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

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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

Equipment Manufacturers/Suppliers	Component Suppliers

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
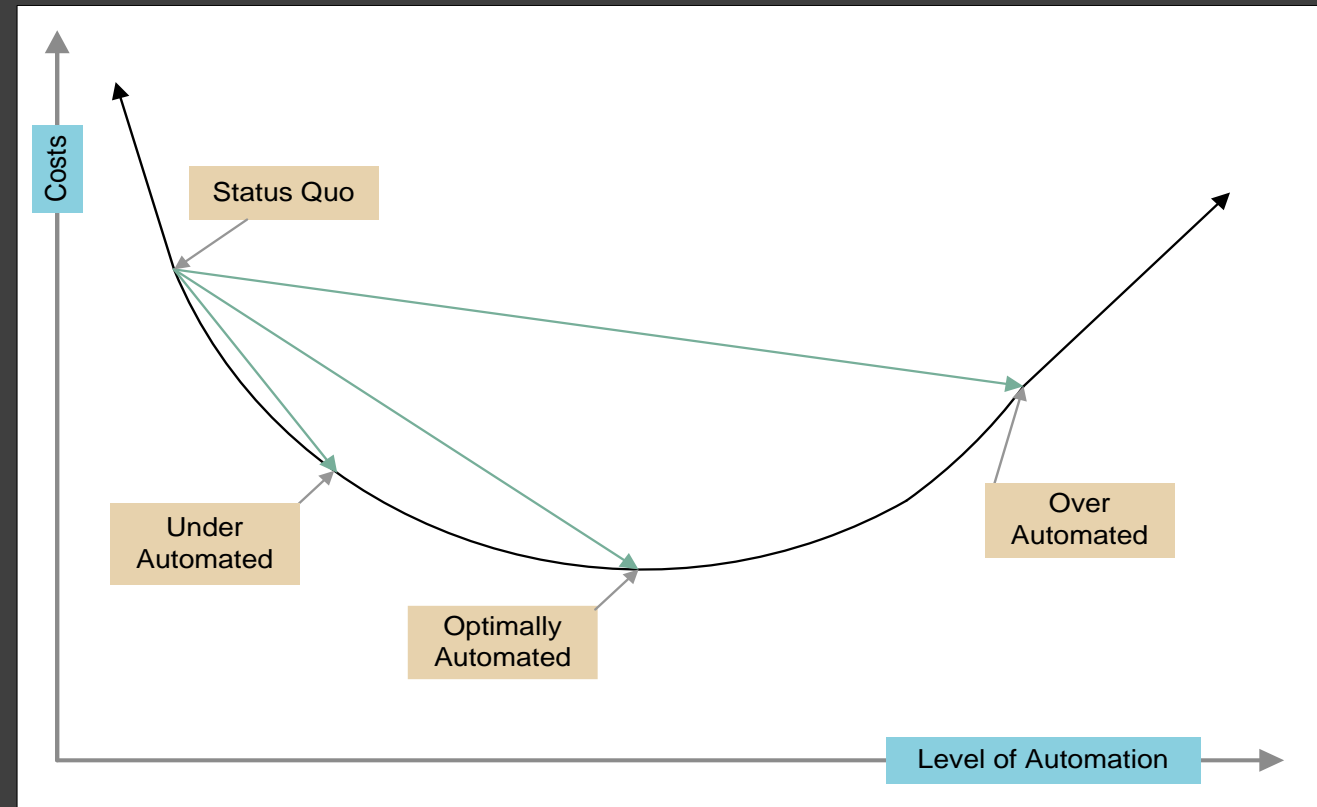
FIFO inventory rotation

ASRS Justification

————

- WHY Storage Automation?

- 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

- WHY Storage Automation?

- HOW much automation?

- WHERE - Brown Field Vs Green Field?

