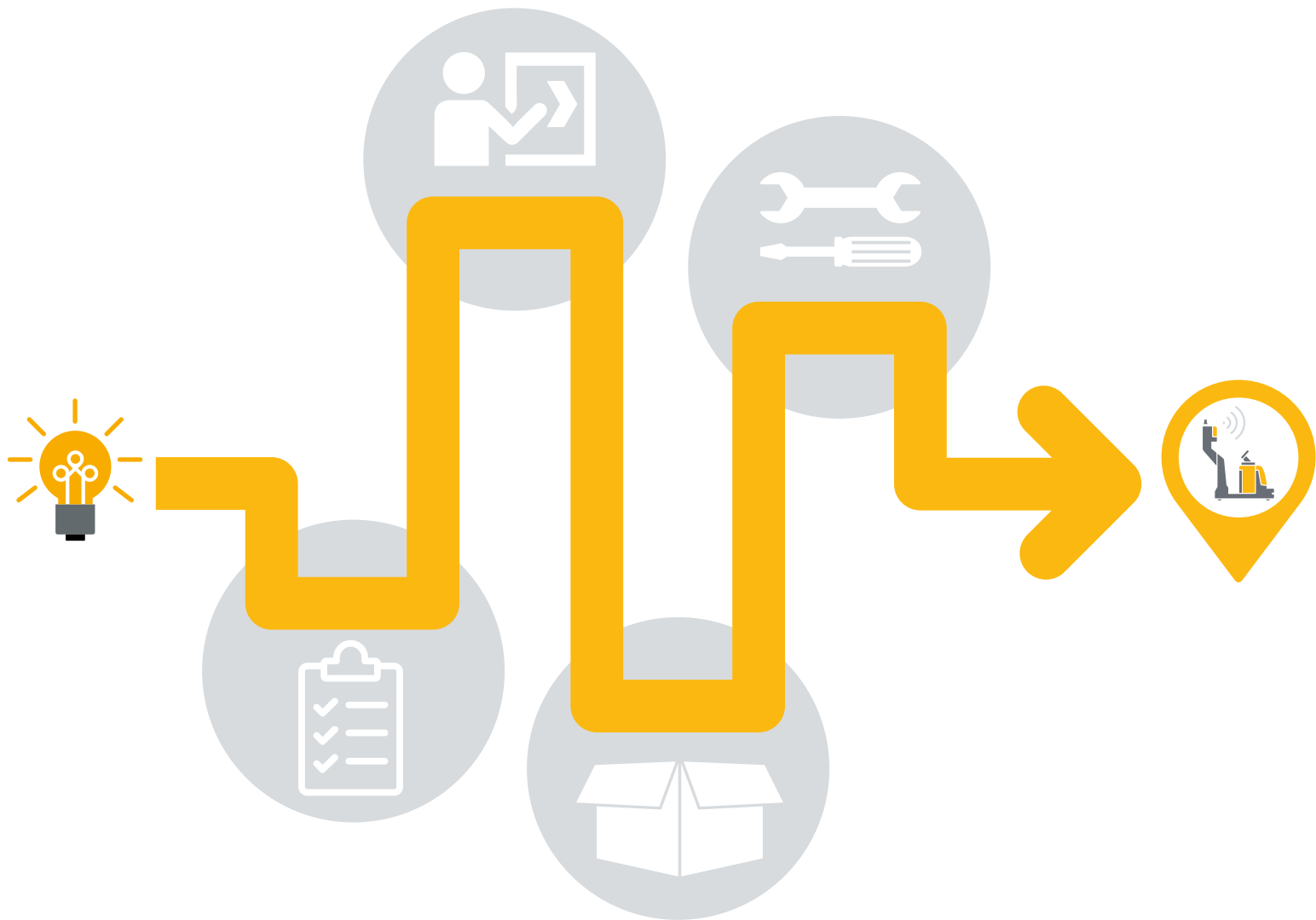


From start to completion: a road map for automating your warehouse.

A complete action plan in four phases and twelve steps.



Introduction: a project in four phases.

You're eager to start automating your warehouse. But how should you go about it? Where should you begin? And who do you need to help you? In this step-by-step plan, we'll guide you through your automation project, all the way to delivery.

An automation project generally comprises four phases:

- A. Preparation.** This phase is about creating support and commitment within the company for the automation project. It's also the point at which you need to prepare a realistic schedule so that you know when the automation system will ultimately be in use.
- B. Concept development.** This phase involves shaping the automation project in specific terms. This starts with mapping the current situation and putting together a reliable forecast of future flows. It's then a matter of deciding on a solution direction and drawing up a business case.
- C. Acquisition.** Once you've determined the direction, you can go to the market and start approaching suppliers. The challenge is choosing the right one.
- D. Completion.** This requires a number of elements, including a good schedule that includes sufficient time for crucial phases such as system testing and commissioning.

This document provides an outline of each phase and the steps that they involve. Remember that this step-by-step plan applies not only to new, automated warehouses, but to systems such as semi-automated order picking systems as well. There too, you will need to start by creating support and commitment and mapping out the current situation and future flows before developing and moving a specific concept to completion.

