td>$80.00</td>
<td>$65.00</td>
</tr>
<tr>
<td><strong>Acquisition costs of additional land/leasehold space</strong></td>
<td>$5,000.00</td>
<td>-</td>
<td>$32,000.00</td>
<td>$13,000.00</td>
</tr>
<tr>
<td><strong>Annual rental/lease cost of additional leasehold space</strong></td>
<td>-</td>
<td>$18,000.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Construction/renovation costs to accommodate sorter</strong></td>
<td>$25,000.00</td>
<td>$15,000.00</td>
<td>$10,000.00</td>
<td>$15,000.00</td>
</tr>
<tr>
<td><strong>Cost of public space lost by installation of sorter (square footage x lease)</strong></td>
<td>$10,000.00</td>
<td>$1,200.00</td>
<td>-</td>
<td>$5,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$40,000.00</td>
<td>$34,200.00</td>
<td>$42,000.00</td>
<td>$33,000.00</td>
</tr>
<tr>
<td><strong>Initial cost of sortation equipment</strong></td>
<td>$70,000.00</td>
<td>$90,000.00</td>
<td>$70,000.00</td>
<td>$110,000.00</td>
</tr>
<tr>
<td><strong>Cost of installation</strong></td>
<td>$10,000.00</td>
<td>$10,000.00</td>
<td>$10,000.00</td>
<td>$10,000.00</td>
</tr>
<tr>
<td><strong>Annual cost of maintenance</strong></td>
<td>$5,000.00</td>
<td>$7,000.00</td>
<td>$5,000.00</td>
<td>$9,000.00</td>
</tr>
<tr>
<td><strong>Annual cost of upgrades/extras</strong></td>
<td>$1,200.00</td>
<td>$1,400.00</td>
<td>$1,200.00</td>
<td>$1,600.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$86,200.00</td>
<td>$108,400.00</td>
<td>$86,200.00</td>
<td>$130,600.00</td>
</tr>
<tr>
<td><strong>Total costs associated with sorter installation</strong></td>
<td>$126,200.00</td>
<td>$142,600.00</td>
<td>$128,200.00</td>
<td>$163,600.00</td>
</tr>
<tr>
<td><strong>Annual check-ins at service point</strong></td>
<td>50,000</td>
<td>65,000</td>
<td>40,000</td>
<td>70,000</td>
</tr>
<tr>
<td><strong>Benchmark time required per manual check-in (minutes)</strong></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Annual time spent on manual check-in (minutes)</strong></td>
<td>10,000</td>
<td>13,000</td>
<td>8,000</td>
<td>14,000</td>
</tr>
<tr>
<td><strong>Annual cost of manual check-ins (LA, step C)</strong></td>
<td>$257,300.00</td>
<td>$334,490.00</td>
<td>$205,840.00</td>
<td>$360,220.00</td>
</tr>
<tr>
<td><strong>Benchmark time required per automated check-in (minutes)</strong></td>
<td>0.15</td>
<td>0.15</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>Annual time spent on automated check-in (minutes)</strong></td>
<td>7,500</td>
<td>9,750</td>
<td>6,000</td>
<td>10,500</td>
</tr>
<tr>
<td><strong>Annual cost of automated check-ins (LA, step C)</strong></td>
<td>$192,975.00</td>
<td>$250,867.50</td>
<td>$154,380.00</td>
<td>$270,165.00</td>
</tr>
<tr>
<td><strong>Potential annual time saved by installation of sorter (minutes)</strong></td>
<td>2,500</td>
<td>3,250</td>
<td>2,000</td>
<td>3,500</td>
</tr>
<tr>
<td><strong>Potential annual cost saved by installation of sorter</strong></td>
<td>$64,325.00</td>
<td>$83,622.50</td>
<td>$51,460.00</td>
<td>$90,055.00</td>
</tr>
<tr>
<td><strong>Approximate time required to achieve 100% ROI of first year’s expenditure (years)</strong></td>
<td>1.96</td>
<td>1.71</td>
<td>2.49</td>
<td>1.82</td>
</tr>
<tr>
<td><strong>Maximum number of bins/sorts that can be accommodated</strong></td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td><strong>FTEs</strong></td>
<td>11.5</td>
<td>12.3</td>
<td>9.2</td>
<td>10.6</td>
</tr>
</tbody>
</table>
Logistical

• Intended outcomes
• Project triangle: small, cheap, complex
• Bin numbers/sort matrices
• Floating/static collections
• All manufacturers, equipment, options
Financial
• Manual vs. machine check-in
• Space
• TCO
• Maintenance
Workflow
• Staff complement: adjust standard
• Redistribution *may* result in FTE savings
• “Machine expert” portfolio
• Independent operation unlikely
• Staff response: YMMV
• Ergonomic advantages?
Physical
• Size
• Renovations
• Customer return location
• Proximity to key areas, individuals
• Customer training
Equipment
- Physical space requirements
- Future expansions
- Visibility
- Straight lines: good
- Environmental controls
Operational

• Hours of service
• Activity volume
• Population/density/growth
• Proximity
• Customer goodwill
• Location and surroundings
Other
• Collective Agreement/job descriptions
• Blueprint accuracy (Otto)
• Centralized vs. multiple installations
Percentage of check-ins performed by sorter, sorter locations only

- January: 89%
- February: 89%
- March: 63%
- April: 59%
- May: 64%
- June: 67%
- July: 78%
- August: 85%
- September: 87%
- October: 89%
- November: 89%
- December: 88%
Percentage of check-ins processed by sorters, system-wide

- **January** 56%
- **February** 35%
- **March** 37%
- **April** 34%
- **May** 37%
- **June** 36%
- **July** 42%
- **August** 46%
- **September** 50%
- **October** 52%
- **November** 53%
- **December** 54%
Lessons learned

• Processing speed
• Return ports
• Cushions
• “Care and feeding”
• Item-specific issues