IFS Softeon

ROBOT AND GOODS-TO-PERSON SELECTION GUIDE:

ALIGNING AUTOMATION WITH YOUR WMS

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OVERVIEW

Dizzying! That might be the best way to describe the number of robot and Goods-To-Person (GTP) options out there. Anyone who has walked the floor of an automation show like ProMat or Modex can attest to the breathtaking array of choices in robotic automation. Partly fueling and partly reacting to the frenzy of this innovative technology, customers of all types and sizes now see robotic automation in their future.

But before diving into specific technologies, it's critical to step back and think holistically. Think of the warehouse as a central nervous system. This analogy reflects the importance of ensuring that any automation you introduce fits seamlessly within your broader operational flow. Just like a nervous system, your warehouse must coordinate a wide array of inputs and responses across multiple domains.

In this system:

- The WMS serves as the brain, providing central intelligence and visibility across the entire operation.
- The WES acts as the multi-agent orchestration layer, managing real-time priorities and communication between systems.
- The WCS functions as the final connector, interfacing with physical automation like conveyors and sorters.
- And finally, you have your robotics solutions, which need to act in harmony with these layers.

We often see robotics vendors embedding decision-making capabilities into their own systems. While this might offer localized benefits, it can quickly result in conflicting "brains" in your operation, each with its own priorities. To avoid this "two brains" dilemma, it's essential to maintain a single, centralized decision-making structure that understands constraints and opportunities across the whole facility. That's where your WMS and WES come in, enabling true orchestration rather than isolated optimization.

This lens is too often overlooked. The allure of technology can distract from the deeper need to ensure each piece fits within a comprehensive operational strategy. One that considers labor, planning, execution, analytics, and the interaction between people and robots.

> "Gartner echoes this with their prediction that by 2028, 80% of warehouses and distribution centers will have some form of warehouse automation, with 30% of those having robot platforms by 2030."

This acceleration of robot platforms results from several factors. First and most apparent, labor scarcity and costs arising primarily during COVID but carrying on to today have profoundly impacted operations. Secondly, peak volumes have pushed operations to the edge of feasibility – robotic automation can help solve peak–season pushes. Finally, the cost of robotic automation adoption has dropped dramatically over the past 3-4 years, and in some cases automation vendors, have shifted to a Robots-as-a-Service model, creating a cost structure more in line with the operational benefits and ROI.

How do you break it all down? Where do you even start? Here, the Softeon Robotics and GTP Guide, we aim to answer these questions and accomplish the following:

- Provide decision-making footing. Help you develop a decision-making process or, minimally, provide a decision matrix.
- Describe some of the major types of robotic systems prevalent when writing this paper and their use cases.
- Give you tips on vendor selection and negotiation.

It is easy to become confused and disillusioned by the magnitude of choices. Don't worry – you are not alone. Part of the dilemma of having so many options involves imagining so many use cases. "Oh, I can see how this would be good in this situation, and that would be great in that situation." That is the problem with choices, isn't it? When you have too many, the sheer number itself becomes an obstacle. How do you navigate all of this without getting stuck, or even worse, have your problem defined by the solutions offered by a single vendor? You start with objectives – your objectives for applying technology.

Objectives – What am I Trying to do?

Objectives are different than use cases. Objectives help you define your problem and establish success criteria related to those objectives. The three most common objectives are:

- Reduce full-time equivalents (FTEs)
- Scale
- Maximize footprint
- Operational Scalability

First, let's clear up the distinction between FTE reduction and scalability. There can be a strong correlation between these objectives, but not always. Here is a real-life example. Remember manual toll plazas on tollways? If you've been driving for more than 15-20 years, you will likely remember the old toll plazas and queuing up to toss in your 70 cents or, even worse, getting change from the attendant. It was a massive delay, especially during rush hour.

But then came toll tags – RFID tags that allowed you to breeze through the toll plaza at 65 MPH.