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Phase A: Preparation.

Step 1: Determine the logistics strategy

Why this step?

An automation project needs to contribute to the realisation of the business strategy. If you can demonstrate this, you will have taken the first important step towards management approval. This will also give you a good story to help you build support on the shop floor. Your employees will be motivated if you can make it clear to them why their extra effort is required.

How should you approach this?

Ideally, management will have already put together a clear medium-term to long-term strategy. If not, ask them about the corporate strategy. The logistics or supply chain strategy should be derived directly from this business strategy. In other words, the logistics strategy must contribute to the realisation of business objectives.

A choice of three strategies

Researchers Treacy and Wiersema broadly distinguish three different strategies and companies will need to choose between them. After all, you cannot perform to the optimum in every area. Each strategy has consequences for the way in which you organise the logistics and operate the warehouse.

- **Operational excellence:** the company competes primarily on price. This means that logistics costs must be minimised. This requires the warehouse to have standardised processes that are carried out as efficiently as possible.
- **Customer intimacy:** it's not the price, but positive relationships with customers that set the company apart. This requires rapid response times, for example, and a high level of service with complete and error-free deliveries. In the warehouse, this means a focus on short throughput times and maybe even additional space for value-added logistics.





- **Product leadership:** the company distinguishes itself through innovative products which people are eager to commit to. They are prepared to wait for delivery and to pay a little more for the product. The quality of the product must be exceptional, as must the logistics that support it.

Which strategy does your company follow?

Unfortunately, many companies have not formulated a clear corporate strategy. The question is then which performance indicators or KPIs you and your warehouse will be viewed through. Is it about the costs or the number of orders that are delivered promptly, correct and complete? Your automation project must contribute to the attainment of the objectives that are associated with these performance indicators. The following strategic questions are of particular importance to automation:

- **How is the market developing?**

This question determines aspects such as the future order pattern and the scope and nature of the work that follows.

- Will volumes increase or decrease over the coming years?
- How are the needs and requirements of customers changing?
- Are they likely to order more frequently or expect faster delivery times?
- What are competitors doing?

- **What strategic decisions is the company making?**

These decisions have an impact on the range and stock in the warehouse.

- Are there any plans for mergers or acquisitions?
- Does the management want to tap new markets or establish new product groups?
- What does the stock strategy look like? Does the company want more or less stock in storage?
- Are there plans to produce more to customer order, for example, or to move stock risks to suppliers?

- **What are the technological options?**

The answer to this question will indicate the way in which automation can help meet future challenges.

- What innovations are taking place when it comes to automated systems in logistics?
- What options do current and future technological possibilities offer?
- Which technology can contribute to achieving the corporate strategy?

- **How much financial room is available?**

The answer will clarify whether or not the desired technology is actually feasible.

- Does the company have equity to invest in automated systems and is it willing to tap into that equity?
- Are banks willing to finance a new warehouse?
- What return on investment is required?

What will this give you?

Insight into the corporate and logistics strategy, supplemented by the answers to the questions above, will help you to prepare for the next step: creating support and commitment. You will have a grip on discussions with the management and other departments and be able to avoid surprises.



Step 2: Create support and commitment

Why this step?

Automating your warehouse will have a major impact on the organisation as a whole. In general, the higher the degree of automation, the greater the impact. If you build a completely new, automated warehouse – maybe even at a different location – every department will be affected to one degree or another. To make the project a success, the entire organisation will need to support the intention to automate from the very outset. Only if management and other departments are convinced of the need for automation can you be certain of their support.

How should you approach this?

The key is to work with management to give your plans some direction. This can only work if the entire management team shares the same vision for the future. This is the point at which the corporate strategy comes back into picture. If you establish which logistics strategy is required to realise the corporate strategy, you can increase the management team's willingness to work with you to shape the automation plans. It is important that every member of the management team then takes responsibility for the role of their own department(s). Only then will you find the support that you need to advance your plans.

Which departments should you involve in your plans?

• Sales and marketing

Sales and marketing are the eyes and ears of the company. They understand market developments and how customers' expectations are changing. As such, they provide important input to the corporate strategy and thereby determine, to a large extent, the way in which logistics should be organised. In addition, you also need sales and marketing to ensure that the system is a success after commissioning. If your automated systems can increase value for customers, sales and marketing will be responsible for 'selling' them.

- What changes in customer preferences and requirements do they witness?
- How is turnover developing?
- How does a higher level of service, shorter response times or better quality affect turnover and margins?

• Production

The production department - or in the case of a trading company, the purchasing department - is responsible for determining the incoming material flow.

- What will change here in the coming years?
- Will production capacity remain stable or increase?
- Will the department produce to stock or customer order?
- Are series or batch sizes changing or are there other plans to adjust the production philosophy?
- Are there developments in production technology or legislation?
- Or are there plans to outsource parts of production?

- **Research and Development**

The product development department also has an impact on the incoming material flow.

- How will the design change in the coming years?
- Will the number of versions of products, and thus stock, increase?
- Will that mean an increase in the number of components, or is there standardisation in that area through modular design techniques?

