

Data Analysis e-Book

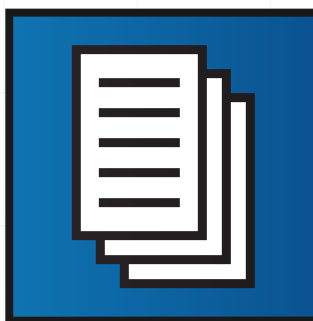
Presented by: abco automation, llc.



Data Analysis

Design Perspective: The purpose of a data analysis is to dive down into the mathematical actuality of your operation and retrieve the system rates to concrete our concepts.

1. Data Collection



After a mutual NDA is signed, we ask you for the data we need to analyze your project; typically, receiving lines, order lines, and an item master file. Once we have the data, we study it, and define all the terms, producing a Data Definition Document (D3). The D3 is used to reach consensus on what the data consists of, and to define terms, anomalies, flows and flags in your data.

We approach your data set as if we have never seen one before, making no assumptions, and we handle your operation with attention and care. We have a brief meeting with you to discuss the D3 to make sure we understand your data before starting the analysis - this extra step saves a lot of time in the long run.

2. Data & Process Analysis



The purpose of our analysis is to mathematically model the current flows through your distribution center, and to understand your operational processes through personal observation. We recreate your system as it exists mathematically. We process, chart, and analyze operation as it is now. Our analysis provides the basis for our future design based on empirical evidence.

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3. Present & Iterate



Having finished an analysis of the data from your current operation, we will present the findings to you. At this stage, you give the results a 'sanity check' to insure the results paint an accurate picture of your operation today. We refine any points of dissonance observed in the analysis until you see your operation accurately and precisely represented in the values we produce.

4. Grow the Design to Design Values

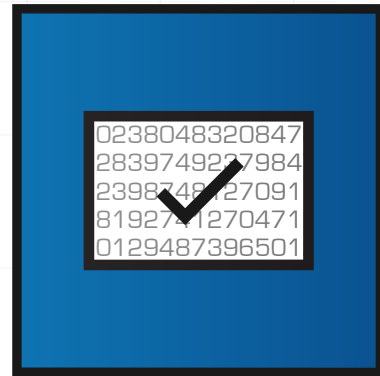


Your organization can grow in a lot of ways: more customers/stores (orders), more SKUs (more lines/order), and demographic growth buying more (more pieces/order-line). Each type of growth has a different effect on the way your operation will run in the future. Using these inputs, we collaboratively grow the analysis of the existing operation out to the future 'design year.' From the design year results, we develop the hourly rate required for each process to meet the future demands on the system for average, peak and maximum performance.

Data Analysis

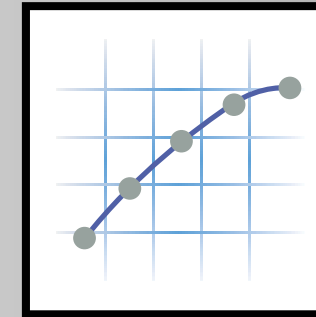
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5. Completed Design Values

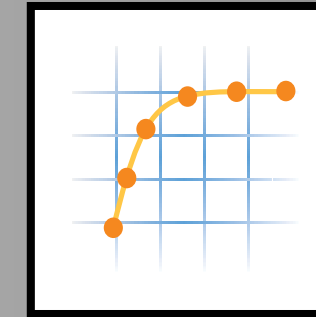


Though the Design Values are the output of our analysis, they aren't the only benefit of the process. The data and process analysis gives us key insight into your how you need to operate your distribution center in the future. We learn a lot about your business and so do you.

A Tale of Two Curves



V.S.



If you don't know what the Pareto Curve is, Google it. Remember the 80-20 rule? That is Pareto. In general, 20% of your SKUs will do 80% of the volume of your operation. We know that you are thinking, "Everyone knows about the Pareto Analysis, anyone can do that." You are correct: any engineer worth his salt will attempt to analyze your SKUs in terms of volume of lines shipped/received. That level of analysis is too simplistic to design automation as it only represents half the picture.