Toll Plaza automation was not about reducing 8 FTEs per shift (or however many manual lanes you had). The biggest problem that manual tollways had was providing enough toll booths to handle peak volume. At the time, the only solution was to undertake large construction projects to widen the toll plaza and create more tollbooths – requiring land acquisition and significant construction costs.

So, it was never about reducing FTEs – it was all about solving the scalability problem. The objective was to support toll collection at freeway speeds. The FTE reduction may offset some IT infrastructure costs, but it was likely not even a small part of the consideration.

The third most common objective is to achieve more density and throughput per square foot of an existing facility. The driver for this might be the relative cost of acquiring more space or moving a facility vs. the state of demand. In this case, space constraints might outweigh other issues and become the principal driver.

How do you start to consider objectives and not fall into the trap of getting enamored with sexy use cases? Here are some ideas.

SELF-ASSESSMENT – WHERE AM I TODAY?

Greenfield vs Brownfield Investments

Your facility plans will heavily guide your decisions, whether you are using or acquiring new space, often called a Greenfield opportunity, or utilizing space within an existing building, usually referred to as a Brownfield opportunity.

Greenfield

Greenfield sites are blank slates – empty or close to empty boxes or something as green as a blank sheet of paper. While they are not without constraints (number of dock doors, square footage, etc.), they are blank slates from a construction and facility management perspective.

Brownfield

Brownfield sites are buildings with warehouse infrastructure. They tend to be much trickier and the most common types of sites. By nature, they will likely have pre-existing racking, conveyor, mezzanines, electrical, and other facility overheads to work around.

Part of the question in Brownfield sites comes down to the costs of converting parts of the building: clearing existing infrastructure, running new electrical and fire suppression, efforts related to integrating existing automation, and even assesing the floor's tensile strength in battery handling areas.

One hidden danger of working on a Brownfield site concerns business continuity. If you clear an area for new automation, does it impact the site's ability to meet operational throughput requirements? We often talk about this as the "getting from here to there" problem, and it needs to be as much a part of the plan as designing the final state of the building.

Creating an Opportunity Comparison Framework

So far, we've discussed a high-level approach, setting objectives, and some traps to avoid. Let's start diving into details.

Critical Constraints - Facility Profile, Floor Area Data and Going Vertical

Sometimes, we talk about an operation's top drivers to implement automation as solving pain points. This is an old-fashioned approach to thinking, as the top drivers within a decision-making process should instead consider both the current operational conditions and the future.

So, while solving current pain points may be a place to start, it may not be a great place to land in the long run. Instead, let's think about how you want your facility to operate, informed by some of its current pain points but driven by the idea of solving for the future state.

We discussed the difference between scalability and FTE reduction above. As described, these may be part of the same problem–but sometimes they are not.

> Let's explore the topic of operational scalability a bit more. Like squeezing a partially full balloon, if you apply automation to one area of your facility, another area might bulge and have difficulty maintaining itself against the new pressure. Does increasing your picking speed flood your conveyors and/or your packing stations?

Think about scalability and secondary impacts to your operations as the elasticity of operational throughput. Throughput elasticity speaks to how closely your throughput becomes tied to critical constraints of labor, facility elements like pack-out stations, etc. The more elastic your operation is, the less dependent it is on critically constrained resources. This concept needs to be part of any decision matrix.

Secondary Impacts - Throughput Elasticity

Talking about scalability in terms of elasticity might seem a bit esoteric, so let's get to the details. When you dive into scalability, define what you mean by specifying a timeboxed approach. Hint: Scalability timeboxes might eventually drive the solution choice.

You may think about this in terms of a calendar: **"My main scalability concern happens at peak season, between November 15th and December 24th." Or, "our busy season is summer, just before the start of the American football season."** These are good examples of calendar-based scalability timeboxes.

You may also have timeboxes that are more daily or weekly in nature. For example, **"Our peak volumes happen Mondays and daily between 4-6 pm to satisfy SLAs around 'orders in today, ship today.' So, all day Monday and 4-6 pm every day, I have a scalability problem."**

Recognizing scalability timeboxes can be crucial to understanding your overall elasticity.