- **Purchasing**

This department plays an important role in the purchasing of an automated storage and order picking system and associated services.

- Does the purchasing department have the right skills?
- Is experience available in purchasing these kinds of system?

- **Finance**

An automated system for a warehouse requires a large investment. The finance department can offer insight into the financial room that's available.

- What financing options does the company have?
- What is the desired return on investment?

- **ICT department**

Automation, in whatever form, has an IT component.

- To what extent must the automation system be integrated with other IT systems such as the existing ERP or Warehouse Management System (WMS)?
- What are the requirements of the IT department?
- How much time does the IT department have?

- **HR department**

Automation will mean a change to or even disappearance of existing roles in the warehouse. The HR department can help guide this particular aspect.

- Which people are suitable for a role in the overhauled warehouse?
- What skills are needed?
- How can you encourage these people to change along with the organisation?
- How should you approach those who aren't suited/willing to change?



What is your role?

A critical question is your own role in the project.

Your position in the organisation.

- What is your decision-making authority?
- What are you responsible for, and what are the limits of your responsibility?
- Who has decision-making capacity?

The key is in making sound agreements with management on tasks and responsibilities in advance. That ensures clarity, prevents any comeback after the fact, and protects relationships from being affected by differences of opinion.

Your skills

- Do you or your team have experience in purchasing and implementing large and complex systems?
- What tasks or roles can you delegate to other people in the organisation?
- Can they combine that with their current role or would you need to free them up for it?

Be clear about your own skills and the skills of your team. The question is whether you can do everything yourself. It may be that you need to hire in some or all of your knowledge and experience, perhaps in the form of a consultant, interim manager or project manager. These are specialists who frequently undertake these kinds of large, complex project on a regular basis, while for you it may be the first and last time you'll do it.

Tip: establish a project team

- Ensure that all relevant departments are represented in the project team.
- Appoint a project manager with specific project management skills.
- Ensure that there is clear division of tasks, roles and responsibilities.
- Ensure that project team members understand the time commitment.
- Establish clear working agreements, including on the frequency of meetings, follow-up on points for action, sharing of information, etc.
- Does the team lack certain skills? Does it lack the time to devote to the project? Don't be afraid to hire in external knowledge and experience.

What will this give you?

Once you have completed this phase, all boundary conditions will have been satisfied to help ensure that the automation project is a success. You have gained support from management. You have informed all respective managers and their departments and gained their support too. You have put together a project team with members who know what is expected of them and have the time and space to fulfil their role within the team.



Step 3: Establish a realistic schedule

Why this step?

If you put together a realistic schedule in advance, you increase your chances of it actually being met. You will avoid becoming bogged down in certain phases, waiting for final approvals. In addition, if you have a schedule in place, you can also manage expectations within the organisation. A complex automation project is not something that you can complete overnight. Constructing a new, automated warehouse can easily take as long as three years from initial idea to completion.

How should you approach this?

There are three important aspects when establishing a schedule.

- **Determine the desired end goal**

When should the automation project be completed? In some cases, there may be hard deadlines to meet. These could include an existing rental contract or maintenance contract that is due to expire, or a turnover forecast that clearly indicates when current capacity will run short.

- **Pick the right moment**

When is the right time to commission a new warehouse or a new system? If you can, pick a quieter period so that you have the time to upscale towards the peak season. Take into account any outflow if you need more time. This will prevent the system running short of capacity during the peak season.

- **Work back from the end goal**

Make a realistic assessment of each step. Remember that testing and adjusting the system can sometimes take longer than building the hardware itself. You should also build in enough time to get people on board with the developments - you can do this with presentations, demonstrations, workshops, training and reference visits. Many companies underestimate the time needed for change management.

- **Take external pathways into consideration**

There are often external processes with long lead times running in parallel to an automation process. These could include:

- Purchasing industrial land.
- Architect's design.
- Building permit from the local authority.
- Funding from banks.
- Approval from fire service and/or bodies.
- Construction/expansion of the premises.

Ask what the lead times are beforehand and take them into consideration in your schedule.

Try to run as many processes as possible in parallel to avoid wasted time.

- **Establish 'milestones' and go/no go points**

Clarify what needs to be ready by when for the next phase to begin. Don't be afraid to postpone the next phase if the phase before it has not been completed.

- **Announce the schedule**

Ensure that all people and departments involved are aware of the schedule so they know what is expected of them and when. Once the project has started, keep them informed of how things are progressing.

What is a realistic schedule? As a rough guide, it might look like this:

1. Preparation: six months to a year.
2. Concept development and acquisition: six months to a year.
3. Completion phase: six months to a year.

In other words, a full automation project tends to take between one-and-a-half and three years. If you can free up project team members and give them more time, you can expect things to move faster than if they have to squeeze the project into their 'day jobs'.

Note that the majority of the time spent on the project is for the first two preparatory phases. If, later on in the process as questions about things like the automation model are answered, you will be able to be more detailed in specifying the schedule. Below is an example of a generic schedule.

What will this give you?

