How to Calculate AS/RS ROI: Key metrics that often get overlooked

Presented by:
Mohan Ramankutty
Andy Lockhart
Daniel Labell
Presenters

Andy Lockhart
VP Sales, Integrated Systems
TGW Systems Inc.

Mohan Ramankutty
Senior Director – Design & Development Americas Technology Center
Swisslog Americas

Daniel Labell
President,
Westfalia Technologies, Inc.
Who we are

- Leading automated storage/retrieval systems suppliers
- Mission: To deliver remarkable value to our members, channel partners, industry associates and end users, by creating the awareness and market growth of Automated Storage and Retrieval Systems (ASRS) technologies
<table>
<thead>
<tr>
<th>Equipment Manufacturers/Suppliers</th>
<th>Component Suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoStore</td>
<td>Lenze</td>
</tr>
<tr>
<td>Dematic</td>
<td>Sew Eurodrive</td>
</tr>
<tr>
<td>Electric80</td>
<td>SICK</td>
</tr>
<tr>
<td>Hänel</td>
<td>Siemens</td>
</tr>
<tr>
<td>Interlake</td>
<td>Modula</td>
</tr>
<tr>
<td>Kardex Remstar</td>
<td>KNAPP</td>
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<tr>
<td>KNAAP</td>
<td>Swisslog</td>
</tr>
<tr>
<td>MIAS Group</td>
<td>TGW Living Logistics</td>
</tr>
<tr>
<td>Modula</td>
<td>Vanderlande</td>
</tr>
<tr>
<td>Muratec</td>
<td>Siemens</td>
</tr>
<tr>
<td>Sencorp White</td>
<td>SICK</td>
</tr>
<tr>
<td>Westfalia</td>
<td>Siemens</td>
</tr>
<tr>
<td>Mecalux</td>
<td>Siemens</td>
</tr>
</tbody>
</table>
Agenda

• Why are you here?

• So you need financial justification?

• What are the traditional justifications in today’s typical ROIs?

• What are the lesser known ones?

• Summary
Why do you need a justification

• Capital Spend for Automation

• Improving the operational efficiency of the fulfillment operation

• Improve Customer Promise

• Dealing with SKU growth and SKU churn
How do you go about building the case

• What are Automated Storage and Retrieval Systems
• Why ASRS is relevant for your business
• What type of justification do you need – speak the right language
  • ROI / TCO / IRR / Break Even / NPV / Amortization out
• What are the key drivers for the business that ASRS automation addresses?
ASRS Justification

• WHY Storage Automation?

• HOW much automation?

• WHERE - Brown Field Vs Green Field?
WHY
Storage/Retrieval Automation

- Direct and Indirect labor savings
- Optimized worker ergonomics
- Increased safety
- Enhance organizational performance culture
- Maximize order fulfilment rate
- “Software” driven operations
WHY Storage/Retrieval Automation

- Smaller building footprint
- Reduced cubic space/ Energy savings
- Control of downtime
- Forces Operations discipline
- Eliminate/reduce physical inventory counting
WHY
Storage/Retrieval Automation

- Improved Order Accuracy
- Improved product integrity (less damage/pilferage)
- Control of “quarantined” product
- FIFO inventory rotation
ASRS Justification

• WHY Storeable?

• HOW much automation?

• WHERE - Brown Field vs Green Field?
ASRS Justification

• WHY Storage Automation?

• HOW much automation?

• WHERE - Brown Field Vs Green Field?
ASRS Justification

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ASRS Justification

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• HOW much automation?
• WHERE - Brown Field Vs Green Field?
ASRS Justification
Brown Field Vs Green Field

Brown Field Advantages:

- Lower Capex
- Same geographic footprint
- Known transportation costs
- Known labor market
- Faster realization timeline
ASRS Justification
Brown Field Vs Green Field

Brown Field Challenges:

- Existing building with columns and obstructions
- Irregular shaped floor space
- Sloped or stepped ceilings
- Floor conditions – level, concrete strength
- Disruption of current operations
ASRS Justification
Brown Field Vs Green Field