The Fitness Check and Automation Scope

Depending on whether your site is Greenfield or Brownfield, business continuity may also play a role in your decision (see the hidden dangers of Brownfield sites above). But let's focus more on the idea of fit. Fit is a broad term but a helpful concept in the case of automation.

Key elements of **fitness:**

- Does the technology **fit** your order profiles, now and in the foreseeable future?
- Does the technology physically **fit** in your operational footprint?
- Does the technology **fit** your facility flow (considering other operational constraints and operational elasticity)?

The above elements of "fit" are interrelated. But let's start with the biggest misstep organizations make–misaligning **Order Profiles** with the choice in robotics and other automation.

Order profiles are always the starting point for any automation conversation but are particularly important when considering robots and goods-to-person technology. The first goal of any comparison matrix is to understand your automation scope – items available for robotic or goods-to-person picking. For example, can you have fast-moving products or super-fast-moving items like product introductions fit into your robotics solution? Similarly, do your slow movers fit or do you use a dense-storage solution for those? Do you have "non-conveyable" product requiring exclusion from specific robotic processes?

If so, how are those injected back into the process? Define a realistic automation scope and beware of vendors who express their abilities, without empirical evidence, that they can handle any volume.

Your automation lane definition might become "all less-than-case pick items that are A, B, and C movers (not super-As and not conveyable) are all available for robotic picking," which is within the automation scope.

Develop a Data Matrix Data Gathering/Collection – Who Am I?

The last thing anyone wants is to invest all their time and energy into researching, selecting, piloting, and implementing robot/GTP solutions and see them fail. For many organizations, undertaking this effort is a once-in-a-generation transformational opportunity. How do you ensure success? It is all about the data. The biggest key to success is to pull accurate data, consistently present it to prospective vendors, and add a solid insistence that the vendors prove their solutions against the same data measure. Let's focus on order profiles, active SKU counts and profiles, and facility constraints.

Order Profiles

Order profiles speak to your customers' ordering patterns. The main questions include: Do they mostly order a single item? What percentage of customers order more than one item? Is there any item affinity?

- **Singles:** Single line/one item, quantity of one orders are often called singles. Creating a single process can be critical to operational scalability and automation. Therefore, correctly understanding if you have enough orders to develop a stand-alone singles process will be key to your automation. Hint: most direct-to-consumer order profiles are less than two items per order (usually 1.2-1.5 items), so a well-understood singles process will be critical to your scalability and picking efficiency.

  A singles process usually consists of batch-picking many singles orders into a tote or other container, taking them to a pack station (or manual labeling station), and printing the paperwork "en masse." This type of processing is particularly great for production shipped in bags or envelopes. Still, it can also be used for items shipped in cartons as all the singles in the tote are shipped the same way–get a series of labels, pack them, affix shipping labels, and they are ready to ship.

- **Multi-item orders and Item Affinity:** These may or may not be related. Item affinity refers to products or product categories often ordered together. Health and Beauty Aids (HBA), pet food, and pet supplies/toys are well understood to have strong item affinity.

  Understanding whether your customers typically purchase in the same or similar item groups is critical to understanding your automation approach. Prospective robot and GTP vendors must receive accurate information to create realistic throughput estimates.

Active SKUs and SKU Profiles

The first thing you'll want to do with any prospective robot or GTP vendor is discuss the number of active SKUs and the percentage of super-fast (promo/new release), fast, medium, and slow SKUs.

Incorrect data or incorrect choice of technology related to this topic will likely produce a negative, or even possibly catastrophically negative, outcome. The difficulty comes from the facility-wide repercussions of product placement and replenishment. For example, say that your goal is to handle 100% of your less-than-case order volume by robots or robotic GTP. That compels us to ask, does that homogenized approach to robotics fit within the SKU profile of the organization? More to the point, does it work for all the SKUs from your fastest moving to your slowest?

