Automate the Vision
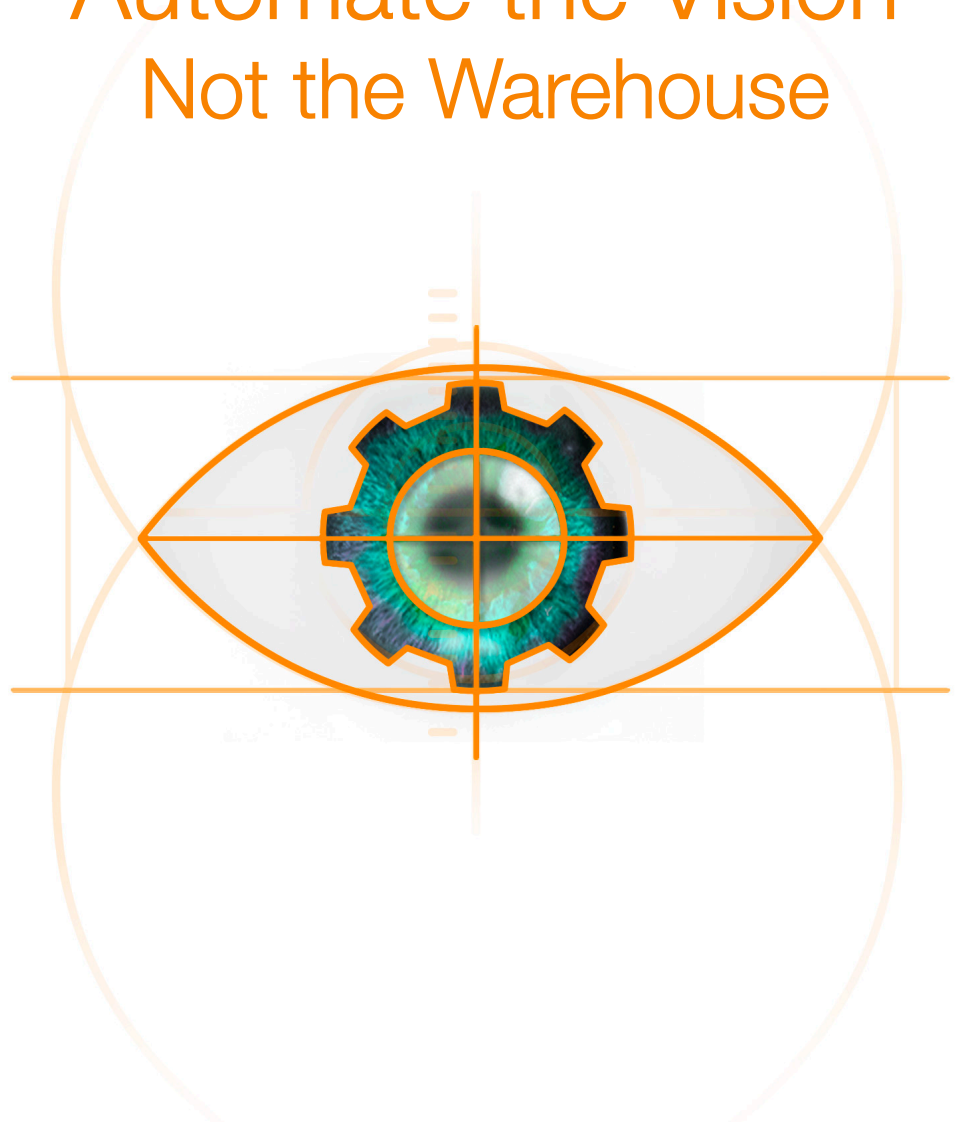## Not the Warehouse

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Fulfillment automation can dramatically enhance an omnichannel retailer's competitive market edge. If done right, it can bring measureable strategic advantages that go far beyond the obvious improvements of enhanced fulfillment capabilities and reductions in costs-of-goods sold, and enhance a company's capabilities and growth potential in a variety of areas. But such advantages can only be gained if the approach to automation is one that incorporates a complete vision of strategic business objectives at the front end of the fulfillment automation process. Why?