Green Field Advantages:

• Optimal geographic location choice (nearer to customer/supplier base)
• Lessened footprint limitations
• Selection based on capacity and/or throughput
• Flexible layout options (internal and external to warehouse)
• Expansion options planning
ASRS Justification
Brown Field Vs Green Field

Green Field Challenges:

• Higher Capex
• Longer realization timelines
  • Acquisition
  • Permitting
  • New construction
  • Weather factors
• New location – labor market, transportation costs
Lesser known, yet, impactful factors for ROI justification

*these factors will/can be used in a justification model framework

- Insurance
- Speed to onboard workers (full-time and temp)
- Healthier work/life balance & longevity of workers
- Product security/quality of product
- Footprint & future needs
Lesser known, yet, impactful factors for ROI justification

*Sustainability/ Energy usage

Sales advantage

Better inventory visibility

New customer value added services

*these factors will/can be used in a justification model framework
Justification Model Framework

• Used to compare a benchmark system (conventional build) to an automated system

• 2 broad categories of cost considered due to depreciation being handled differently
  • **Investment costs** (land, building, other non-equipment purchases)
  • **Equipment costs** (racks, S/RM, conveyors, fork trucks, LGVs, computer hardware/software, building related items that are considered part of equipment)
5-Step Process of Justification Model

- **Step 1**: Define cost of benchmark vs. automation
- **Step 2**: Find the cost of capital, income tax rate, inflation for equipment & labor costs
- **Step 3**: Define operating costs for both the benchmark and automated systems
- **Step 4**: Project investments and operating costs for 20 years (using inflation assumptions)
- **Step 5**: Perform discounted cash flow IRR/NPV calculation
# Justification Model Framework – Step 1

<table>
<thead>
<tr>
<th>Investment Costs</th>
<th>Benchmark</th>
<th>Automated</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>$1,000,000</td>
<td>$ 800,000</td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>$5,000,000</td>
<td>$ 4,000,000</td>
<td></td>
</tr>
<tr>
<td>Other non-equipment purchases</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment Cost</th>
<th>Benchmark</th>
<th>Automated</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racks</td>
<td>$1,000,000</td>
<td>$ 3,000,000</td>
<td></td>
</tr>
<tr>
<td>Storage/Retrieval Machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conveyors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fork-trucks</td>
<td>$ 500,000</td>
<td>$ 100,000</td>
<td></td>
</tr>
<tr>
<td>LGV's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Hardware/Software</td>
<td>$ 200,000</td>
<td>$ 500,000</td>
<td></td>
</tr>
<tr>
<td>Building related items that are considered part of equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$7,700,000</td>
<td>$11,900,000</td>
<td>$4,200,000</td>
</tr>
</tbody>
</table>

**This differential cost is what must be justified**
Justification Model Framework – Step 2

- Define weighted average cost of capital (WACC) –
  - EXAMPLE 8%

- Define corporate income tax rate –
  - EXAMPLE 33%

- Define inflation factor for equipment & labor –
  - EXAMPLE 2.5%

- Define business/sales growth –
  - EXAMPLE 3%
### Justification Model Framework – Step 3

**These annual operating cost savings must justify the added cost of automating**

- This step relates to the benefits and operating costs mentioned before (ROI factors)

<table>
<thead>
<tr>
<th>Operating Costs (Annual)</th>
<th>Benchmark</th>
<th>Automated</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>$1,500,000</td>
<td>$500,000</td>
<td></td>
</tr>
<tr>
<td>Building maintenance</td>
<td>$100,000</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Equipment Maintenance</td>
<td>$150,000</td>
<td>$200,000</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>$100,000</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Product Damage</td>
<td>$150,000</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Less tangible benefits (worker availability, worker attraction, ergonomics, safety, enhanced culture, higher order fulfillment rate, software driven operations, operational consistency and discipline, elimination or reduction of physical inventory counting, improved order accuracy, improved product integrity, control of quarantined product, FIFO accuracy)</td>
<td>$200,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$2,200,000</td>
<td>$850,000</td>
<td>$1,350,000</td>
</tr>
</tbody>
</table>
Justification Model Framework – Step 4