It is easy to say, "Just toss it all in there!" and be done with it. Our experience is that for some executives, that's what they want to hear–a single solution that will work for everything. In other words, just let the robots do it all. Theoretically, such an approach might work from a picking perspective but could also cause significant peripheral impacts.

Active SKU Counts and Replenishment Pressure

Depending on the type of robot solution and, more specifically, if it segregates inventory as inside or outside of automation, your next problem might be replenishments. Some robot vendors, especially the shelf-shuttle GTP vendors, have a concept of a "dance floor." This is the robot-only area of the operation where shelf shuttles busily move shelves to coordinate picking activity.

The 'dance floor' has both a physical and more realistic operation limit to the number of shelves in motion – and thus the number of SKUs and inventory. Replenishment pressure relates to the operational effort required to keep up with replenishments in robotic technology or the 'dance floor.'

- Constantly replenishing your fastest-moving product may mean more operational pressure to keep up with demand.
- On the other side of the spectrum, you have slow-movers. Replenishing slow movers into your robot area means pulling inventory and moving it only to satisfy a small number, or no other orders, per month. Many very slow-moving items can take up operational time and potentially critical capacity in the robot-picking technology or on the dance floor Suppose you have a very long tail of slow-movers. In that case, you might find yourself constantly replenishing this sort of inventory and building up a significant presence of slow-movers in the most critical area of your operation.

Facility Profile, Floor Area Data, and the Relationship to SKU Profiles

One of the main drivers of automation adoption is the appetite to allocate space for technology. We discussed this in the context of Greenfield vs. Brownfield, but it is essential regardless of that context.

- Lots of floor space?
  If your facility has a lot of floor space, the question becomes how to divide it. So, this, like anything, boils down to providing vendors with accurate facility data–down to aisle widths in conventional storage areas. If you are keen on maintaining your current conventional storage racks and shelves, while potentially sharing the floor with robots and human associates, communicate this to vendors, allowing them to shape the solution to your desires.
- Separate Dance Floor?
  If you are looking at technology that will require exclusive-use areas of the building, ensure that you communicate to vendors the square footage available for operational use and maintenance (charging and out-of-service units).
- Going Vertical?
  Some technologies may include vertical elements (3-dimensional storage or advanced vertical storage technology). Communicate the square footage, maximum height available, and maximum floor load to your vendors.

EVALUATE / ANALYSIS - ENTER REALITY - WHAT IS POSSIBLE?

ROI / PILOT - LET'S GO!

Traps to Avoid

We can often tell if an automation or robotics vendor is already embedded at a customer site by how customers talk about their use cases. In other words, one of the automation vendors has already framed some of the operational problems around their solutions. The first trap to avoid is **Vendor Think.** Don't let a single vendor's approach color your objects and how robots can fit into your operation. Define your objectives and the corresponding success criteria in operational and financial terms, not based on a single technology.

The second trap to avoid is **fixating on low-hanging fruit.** Addressing low-hanging fruit, meaning easily achievable automation elements may be part of your decision criteria. However, it should be just that – part of the decision criteria. The dilemma any decision maker faces involves justifying their position against other potential paths forward and analyzing opportunity costs.

Here is an example. Say you've walked your operation and thought, "It would be straightforward to use autonomous pallet movers from receive staging to aisle staging." Nice. Easy. Great, right?

Without defining objectives (minimizing more extended movements, shifting or reducing FTEs with pay differentials due to being certified to drive fork trucks, etc.), how do you judge the success of such an initiative? It cannot be something like, "at least it was easy." Defending capital decisions based on ease will not likely win over a CFO.

How do you measure any associated opportunity costs – like reserving space for new changing stations for vehicles specializing in inbound operations vs. using that same space for chargers for different picking-oriented vehicles? Are you giving up the ability to add picking robots by occupying the only available portion of your operation with the electrical upgrades and space to handle large AGVs?

All of this is to say that low-hanging fruit is convenient, easy to imagine, and even easy to implement but it must be weighed against the more significant goals of the operation.