It's human nature to begin the process of improvement by looking at the shortcomings of an existing operation. And the natural tendency for those tasked with spearheading the improvement process is to subsequently focus on the components needed to improve the facility, rather than the objectives behind the improvement. This often results in a mindset that begins comparing products and scrutinizing costs before there is a real understanding of either the solution needed to achieve a company's strategic vision or the potential payback such a solution can bring to the company.

Fulfillment automation can be highly intimidating. And for those tasked with the effort, the prospects of endorsing capital outlays for systems that could potentially change a company's growth prospects can be both enticing and completely overwhelming. Because, if the system delivers as promised, the individuals who recommended it could be heroes — but if it doesn't, those would-be heroes may not have jobs when it's all said and done.

This is why many automation projects are doomed from the start. Those tasked with the project too often play it safe. And instead of exploring possibilities, they look to eliminate risk. Their approach usually begins with a laundry list of perceived equipment and software needs, that eventually gets translated into a number, that gets whittled down to create a budget, and, ultimately, guides the fulfillment automation search from there. And unfortunately, such an approach usually results in the systematic elimination of opportunities to such a degree that a retailer ends up with a fulfillment system that may enhance internal efficiencies and lower the cost-of-goods sold, but never realize the full potential of the strategic benefits automation can bring.

With that in mind, an Invata client recently gave some sage advice to an Invata prospect who was touring his Invata-built omnichannel fulfillment center. His advice to the high-end retailer was to look beyond the sorter, the automated storage and retrieval systems, the conveyors, the pick-to-light systems, and even the IT servers, and to think of the facility not as a fulfillment center, but as a strategic weapon for accomplishing business objectives.

The Invata client said this because his perspective had dramatically changed since his facility came online a couple years back, and the expanded capabilities his company had realized as a result had not only changed his outlook on automation, but had dramatically enhanced his company's ability to move product in ways they had not anticipated.

Seeing Automation as a Strategic Weapon

When done right, fulfillment automation dramatically enhances a retailer's ability to move product, execute marketing initiatives, control profit levels, and increase customer loyalty and retention. As a result, a retailer can adopt both a more nimble and strategic approach to purchasing, marketing, sales, and product pricing.

In fact, in addition to dramatically enhanced operational efficiencies, decreased cost-of-goods sold, and reductions in both labor and shipping costs, Invata clients have realized strategic advantages and payback from their investment in fulfillment automation in the following areas:

- Product development and sourcing

  Faster, reliable fulfillment enables a more strategic approach to product sourcing. It enables last minute delivery of product to the distribution center, promotes faster purchase-to-sale turn, ties-up less cash in inventory, and enables greater flexibility in product life cycle.

- Product marketing and promotion

  From a marketing and promotion standpoint, there are distinct advantages as well — both in-store and online. Reliable store deliveries enhance a retailer's ability to plan promotions, enabling greater flexibility and spontaneity with store sales events, a more efficient coordination of company-wide marketing initiatives, and greater precision in maximizing selling potential at the store level. Faster, reliable, ecommerce fulfillment enables greater flexibility and spontaneity for online events like special promotions and flash sales, maximizing a retailer's selling opportunities with mobile and online customers.

- Product pricing and clearance

With the ability to handle fulfillment for flash sales without compromise to everyday fulfillment requirements, retailers are able to manage inventory discounts as needed to move product without selling it off to deep discount 3rd party resellers. In doing so, retailers not only maintain better profit margins and control of inventory, they also preserve brand identity and bolster customer loyalty in the process.

- In-store relations

Faster, reliable fulfillment enables store managers to know when to expect shipments, more effectively plan in-store labor, and maximize the selling opportunity.