Costs

Status Quo

Under Automated

Optimally Automated

Over Automated

Level of Automation

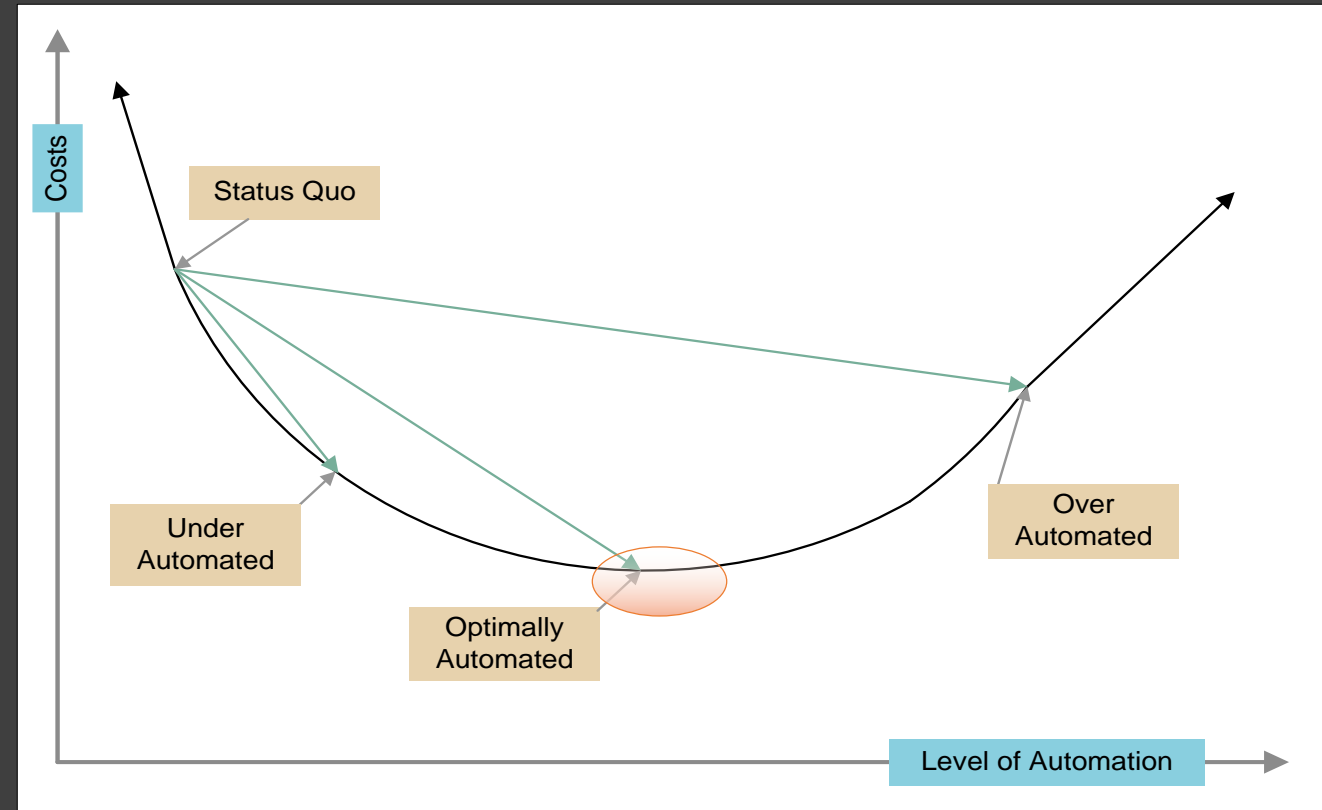# ASRS Justification

- WHY Storage Automation?

- 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

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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

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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

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

Sustainability/ Energy usage

Sales advantage

Better inventory visibility

New customer value added services

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)

Justification Model Framework – Step 1

	Benchmark	Automated	Delta
Investment Costs			
Land	$1,000,000	$ 800,000	
Buildings	$5,000,000	$ 4,000,000	
Other non-equipment purchases			
Equipment Cost			
Racks	$1,000,000	$ 3,000,000	
Storage/Retrieval Machines		$ 1,500,000	
Conveyors		$ 2,000,000	
Fork-trucks	$ 500,000	$ 100,000	
LGV's			
Computer Hardware/Software	$ 200,000	$ 500,000	
Building related items that are considered part of equipment			
Total	**$7,700,000**	**$11,900,000**	**$4,200,000**

*__**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

	Benchmark	Automated	Delta
Operating Costs (Annual)			
Labor	$1,500,000	$ 500,000	
Building maintenance	$ 100,000	$ 50,000	
Equipment Maintenance	$ 150,000	$ 200,000	
Energy	$ 100,000	$ 50,000	
Product Damage	$ 150,000	$ 50,000	
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)	$ 200,000		
	$2,200,000	**$ 850,000**	**$1,350,000**

***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)

Justification Model Framework – Step 4

Example based on a 10-year analysis

- ## Using Inflation Only

Initial Outlay	Year 1 Savings	Year 2 Savings	Year 3 Savings	Year 4 Savings	Year 5 Savings	Year 6 Savings	Year 7 Savings	Year 8 Savings	ETC.
4,200,000	1,350,000	1,383,750	1,418,344	1,453,802	1,490,147	1,527,401	1,565,586	1,644,844	ETC.

- ## Using Inflation & Sales Growth

Initial Outlay	Year 1 Savings	Year 2 Savings	Year 3 Savings	Year 4 Savings	Year 5 Savings	Year 6 Savings	Year 7 Savings	Year 8 Savings	ETC.
4,200,000	1,350,000	1,424,250	1,502,584	1,585,226	1,672,413	1,764,396	1,861,438	1,963,817	ETC.

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Justification Model Framework – Step 5

Example based on a 10-year analysis

Initial Outlay	Year 1 Savings	Year 2 Savings	Year 3 Savings	Year 4 Savings	Year 5 Savings	Year 6 Savings	Year 7 Savings	Year 8 Savings	ETC.
4,200,000	1,350,000	1,383,750	1,418,344	1,453,802	1,490,147	1,527,401	1,565,586	1,644,844	ETC.

- 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

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