Beware of the Long Tail

When looking at your order profiles, some assumptions must be made about whether you have a long tail regarding the items ordered. Above, we said that we might choose A, B, and C items within the automation scope. That sounds nice and easy. However, depending on the type of robot or other automation, any decisions of the automation scope need to consider the replenishment cost, if replenishments are required, and the total physical capacity of the robotics/goods-to-person tech.

What you want to avoid is the necessity of replenishing low-movers in your robot area, taking up important operational resources, and potentially critical storage capacity for items not often picked. So, please beware of the long tail (regarding the number of items in play), or at least consider it when your making your automation decision (see the data matrix below).

ROI Modeling and Expectations

As more vendors have entered this space, their selling processes have significantly matured. Most vendors will do an in-depth analysis of FTE utilization and ROI projections. As discussed above, the keys to success in this area involve the accuracy of data (order profiles, SKU profiles, affinity, etc.).

Any vendor you are considering should have defensible FTE/ROI analytics. Operations must review these closely to ensure the vendor considers all the use case elements and provides an even playing field for ROI comparisons. For example, it would be a mistake to allow vendors to use different metrics of singles vs. multi-line orders for their analysis or not consider the same operational footprint.

Can a pilot be successful without hitting ROI goals? Absolutely. The biggest issue with pilot projects is how big of a step into the technology you take. Say the vendor suggests 30 robots to cover your eComm area for the profiles you've provided. If your pilot contemplates 10 robots, for example, your FTE utilization and ROI projections could be all over the place vs the recommended configuration.

The key here is understanding how accurate their FTE/ROI estimates are related to the piloted number of robots. Getting estimates from the vendor when running the piloted number of robots and comparing that to the actuals should give you a sense of the accuracy of the FTE/ROI projections when the project goes live.

HOW DOES IT FIT?

WES, WMS Integration, and Multi-Agent Orchestration

It would be great if we could magically say, "Make robots work in my warehouse," and make it happen. While we've discussed the potential facility infrastructure improvements necessary to include robotic and GTP technology, we've not touched on the software side. It is, nonetheless, essential to the success of any project.

Some robotic and GTP solutions include a WES or Warehouse Execution System. The scope of these is typically limited to using the vendor's technology. In other words, the vendor supplies WES software that coordinates the equipment and frequently includes an integration module.

This WES element generally integrates with the facility's existing WMS technology. While adequate for a vendor's purpose-built solutions, these WES offerings lack higher-level coordination and multi-agent orchestration.

This document previously discussed operational elasticity and situations where putting pressure on one area of the facility may cause constraints in other areas. An independent WES allows the operation to flow more seamlessly by throttling order input or managing the order releases by areas of constrained resources.

Additionally, an independent WES, such as Softeon offers, provides for multi-agent orchestration. Multi-agent orchestration refers to the ability to communicate and coordinate between multiple vendor solutions to provide the optimal flow–no matter what robot or GTP vendors are involved.

Understanding the use and scope of the vendor's software solution, whether called WES or something else, is critical to a successful implementation.

Use Cases and Form Factors

Picking Robots

Picking robots fall into different categories: Collaborative Picking Devices, Shelf-Moving Goods-to-Person (GTP), 3-dimensional GTP, and Robot Arm/Manipulator picking.

Collaborative Picking Robots.

These robots, often called cobots, are used with human team members to increase the efficiency of human associates.

Some of the first widespread uses of robots were cobots. These bots produce ROI by minimizing the labor spent on physical travel (vs. doing the actual task of picking from a location). They are great for facilities with existing conventional shelf-locations, larger facility footprints, and many SKUs. The two major styles of these devices are swarm-picking bots and follow-me bots.

Swarm-picking technology sends many robots into the facility simultaneously and assumes a human will be in or near an aisle/zone that requires a pick. This way, human associates can be placed strategically to cover certain aisles or portions of the building for slower-moving products. Some of the historical leaders in this area are (in no particular order) Locus Robotics, Fetch/Zebra Robotics, and GreyOrange*.