- Customer satisfaction, retention, and loyalty

And, of course, there are the advantages gained from enhanced customer service. Better more reliable store selection enhances the experience for in-store shoppers, while faster delivery of e-commerce orders dramatically enhances the shopping experience for the online and mobile customer. Both increase levels of customer satisfaction while increasing the likelihood of additional sales with existing customers. This diminishes the need for new customer acquisition and increases customer retention, all while enhancing customer loyalty. And since loyal customers have been shown to spend more than new customers and cost less to serve over time, purchase higher margin goods, and act as commission-free referrals to the businesses they support, customer loyalty is a benefit of automation that shouldn't be ignored.

So how does a company achieve a level of automation that strategically enhances it's market advantage? By empowering those tasked with systems improvement to look beyond the checklists, hardware specs, and overly simplified side-by-side comparisons and begin their process with understanding the methodologies for achieving strategic vision.

Let the Data Lead you

The Invata Approach to fulfillment automation is a data driven process — so much so, that all decisions relating to system concepting, design, operational theory, and life cycle performance are driven by client data and the outputs derived from the analyses our Intralogistics Science team runs on that data.

The reasoning behind this is simple:

The proper analysis of client data will reveal all a client needs to know for determining the most efficient, strategic, and financially sound solutions for any fulfillment challenge.

In fact, analysis of client data is not only the singular way to know if the solution being offered is the best for your company's business vision, it is also the only way to leverage fulfillment automation that achieves the strategic market advantage our client spoke of during a recent on-site visit. Why?

Automated fulfillment operations today rely on a level of interdependency between man and machine activities that make it virtually impossible even for material handling and warehouse management experts to fully predict or adequately react to the consequences design and operational decisions will have on systems performance. Impossible, that is, without the aid of sophisticated computer systems, advanced analytics, and algorithms — which is why an approach founded in the principles of data science is critical to the realization of strategic vision.

Achieving Strategic Vision Through Intralogistics Science

Invata's proprietary approach to ensuring clients achieve their strategic vision through automation is a highly scientific, iterative process of data validation, mining, clustering, analysis, and visualization that is used for the development of processing strategies, computer models, software algorithms, and payback justification for all system design and processing decisions.
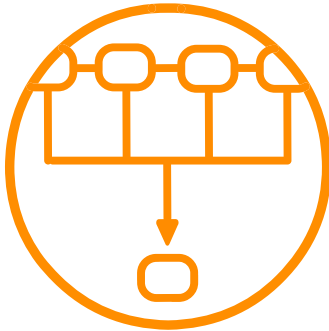
The process begins with the extraction, validation, and visualization of a client's operational data. Once the data has been validated (meaning biases and anomalies have been removed and the data has been normalized and classified such that it clearly represents the client's current operational state), it is then mined for information. What is called a K-means clustering algorithm is used to recognize clustering patterns along with any other extrapolated trends.

The focus of the analysis at this stage is on a client's inventory. As part of the data mining process, we explore different rationales for inventory fragmentation options with the intent of discovering the most cost effective strategy for storing and handling a client's inventory.

Considerations are made during this phase of the analysis for SKU sizing, velocity, and any special handling needs in addition to the impact various fragmentation decisions might have on things like line fill rate, order fill rate, and the percentage of inventory affected. Through an iterative process, an inventory fragmentation strategy is developed that outlines optimal ways to utilize available storage technologies for handling a client's inventory. The strategy is

then supported by a slotting algorithm that allows for input variables to fine tune the analysis.

After providing visualization of the inventory fragmentation strategy, we focus on developing the logic for how the automation process will work. In doing so, we map various scenarios for the physical flow of materials and marry those with operation data to understand the resulting work streams and process frequencies inherent to each operational flow proposal. We use decision tree mapping as the foundation for this process.
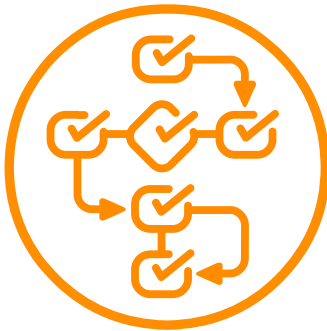
Once we arrive at an optimal materials flow scenario, the system concept is born. We then begin the process of evaluating the broad-stroke inventory and order management strategies used in the system concept for the purposes of refinement and the eventual creation of the inventory and order management algorithms that will get coded into our warehouse execution software.