When it comes to automation, the real opportunity surfaces when you look at your SKUs on a Pareto Curve in terms of pick-frequency and the SKU's cubic-volume. There are two reasons for this: First, we can dynamically slot SKUs nowadays, so we can use automation to cut wasteful movement out of your operation. Second, bowling balls and pencils don't have the same cubic-volume. You can fit two bowling balls into a tote, or about 1500 pencils; yet both SKUs may move at the same number of lines/day. The number of movements required for each SKU would be dramatically different. I might need to move 50 tubs of bowling balls, but have 25 days of pencil inventory in a single tote, even though they both move 100 order-lines/day! Call us, get a real analysis.

Concept Design

Collaborative. Iterative. ROI Focused.

1 After we have agreed to the results of the data analysis and design-year hourly system rates, we begin concepting. Our team will usually produce multiple concepts along the spectrum from manual operations to light-out automation to present your company with the best options to consider. (See below)

2 For each concept we present, we outline the following:

1. Concept advantages and disadvantages
2. The system footprint to define the cost of the building required
3. A headcount to establish annual labor costs
4. A rough-order-of-magnitude capital cost

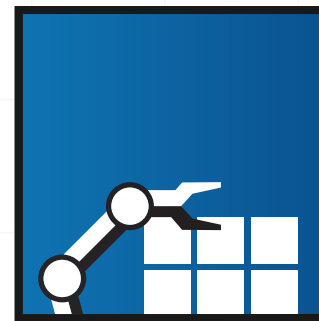
3 These results are baked into a return-on-investment analysis for each concept option. While it is possible that all concepts have a similar ROI, the ROI analysis provides a tool to inform your team and assist in making a decision about which concept to pursue based upon your company's appetite for capital projects, automation, and other things communicated. The choice is up to you!

Low Automation



Largely driven by labor, processes are augmented by select automation.

Medium Automation



A medium solution would include a blend of product-to-person automation technology, and other manual processes.

High Automation



A lights-out, automation driven operation, with the barest labor requirements.

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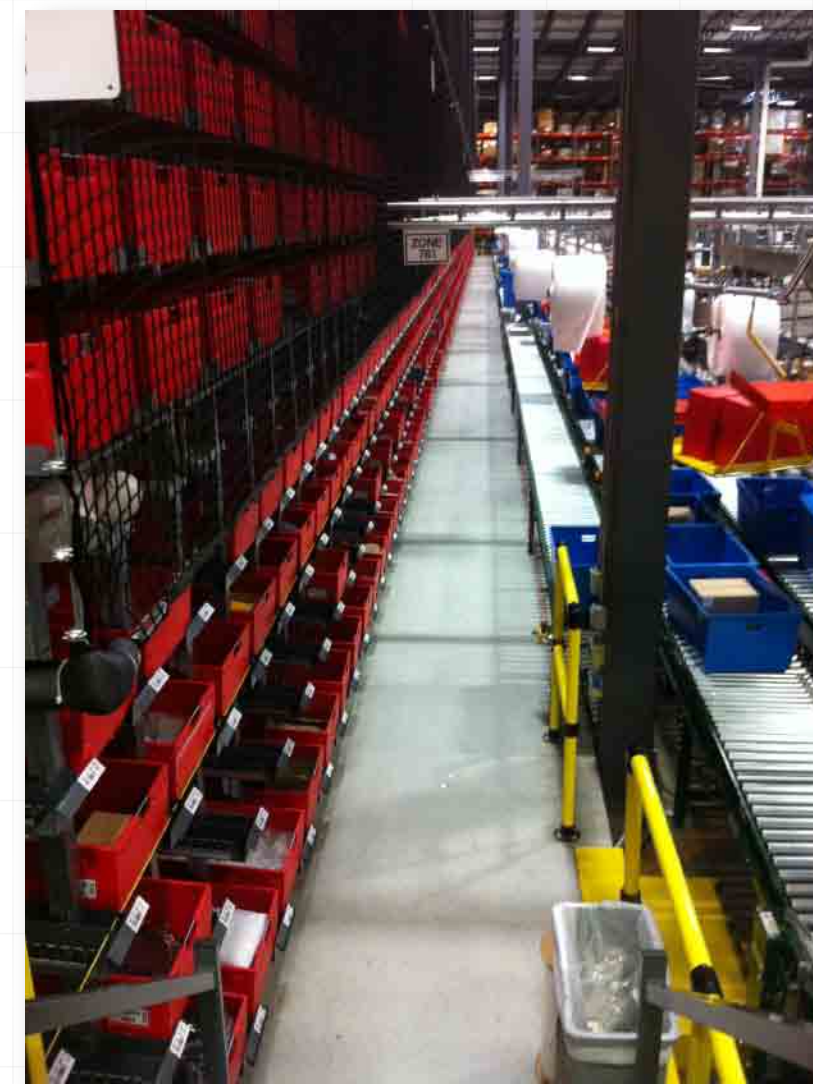
Concept Design | Collaborative. Iterative. ROI Focused.