Project momentum. You know at what point in time which phase or step needs to be completed so that the desired completion date is safe. Monitoring lead times is an important responsibility of the project manager. They are responsible for ensuring that decisions are taken and approvals given at points at which the project is at risk of stagnating.

Step	Lead time Per step (months)	Total time (months)
4. Map the current situation	2	2
5. Map future flows and processes	2	4
6. Determine the concept direction	3	7
7. Take the business case to management	3	10
8. Select the supplier(s)	3	13
9. Prepare a detailed schedule	1	14
10. Decide on the detailed design	2	16
11. Prepare the warehouse	6	22
12. Test the system and train people	2	24
Final commissioning	1	25

4. Map the current situation 2 2
5. Map future flows and processes 2 4
6. Determine the concept direction 3 7
7. Take the business case to management 3 10
8. Select the supplier(s) 3 13
9. Prepare a detailed schedule 1 14
10. Decide on the detailed design 2 16
11. Prepare the warehouse 6 22
12. Test the system and train people 2 24
- Final commissioning 1 25





Phase B: Concept development.

Step 4: Map the current situation

Before you can start to automate, you need to know exactly what it is that you want to automate. What are current flows through the warehouse like? What activities are carried out on the warehouse floor? Where are the bottlenecks?

This step will also indicate the extent to which the current operation can be improved with minor adjustments or optimisations. Implementing these improvements will create additional space for growth or change. This can also help to delay the point at which warehouse automation becomes inevitable.

This step can be conducted concurrently with step 5: Map future flows and processes

How should you approach this?

Qualitative analysis

Start with a qualitative analysis of the operation. There are two ways of doing this, each of which gives insight into the processes on the warehouse floor, but in a different way.

- **Map the flows in the layout**

- Prepare a layout of the warehouse, marking the different storage areas, racking, workstations and docks.
- In that layout, indicate the flows from the moment goods enter to the moment they leave the warehouse.
- Take into consideration differences in product groups: do all goods go to the same storage area or do some products have their own space in the warehouse? Are there intersecting or opposing streams? Do goods take a seemingly unnecessarily long route through the warehouse? This is an indicator of bottlenecks and inefficiencies in the operation.

- **Map all process steps in a flow chart**

- Map out each process step by step by creating a flow chart. What happens when a truck arrives at the dock? What happens with each order placed by a customer? For example, start at truck unloading, then goods inspection, booking-in and storage.
- Take the different flows into consideration. In a food warehouse, the storage process for fresh food will look different to that for non-perishable food. In a retail warehouse, an order from an online store will have a different process to an order for restocking a shop.
- For each process step, indicate who takes care of implementation and who is responsible.
- Remember to take all exceptions into consideration. What happens if an incoming batch of goods is rejected, for example? What if an order picker finds a picking location is empty? Such instances often trigger other processes.



For automation, the extent to which these processes can be simplified and standardised is what is important. Each version of a process adds additional complexity and makes automation more expensive.

Quantitative analysis

As soon as there is clarity with regard to the qualitative analysis, it's time for the quantitative analysis - what is the scope of all mapped flows? The key is to look not just at average figures, but at the spread of those figures. Suppose, for example, that you process an average of 100 orders a day. There will be quite a difference in how your operation is managed and how the automation is set up when orders fluctuate between 95 to 105 orders per day and 50 to 150 orders per day. In any event, the quantitative analysis should contain the following analyses:

• Order profile

There is a big difference between delivering orders on full pallets, in boxes or as units.

- What is the number of order lines per order, and the number of units per line?
- What are the differences in order patterns by customer group or sales channel?

• Seasonal patterns

Many companies have a peak season and a low season. To what extent does the capacity of the automation systems need to be coordinated with the volumes in the peak season?

- What do those seasons look like?
- For how long do they last?
- How are stocks built up ahead of the peak?

• Daily and peak volumes

Volumes of incoming goods and orders often vary from one hour to the next and from one day to the next. An ever-increasing number of customers are waiting until the last moment to order (the cut-off time), which gives rise to spikes in the order picking process.

- Can peaks be identified in the distribution of volumes throughout the day and week?
- Are there ways to optimise processes by flattening the peaks?

• ABC analysis

When it comes to automation, fast-moving items often require a different approach, and different systems, to slow-moving items.

- What are the fast-moving, medium and slow-moving items in the warehouse?

Tip: when conducting an ABC analysis, look not at the turnover rate but at the order picking frequency - the number of times a picking location is visited. If a fast-moving item only leaves the warehouse as a full pallet, the impact on the order picking process is very different to that of a fast-moving item ordered only by the unit.

• Number and type of picking locations

To determine this, both the ABC analysis and item details are important.

- How many picking locations are there and what size are they?
- Is that sufficient, or are more needed?
- What are the dimensions of the items in stock?
- How many items are there in a box and how many boxes are on a pallet?

- **Utilisation of storage locations**

If the utilisation rate is above 95 percent, there is a question of whether the current warehouse capacity is sufficient.

- What is the warehouse utilisation?
- How many storage locations are at capacity?