Follow-me cobots are bots more tied to a particular human or set of humans. They reduce travel labor by optimizing the travel path, compel a more consistent pace, and allow for bot trade-offs amongst human associates (handling different areas of the building). These bots tend to have a bit more capacity than the swarm-style bots.

Swarm-style bots can be larger. Bot size may impact your facility design due to the possibility of needing wider aisles, especially when considering the possibility of 2-way traffic. 6 River Systems* is the historical leader in this type of cobot solution.

Self-Moving Goods-To-Person (GTP) Robots

In 2012, Amazon bought Kiva, one of the only robot games in town. Kiva manufactured early shelf-moving GTP robots. Amazon's aggressive move consolidated the market in this technology while creating a significant vacuum in the robotics space, which fueled many start-ups and technology investments.

Shelf-moving GTP systems bring an entire product shelf to a user at a picking pod or put-wall. They intelligently coordinate shelf movements based on travel time, traffic, and other factors to maximize throughput in the operational area. GeekPlus, Finally, GreyOrange are examples of these*.

3-Dimensional Goods-to-Person (GTP)

3-Dimensional GTP is a proven solution for specific product profiles. These are types of Automated Storage and Retrieval System (AS/RS) devices aimed at smaller form factors like quantities of cases or units stored in totes. They can be in the form of shuttles or autonomous robotic storage and retrieval. They tend to have modular stations for picking and replenishments where operators interact with the system to operate on inventory. They can produce very dense storage solutions as they are essentially a cube of usable storage. AutoStore, Savoye, ViaStore, and Opex are examples of this equipment*.

Robot Arm/Manipulator Technology

This category of robots represents new and exciting opportunities for automation. It offers AI-based, camera-based vision picking using some sort of gripper or suction arm. RightHand Robotics, Osaro, and Berkshire Grey are examples of these*.

Moving/Goods Transportation

Autonomous Mobile Robots (AMRs) are among the most common use cases. We will consider pallet-based movers split by purpose-built devices and hybrid units and less than pallet-based movers.

Purpose-built devices are built from scratch to be Autonomous vehicles. As such, they do not typically include an option for an onboard operator. The advantage of purpose-built AMRs is that they are task-optimized (optimized for particular use cases). E80 Group, SeeGrid, and Vecna Robotics are great examples of purpose-built vehicles*.

Hybrid or dual-mode AMRs allow operations managers to decide whether a vehicle may operate as an operator-on-onboard or autonomous vehicle. This approach's chief advantage is flexibility, allowing operations to switch vehicles in and out of automated mode to suit the situation's requirements. Many of these vehicles started as offerings from old-school lift truck manufacturers (e.g. Crown, Hyster, and Yale, for example) *

Sorting

Sorting robots are used to consolidate fulfillments into outbound containers. Devices of this kind have become popular as they have extended their abilities. Sorting robots typically deal with less-than-case quantities but can include case sorting. The use cases for this type of device include both vertical sortation and floor sortation. Smaller devices using static tops or tilt trays for handling less-than-case quantities and parcels are often positioned on sort tables or mezzanines. Floor sorting robots typically have a T shape with the drive unit at the bottom and a conveyance element aligned to the height of conventional conveyors at the site. Vendors in this area include Tompkins Robotics and AddVerb Robotics.

The Next Step – Humanoid Robotic Automation

Gartner Predictions: "By 2027, 10% of new intralogistics smart robots sold will be next-generation humanoid working robots."

If you had to bet on the areas of the most significant investment in the warehouse robotics field, humanoid robotics would be at the top of the list. While many incumbent robot vendors have humanoid robot initiatives, most operatable robots come from vendors specializing in this form. Boston Dynamics and Agility Robotics* are examples of newcomers in this field. Additionally, the area draws the eye of high-tech companies worldwide – including companies like Tesla. We recommend closely monitoring this robotics sector, especially for use cases like order sorting and tote handling.