The basis of our design philosophy:

When designing a concept, the trick is to find the right balance between these three aspects of a system design:

- 1 Capital Equipment Cost
- 2 Labor (FTEs)
- 3 Footprint (ft²)

Three different concepts of various levels of automation can all have the same ROI; just different quantities of labor, capital equipment and floor space that must be poured. abco automation is an expert at providing you several options on the automation spectrum to help you find the balance of each of these three aspects that makes sense for your company.



ROI Points of Tension | Capital Equipment

1. Capital Equipment

Generally speaking, the more capital investment you make in equipment, the lower the labor cost and the smaller the footprint of the building should be. When we use capital equipment (ASRS, for example) to get product off of the floor and use the cubic space in a building, we can both reduce the travel distances and reduce the footprint.



ROI Points of Tension | Labor (FTE's)

2. Labor (FTE's)

The number of people it takes to operate a facility is inversely proportional to the amount of automation used in the building to automate processes people must do to get orders out the door. The more manual the processes, the more people you will need to operate your facility, and the more labor cost you will incur. Labor is also proportional to the footprint of the building; the larger the footprint, the longer are the travel distances for people, transport (conveyors) and forklifts. In a manual distribution center, 50-70% of a picker's time (4-5.6 hours per 8-hour shift!) is spent traveling to a pick location. The longer these distances are, the more people you will need, and the higher will be your labor burden.



ROI Points of Tension | Footprint (ft²)

3. Footprint (ft²)

Every SKU does not have to have its own location on the floor, because many SKUs in some operations do not get touched every day. If we use automation to put these products in the air until they are needed, we can make drastic reductions in building footprint. People forget that building footprint turns into hundreds of cubic yards of concrete that must be poured, roof that must be purchased, walls that must be closed in and HVAC costs for the enclosed space. The cost for 100,000 ft² is about \$6,000,000. This amount of money can purchase lot of material handling equipment.