Endeavour to visualise all quantitative analyses – perhaps as a graph showing the number of orders received per hour. These visualisations aid understanding far better than an endless list of figures.

Zoning plan

Using the qualitative and quantitative analyses, you can, in conjunction with the outcome of step 5 and before step 6, outline a new warehouse layout. A zoning plan like this is compiled as follows:

1. Start by putting the contours of the current premises down on paper.
2. Indicate the ideal layout of the premises, taking into consideration the space needed now and in the future.
3. Take into consideration space gains you can make by optimising processes and flows.
4. Map the space gains that you can achieve within the contours of the premises, and what additional space you need.

Docks
Removal
Consolidate
Order picking small items
Storage
Conveyor
Automated small items warehouse
Automated pallet storage
Office

Tip: involve your team

It can be a good idea to involve your team in this step, including your team leaders and employees from the warehouse floor. In many cases, especially where manual operations with a low degree of control are involved, there are operations that take place on the warehouse floor that are so obvious that they are at risk of being overlooked. In many cases, these are processes or actions that have come about quietly over the years and that are valuable but have never been explicitly recorded.

Share the outcomes of this step to your team and ask for feedback. Your team leaders and employees can tell you things that you have overlooked. This avoids the need for design modification later in the project when you have already decided on a concept. Another benefit is that by involving your team leaders and employees in this step, you boost support for future changes on the warehouse floor.

What will this give you?

A thorough analysis of the current situation will offer insight into existing bottlenecks and inefficiencies, and into the space for growth that the operation offers. At the same time, it will also indicate ideas for simplification, standardisation and optimisation ahead of processes automation.

This is important, as it makes automation of processes easier and cheaper. In addition, you will also have an initial impression of the space needed now and in the future and the options offered by the existing premises and alternative concepts.

Step 5: Map future flows and processes

Why this step?

An automated system will last for five to ten years without any problems, perhaps even fifteen. This means that the system must be able to facilitate the logistics process not just now, but in future years. Map future volumes by considering the way processes and customer needs may evolve.

How should you approach this?

This step builds on the results from steps 1 and 2. The corporate strategy largely determines how the future will look. It should be possible for you to forecast future volumes and processes with assistance and information from the sales and marketing, product development and production departments.

Specific steps you can take:

- Visualise anticipated volumes for the next five to ten years in a graph so that you can quickly see how flows are developing.
- What is the desired amortisation period? Put this in the graph as well.
- Look at the impact of future processes on the material flow. One effect of e-commerce is an increase in the number of orders, with a decrease in the volume per order. Changes to order patterns of this nature may require other decisions in subsequent steps relative to the warehousing concept.

A forecast will never be entirely accurate, so carry out a sensitivity analysis by calculating two (or more) other scenarios in addition to the base case:

- A 'worst-case scenario': how will volumes develop in the worst-case scenario?
- A 'best-case scenario': how will volumes develop in the best-case scenario?

You should also endeavour to estimate the probability of these scenarios occurring. Put the results into the graph so that you have an idea of the range of your forecast.

A sensitivity analysis allows you to properly balance risks later in the phase. Will automation still be worthwhile, even in the worst-case scenario? Can you upscale if volumes grow faster than anticipated in line with the best-case scenario?

Before moving on to the next step, present the growth scenario, including sensitivity analysis, to management. This will give you valuable feedback, but also give you the basis you need for future decision-making.

What will this give you?

A good forecast of future volumes and processes, including a sensitivity analysis, enables you to make the right decisions when it comes to defining the desired concept and select suppliers. This does not necessarily mean that you should choose a concept that has been forecasted for the next ten years, as no one can see that far into the future. It might make more sense to look at a concept that is sufficient for the next three, four or five years, and which includes options to upscale capacity or expand the system.



Step 6: Determine the concept direction

Why this step?

The concept is nothing more than the blueprint for your future logistics operation. The concept indicates what you will automate, and how. Is full automation desirable? Or would you derive greater benefit from a semi-automated storage and order picking system? Determining the concept direction is perhaps the most difficult step in the entire automation process.

How should you approach this?

What is your role?

In this step, you need to decide whether you and your team should decide on the concept or whether you should bring in external expertise. You have three choices:

1. Do it yourself. This is the most cost-effective, but also the most time-consuming solution. Do you have enough free time? More importantly, do you have the skills? Are you sufficiently familiar with the automation market to develop the ideal concept yourself? Do you have enough experience to know what works and what does not work in your situation? The majority of logistics managers only experience an automation project once or twice in their careers. The question is whether it's a good idea for them to handle it themselves.

2. Hire in a consultant. If you do not have the time or skills yourself, you can hire a consultant. A consultant will have overseen multiple automation projects and can often determine the right concept direction quickly, partly on the basis of experience. Another benefit is independence and objectivity. The consultant will firstly need to understand your situation and want to form their own view of the operation.

3. Use suppliers. You can also leave the 'thinking' to one or multiple system integrators or suppliers of automated systems. These will have managed more than one automation project, perhaps even in your industry. You can ask them to devise their own concept based on the situation mapped in step 5 and on the future developments outlined in step 4. It is then your job to study each concept and decide which one is the best.