CapEx, OpEx, RaaS, and Pilot Costs

The evolution of vendors' commercial and financial models has matched the robotics space's dynamic nature. In the mid-2010s, you would have seen many commercial arrangements falling onto CapEx budgets. In this period, say 2014-2016, robotic technology was much more expensive, and in many cases infrastructure requirements were much more involved. However, some companies have recently preferred a split model (CapEx and OpEx) for robotic systems. Facility improvements, typically networking, power, and changing area configuration, may be better aligned to CapEx spending while ongoing robotic costs shift to OpEx.

This shift to more investment falling onto the OpEx budget was facilitated by a change to OpEx-friendly commercial arrangements and low-cost pilot projects by the robot vendor community. To better synchronize the cost of new robot technology to operational utilization, many vendors have implemented a subscription, or As-A-Service, approach to commercial agreements. The difference between a subscription and a Robots-as-a-Service is a subtle but essential distinction. The difference speaks to the vendor's openness to supply robots as needed. Can you, for example, add some number of robots during your busy season and only pay for the period the robots are used (plus transportation and setup costs)?

While there is usually a concept of a premium for short-term robots and a minimum period (usually 3 months), vendors offering this sort of arrangement are truly Robots-as-a-Service vs simply offering subscription pricing to fit into an OpEx model.

Low-cost pilot projects have become a significant part of the sales process for many vendors. This "try before you buy" approach is helpful for vendors in the selling process because it provides a certain amount of stickiness to their solution. That is not to say pilots are negative; you should get to your chosen vendor before you spend the effort associated with a pilot.

Be aware of the potential for sunk costs associated with any pilot project. These could include potential upgrades to the electrical service, arranging space for charging stations, and networking improvements. Still, the opportunity to negotiate a pilot can assuage ROI, safety, and scalability concerns with a minimal investment. We highly recommend, for all the reasons indicated above, pilot projects.

Key Takeaways

The form factors, use cases, and varieties of robots and goods-to-person technology can be daunting. But that doesn't mean it's not navigable. Our essential tips are:

- Don't become enamored with any vendor or solution – work on the ROI as well as use cases and always consider opportunity costs.
- When you talk with vendors, supply them with the same information: square footage, maximum height (where applicable), order profiles, singles percentages, multi-item percentages, SKU affinity (if applicable), etc.
- Have commercial conversations early in the process. Examine their approaches to OpEx, subscription, and As-a-Service financial arrangements.
- If the vendor offers a true Robots-as-a-Service structure, negotiate the costs of on-demand robots as part of your initial contract.
- When you create your finals list, include IT/facilities representation. If it comes to tiebreakers (quite rare), have IT and facilities maintenance weigh in on the integration approach and any long-term support models.
- Do your due diligence on the vendor's history and financials. There are many new entrants in the field, ongoing consolidation, and an uncertain path forward for some vendors.
- Do a pilot project, but only plan a pilot after selection. Using pilots from multiple vendors as an audition process rarely creates ROI due to sunk costs. Instead, use the pilot after selection to validate the use case(s), FTE utilization, and projected ROI (pro-rated for the percentage of full utilization your pilot captures).
- Think about the integration/orchestration plan for getting the most out of your automation by effectively integrating it with the other software that runs your warehouse.

* References to example vendors are not a recommendation, simply samples of representative vendors

About IFS Softeon

IFS Softeon is a WMS provider delivering visibility from the boardroom to the warehouse floor. Powered by Industrial AI, IFS Softeon combines deep industry expertise, robotics orchestration, and proven warehouse execution in a single, seamless offering. For over two decades, we have helped our customers optimize their fulfillment operations. Investing in R&D enables us to develop software to solve the most complex warehouse challenges. IFS Softeon is laser-focused on customer results, with a 100% track record of deployment success. As part of IFS, Softeon now brings IFS's added scale, global reach, and Industrial AI innovation to the warehouse. We believe warehouse leaders shouldn't have to settle for a one-size-fits-all approach to technology. For more information, please visit www.softeon.com.