In evaluating the inventory strategy, we look to determine, compare, and justify the cost of equipment for inventory storage versus the cost of time or labor needed for replenishment and reslotting. In doing so, we explore parameters for the frequency and volume of replenishment, the fragmentation resulting from movement, and the frequency of dead SKU turnover.

In evaluating the order management strategy, we explore variations for order ranking (the criteria used to rank orders), order batching (waved versus waveless processing methodologies) and options for seeding assignments (where orders are most efficiently processed in an operation).

The output from the inventory and order management

strategies analysis nets us algorithms we can use to support those strategies in the next phase of the process, the development of a computer model based on the design concept.

The model is built with a set of input variables that allows us to iterate variations in input parameters in a sensitivity analysis to better understand their effect on systems performance. Running simulations against the model allows us to further refine the design concept. By automating the outputs of each simulation into our InvataBI visualization platform, we can quickly evaluate the sensitivity of input conditions and view a side-by-side comparison of their respective outputs such that we can further refine the design concept.

Through the use of simulation software, we then add equipment and processing attributes to the model, including routing details and task sequencing requirements as well as the physical components of the design and any resource or machine constraints. We again add dynamic inputs to the model that allow us to fine tune our MHE design to a degree that we have a proof of concept model ready to prove out and validate our design concept.

For the purposes of developing the business case for the client (i.e. the justification for the capital outlay required to automate operations), we use an internal data slicer that allows us to use client data to quantify output volumes and set performance standards. By varying the input, we are able to evaluate system performance for peak as well as off-peak production demand scenarios.

Automation Justification and a Road Map for Change

A key take-away from Invata's Intralogistics Science Methodology for Achieving Strategic Vision is understanding the impact each proposed piece of equipment will bring to a potential system design and quantifying the performance requirements equipment must satisfy in order to be included in the system design. This enables us to provide our clients with both the business case for automating their fulfillment operations and the detailed ROI we provide with every Invata system proposal. No Invata proposal is presented without a business case for financial justification complete with financial return.
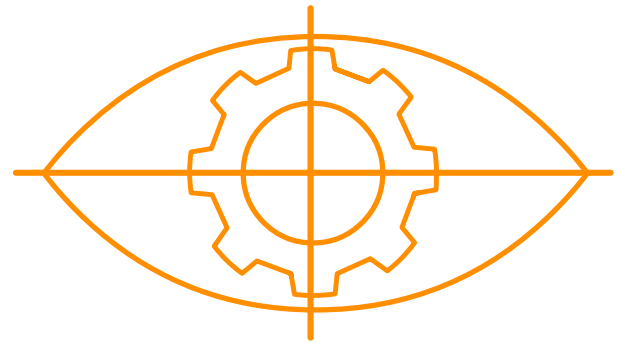
Our goal in this is not only to empower our clients to look beyond the warehouse to see the connections between automated fulfillment and the realization of strategic objectives, but also to help them meet the challenges of future change. We continually hear from our clients that the only constant for them is change, which is why we offer solution methodologies that not only enable Invata clients to see into the future, but to simulate it, test it, and prove out the plan for it far in advance of actual implementation.

In allowing us to iterate through permutations and combinations of strategies and equipment configurations, our Intralogistics Science process allows us to analyze options for our clients both now and in the future. In doing so, we scientifically determine and prove out the

combination of variables that will best meet each client's unique business need — and, in the process, provide them with the strategic weapon they need in an increasingly competitive market.

To learn more about achieving strategic advantage through Intralogistics Science, drop us an email or call us at 860-819-3200.