The approach you opt for will have a major impact on your operation. If you choose to do it yourself or hire in a consultant, you will start by creating a concept. If you decide to seek the assistance of suppliers, you have, in fact, already started the acquisition phase.

The advantage of this latter approach is that suppliers know their own systems better than anyone else and can thus see more opportunity for applications. The drawback is that not all suppliers are fully independent and objective. In many cases, they will have specific expertise in their own systems and may be eager to make them part of the concept they recommend.



Sketch out several concepts based on the defined volumes and processes. Important considerations here are:

- **Level of automation:** Is it possible to start with a semi-automated system or to only automate part of the operation in the initial phase?
- **Impact on the operation:** What are the consequences of a concept for the ongoing operation? Can it continue without interruption? If not, is it possible to divide the completion phase into sub-phases?
- **Space required:** How much space is needed for a concept? Does the automated system fit within the four walls of the premises? Or will an expansion or even new construction be needed? A zoning plan for each concept will give you the answers you need.
- **Budget:** How much can be invested in automation? There is no sense in developing concepts that lack the budget to realise them.
- **Alternative solutions:** Remember to include potential alternative solutions to warehouse problems. For example, is outsourcing the operation to a logistics service provider an option? If you're considering a new construction, is your current location the best? If you can save on transport costs by relocating to a more central location, new construction might be a more realistic prospect.

The next stage is to compare the concepts. Costs, benefits and the amortisation period are among the key criteria, but they are by no means the only criteria.

Other possible criteria:

- **Capacity:** Which concept offers the most warehouse capacity and/or order processing capacity?
- **Scalability:** How easy can capacity be increased over time?
- **Flexibility:** How well will the system work if ranges, order patterns or customer requirements change?
- **Speed:** How long will it take for an order to be collected, packed and made ready for dispatch?
- **Quality:** What is the likelihood of employees making mistakes with the new system?
- **Space utilisation:** How much space will the concept require? Will expansion or new construction be needed?
- **Maintenance:** How much maintenance does the system need? What is the sensitivity to error?
- **User friendliness:** How long will it take for employees to become entirely familiar with the system and the new way of working?
- **Safety and ergonomics:** What is the likelihood of accidents? Does the system contribute to improved ergonomics for employees?
- **Impact on the rest of the organisation:** What are the consequences of the concept for other departments, such as the sales, purchasing or production?
- **Schedule:** Which concept can be completed in the shortest possible time, and in any event before deadline?
- **Impact on the ongoing operation:** What impact will customers notice once the concept is accomplished?
- **Sustainability:** What is the energy consumption of the concept? Does the concept have other environmental downsides, such as packaging waste?

Draw up a table populated with the criteria specific to your warehouse. Establish which conditions a concept must satisfy. Give each criterion a weighting factor, for example where a criterion such as capacity outweighs a criterion such as maintenance. Working with your project team, give each criterion a score in each concept, and record that score in the table. Multiply the scores by the corresponding weighting factors and add the results together. The final result will indicate the preferred concept.

What will this give you?

With this result, you can present your team's thinking to management and seek its approval (step 7). You can then go to the market to look for suppliers in a focused manner (step 8). Important: the concept that you now have does not need to be the final concept. Discussions with market parties and with management may give rise to new insights and adjustments to the concept.



Step 7: Take the business case to the management

Why this step?

Before you go to the market, you need approval from the management. Are they on board with the concept and the financial consequences of it? Remember that once you've signed contracts with suppliers, you can't back out.

How should you approach this?

You will have a stronger position if you can present several concepts to management, not just one. This shows that you have researched the options widely and have not just embraced the first best idea that you have found. Also demonstrate how the concepts will work in practice. How will the operation change? What are the consequences for the rest of the company? What is the schedule for completion? And what do you need from other members of the management to accomplish the concept swiftly?

Define a business case for the most interesting concepts. What are the investments required and what is the amortisation period? Always take the following costs and benefits into consideration:

• Costs:

- Acquisition costs
- Execution costs
- Operational costs: usage costs, maintenance costs

• Possible benefits:

- Reduced labour costs due to increased productivity
- Reduced failure costs due to decreased order picking errors
- Higher turnover thanks to better service levels
- Lower stocks thanks to shorter throughput times
- Less sick absence thanks to improved ergonomics

Tip: determine what you prefer yourself first

In your presentation, use clear arguments to state which concept you prefer. With a well-substantiated argument supported by a clear business case, you can steer the outcome of this process to a significant extent.

What will this give you?

If you complete this step successfully, management will approve the concept direction, schedule and required budget, and you will be given permission to start the acquisition process.





Phase C: Acquisition.

Step 8: Select the supplier(s)

Why this step?

The supplier of the automated system has a major impact on the project, if only because you will have to work closely with them for the next six months or year. A careful selection procedure can boost the chances of success. It's also important to make clear agreements about the realisation phase and to include guarantees in the contract.

How do I approach this?

A proper selection process has four steps, where you reduce a long list of perhaps ten suppliers or more to a shortlist. Ultimately, you will arrive at the final round with two or three suppliers, where you will have to make a decision on the basis of further developed proposals.