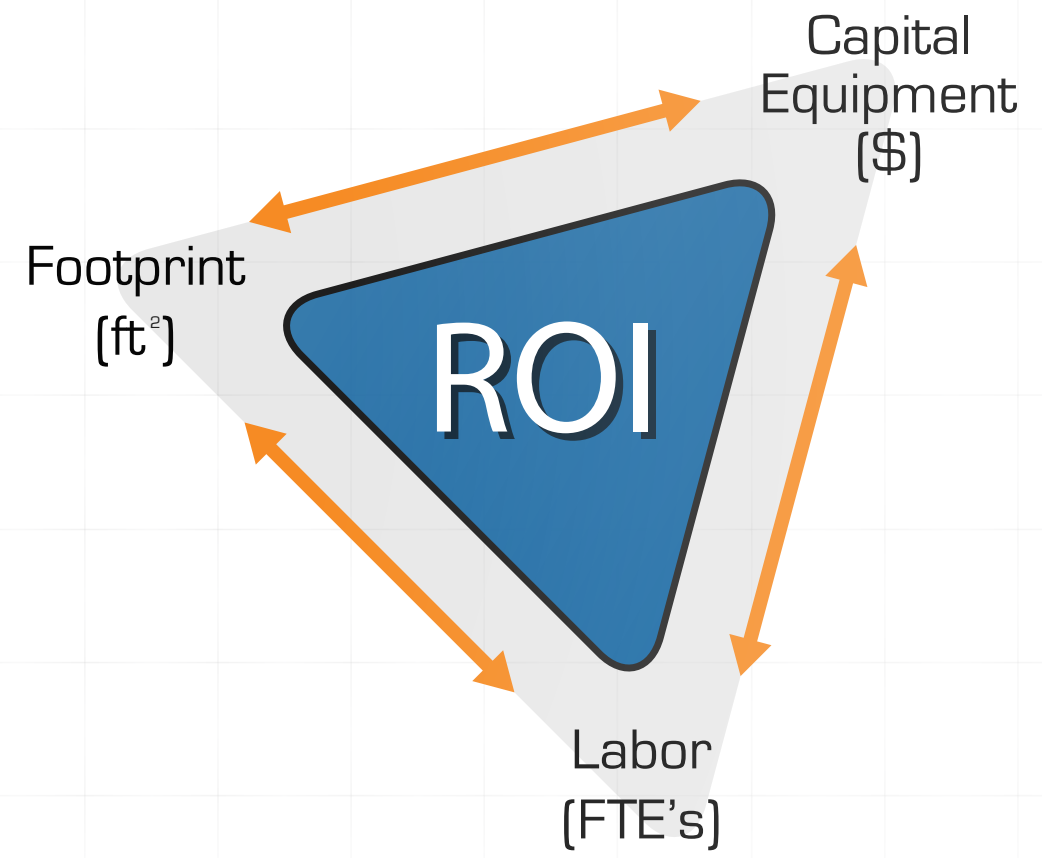
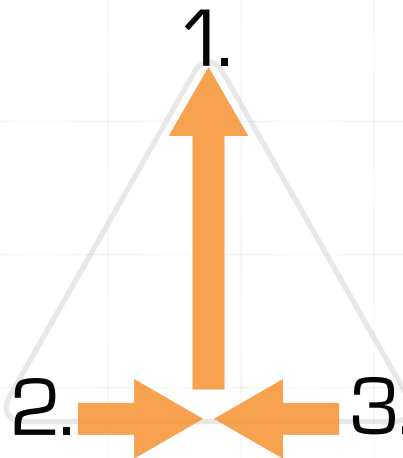
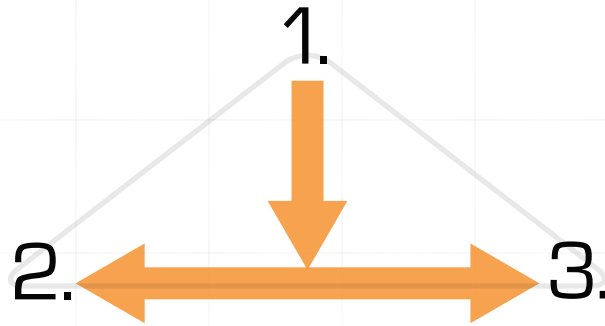
ROI Elasticity and Tension

The puzzle of ballancing space, labor, and capital.

1. Capital Equipment

2. Labor (FTE's)

3. Footprint (ft²)



Automation is great, but there is nothing wrong with labor!

Don't build yourself into a system that can't scale with you business

Using labor to flex



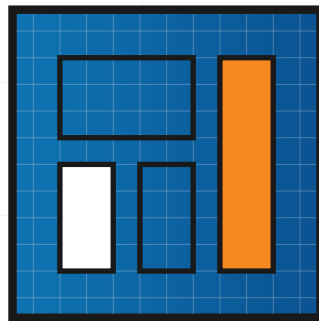
Don't fall into the trap of building the Bridge Too Far. Big automation manufactures are in the game of selling technology, and they win when they fill your building to the brim with the latest and greatest machinery.

Unfortunatley, when you fill your building with machinery, you end up being constrained by the automation that was supposed to be your salvation.

Abco automation uses labor in our designs to flex your operation for peak season; this is especially important in retail looking down the barrel of Q4. We design our concepts work within your current restraints to get you the best ROI without building a wall of automation around your operation.



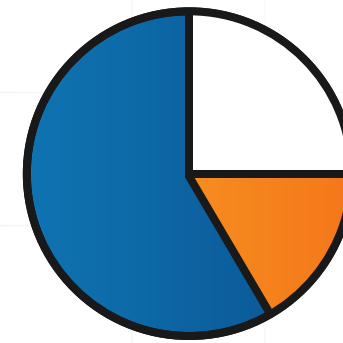
Final Concept and Proposal



Draft Final Layout



Complete final engineering & source equipment



Gather Hard Costs & Complete ROI Analysis



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Present Final Concept & Proposal

We have analyzed the operation, designed a system to fit, our next step is to present a final concept, ROI Analysis, and proposal. We ask, you say "yes" and then we install and go live!

Thank you for your
interest in
abco automation

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