*Example based on a 10-year analysis

**• Using Inflation Only**

<table>
<thead>
<tr>
<th>Initial Outlay</th>
<th>Year 1 Savings</th>
<th>Year 2 Savings</th>
<th>Year 3 Savings</th>
<th>Year 4 Savings</th>
<th>Year 5 Savings</th>
<th>Year 6 Savings</th>
<th>Year 7 Savings</th>
<th>Year 8 Savings</th>
<th>ETC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,200,000</td>
<td>1,350,000</td>
<td>1,383,750</td>
<td>1,418,344</td>
<td>1,453,802</td>
<td>1,490,147</td>
<td>1,527,401</td>
<td>1,565,586</td>
<td>1,644,844</td>
<td>ETC.</td>
</tr>
</tbody>
</table>

**• Using Inflation & Sales Growth**

<table>
<thead>
<tr>
<th>Initial Outlay</th>
<th>Year 1 Savings</th>
<th>Year 2 Savings</th>
<th>Year 3 Savings</th>
<th>Year 4 Savings</th>
<th>Year 5 Savings</th>
<th>Year 6 Savings</th>
<th>Year 7 Savings</th>
<th>Year 8 Savings</th>
<th>ETC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,200,000</td>
<td>1,350,000</td>
<td>1,424,250</td>
<td>1,502,584</td>
<td>1,585,226</td>
<td>1,672,413</td>
<td>1,764,396</td>
<td>1,861,438</td>
<td>1,963,817</td>
<td>ETC.</td>
</tr>
</tbody>
</table>
Justification Model Framework – Step 5

*Example based on a 10-year analysis

<table>
<thead>
<tr>
<th>Initial Outlay</th>
<th>Year 1 Savings</th>
<th>Year 2 Savings</th>
<th>Year 3 Savings</th>
<th>Year 4 Savings</th>
<th>Year 5 Savings</th>
<th>Year 6 Savings</th>
<th>Year 7 Savings</th>
<th>Year 8 Savings</th>
<th>ETC.</th>
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<tbody>
<tr>
<td>4,200,000</td>
<td>1,350,000</td>
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<td>1,565,586</td>
<td>1,644,844</td>
<td>ETC.</td>
</tr>
</tbody>
</table>

• Perform Discounted Cash Flow IRR/NPV Calculation assuming 8% WACC (from step 2)
  • PAYBACK = 3.11 YEARS
  • IRR = 32%
  • NPV = $5,026,257

• Better than just using payback because you’re capturing the value of future cash flows instead of just showing the amount of time it will take to achieve your payback
Operations

• How can automation help?
  • Reduce touches
  • Access to inventory is controlled
    • Reduces damage
    • Reduces losses
  • SKU Management
    • Reduce out of stock
    • Reduce ‘silo’ed SKUs due to central management
Cycle Counting

- Manual
  - Have to visit every SKU and manually scan each case
  - Worse with break pack, scanning each item

- Automation Benefits
  - Typically if a case has been accessed in last 12 months by ASRS
  - Items can be easily bought to a GTP station for counting
Summary

• Understand the type of ROI model you need and your internal audience
• Make sure to include Investment Costs, Equipment costs and Operational savings
• Include the lesser known factors in your model
• When evaluating, compare how you do it today with the proposed automated solution
• Use IRR, NPV and payback to justify your case for automation
• Work closely with your chosen vendor to evaluate ROI and ASRS justification
For more information:

Andy Lockhart
Speaker email: andy.Lockhart@tgw-group.com
Website: www.tgw-group.com
Or visit MODEX Booth #7605

Daniel Labell
Speaker email: dlabell@westfaliausa.com
Website: www.WestfaliaUSA.com
Or visit MODEX Booth #7807

Mohan Ramankutty
Speaker email: mohan.ramankutty@Swisslog.com
Website: www.Swisslog.com
Or visit MODEX Booth #7657