Before you can embark on this step, there's one more question: will you choose a supplier to take on the role of main contractor, e.g. an overall supplier or system integrator? Or will you choose the best supplier for each part of the automated system? With the first of these options, you avoid finding yourself in endless discussions with suppliers who point fingers at one another in the event of problems, something that will harm the progress of the project and perhaps even the quality of the ultimate system.

1. Prepare basic principles

Start by preparing a document of basic principles or a schedule of requirements. This is the document suppliers will use to prepare their quote. It contains boundary conditions and restrictions, requirements and preferences, i.e. the maximum and minimum expectations of the proposal.

Depending on the decision in step 6, you can use the document of basic principles to determine the solution direction. You can outline the concept direction and ask the supplier for their interpretation and associated costs.

You can also omit the concept direction and rely more on the supplier's expertise, experience and creativity. What solution does the supplier propose to help eliminate your bottlenecks and facilitate your growth? In either case, you must provide the information and data you gathered in steps 4 and 5.

2. Search and write to suppliers

The next step is to identify potential suppliers and to write to them. You can find suppliers by Googling, consulting trade media or enquiring within your network. Pay close attention to suppliers' expertise and skills. Do they have experience in your industry? Have they worked on similar concepts? Don't forget to include your existing partners in the quotation process. They may have an advantage when compared to new suppliers as they know your business and its processes. This can save valuable time.

The next job is to send the document of basic principles to the list of potential suppliers. Don't forget to specify very clearly how their quote should be structured. This will allow you to compare all the quotes you receive side by side. Without this, you risk being left comparing apples with oranges.

3. Compare quotes and reduce the short list

Compare quotes based on the document of basic principles. Make a list of selection criteria and attach a weighting factor to each criterion. Analyse how each supplier scores on the criteria and determine the outcome. Which suppliers will you knock off the list first? What further input do you need to choose from the remaining suppliers?

The aim here is to arrive at a shortlist of two or three suppliers as quickly as possible. You can then go into detail with those suppliers to make a final decision. To do this, you have several tools at your disposal:

- **Simulation:** Have the suppliers create a simulation so that you can get an impression, based on actual data, of how the solution will work in your warehouse.
- **References:** Visit supplier references. They can demonstrate a similar solution to the one they propose for you and you can ask users about their experiences.

Important considerations when choosing the supplier: remember that the supplier's sales team is often not the same team that will work on completion. Once the contract has been signed, other people will handle the detailed design and implementation. An important question is who the project manager is. Ask whether you can meet them in advance and request references of their experience in shepherding projects to completion.

4. Final decision and contract negotiations

Once you have made your final decision, you and your purchasing colleague can begin negotiations. Think carefully about the hard agreements and guarantees that you want to include in the contract. Do you want to include penalties if the schedule is not met or the system does not perform as expected? Do you want to agree a service contract? If so, what agreements on response times, etc. would you like to include? Make sure that the contract is checked by a specialist before you sign.

What is your role?

Do you want to do this phase yourself? Or will you be supported by the consultant you engaged? Remain in charge. You ultimately decide what should be in the document of basic principles and you choose the supplier. You can't leave those things to a consultant.

What will this give you?

Once you have successfully completed the selection process, you will have a supplier. This is a supplier with a proven track record of delivery and price - a supplier you can trust. This trust is essential, as it will undoubtedly come under scrutiny during the completion phase.



4.

Phase D: Completion.

Step 9: Prepare a detailed schedule

Why this step?

After all preparatory steps, it's time to start implementing the chosen concept. That means a lot of work for the supplier, and for you as well. How will you handle that? Good preparation and a realistic schedule create clarity.

How should you approach this?

What is your role?

Things are going to get busier, especially if you take on the role of project manager alongside your existing role. As the project manager, you will be the first point of contact for all parties involved - not just the supplier of the automated systems, but other parties including the architect, construction company, installer, fire service, etc. In addition, you will be responsible for managing the project without disrupting the existing operation, and you will need to ready your own organisation for a whole new way of working.

Experience shows that many logistics managers take on too much, with all the associated consequences.

It can be a good idea to engage internal or external assistance. You could free up an employee to take on the role of project manager or hire a consultant. If you want to take on the role of project manager yourself, you could engage an interim manager to temporarily take on the role of logistics manager.





Coordination with the supplier

Good preparation requires a reliable schedule. Coordinate that schedule carefully with the supplier. What should be done at what time? Which parties should be involved? If the system is to be completed in phases, what do those phases look like?

Work with the supplier to re-establish the milestones. Identify the risks that could give rise to delays, such as a supplier not being able to deliver on time or an IT specialist not having the interface with the ERP system ready on time. What should you do if those risks become reality? What are the consequences for the project and what is the impact on the schedule?

Translation to own organisation

Prepare a schedule for you and your organisation:

- What should be done at what time?
- Who should be involved?
- How much time is needed?

The key is to manage the expectations of everyone in your organisation. Share the schedule with your colleagues, involve them in activities and give them responsibility. That way, you also boost support in the organisation.

What will this give you?

With good preparation and a proper schedule, you can keep a grip on the project as a whole. You will avoid unexpected situations, delays and the need to constantly 'put out fires'.

Step 10: Decide on the detailed design

Why this step?

You have decided on the concept, but before the supplier can complete it, you need a detailed design. That design will indicate precisely what each component will look like, where each component should be installed and how those components will communicate with one another. Only once this is clarified can system installation begin.

How should you approach this?

Creating a detailed design is the supplier's responsibility but you will need to give the supplier some input and validate the detailed design. You should do this with care. After all, when it comes to a detailed design, rubbish in = rubbish out! In other words, if the input you give your supplier contains errors, so will the system that results from it. If this is only discovered during the installation or testing phase there will be additional costs and delays. Imagine you plan a passage in a specific location in a wall, only to find during construction that a load-bearing beam or pipe blocks the way. It could take days to resolve the problem.

In this phase, it's essential to establish good testing protocols. The question is how the test should look to ensure sufficient guarantee that the system can accomplish the agreed capacities, even at full load. You should test all subsystems – but don't forget to test the overall system as well. The biggest challenge lies in the integration of individual subsystems.

Performing a test at full load is difficult. In many cases, much of the range will be missing or there will be insufficient operators or orders. In that case, discuss with the supplier how far you can go with testing and include the requested system availability as determined by the contract. Remember that this kind of test demands a lot from your own team as well.

Finally, prepare a plan B for cases where completion of the automated system fails or commissioning presents problems. Can you still fall back on your old methods or, if IT is giving you problems, go to a backup server?

What will this give you?

Detailed insight into the further course of completion. You will know exactly how the system will look and how it will be tested and commissioned later on, one step at a time.



Step 11: Ready the warehouse and the organisation

Why this step?

As soon as the detailed design is ready, the supplier and subcontractors can start work. This is the phase in which the systems and components go into production. This is a fairly calm phase for your organisation and is a good opportunity to ready your team for the new working method and prepare the warehouse.

How should you approach this?

Start by sharing the results of the previous phase with your team. How will the system look and how will it soon be tested? How will team members work with it? Explain to them what their roles will be in the testing phase. Remember to tell them that the testing phase is also a training phase. During testing, there is a good opportunity to get to know the system. Create a test schedule that brings all future operators on board.

This phase is also a good opportunity to ready your warehouse. Does any part of the premises need to be vacated? Where will that stock be placed in the interim? Can you start to dismantle racking or other systems yourself? It's also important to start recruitment and selection of any new employees. Remember that an automated system requires specific skills. Consider technical employees for everyday maintenance or IT specialists for application management. Are these people already in your current team or do you need to recruit new people? If new employees are already there when testing procedures get under way, they can get to know the new system from the very outset. If the automation project involves warehouse expansion or new construction, this is the time to put everything in place. When the components arrive and physical installation actually starts, the modified or new premises will need to be ready.

What will this give you?

The relative calm of this phase will ensure that by the time the supplier starts installation work, you will have had enough time for finishing touches. You'll have left nothing to chance.



Step 12: Test the system and train people

Why this step?

This is the point at which the system is installed. This is primarily a job for the supplier. For you, it's the next phase that's important – testing the system and training your people. You must ensure that your organisation is ready for a largely new, automated working method.

How should you approach this?

Mechanical installation of the system doesn't usually take very long. The racking, equipment and workplaces that will form the hardware of the automated system will be put into place quickly. You'll witness a lot of activity on the warehouse floor, and a lot of progress to go with it. This will contrast somewhat with the following phase in which the system is tested and your employees undergo their training. With the hardware in place, it may seem like progress has stalled. There'll be people staring at laptops, occasionally operating parts of the system.

Appearances can be deceptive. The testing phase is essential. This phase will determine whether the parts together deliver the performance that the supplier promised. Errors that come to light now can still be easily fixed, without endangering deliveries to customers in any way. Sometimes, companies may want to reduce the testing phase, particularly when schedules are under pressure. This is to be discouraged. An improperly tested system is almost guaranteed to cause problems after commissioning and those problems will undoubtedly occur when you least want them, i.e. when you need to deliver orders.

As stated in step 11, good testing protocols (of the whole system and its component parts) are important. You will need to supply the products, orders and operators. For high-capacity tests, you'll need a large volume of products and orders.

Some important considerations during testing:

- Can you use test products or do you need to draw from existing stock?
- Will you use real orders in the tests, orders that will actually be delivered with the new system, or dummy orders?

To be able to test the system you'll need operators, which means they will need to be able to use the system immediately. The question, however, is whether the testing procedures offer sufficient training opportunity. It's important to establish a good education and training programme with the supplier. Make clear agreements on training times and ensure that all employees are involved as much as possible. Once training is complete, check it is sufficient. It's vital that all employees have the self-confidence they need to actually work with the system.

Tip: distinguish between operators who will soon need to start working with the system and technical personnel who will be responsible for keeping the system running. The latter group, with expertise in mechanical, electromechanical or ICT fields, will need different education and training.

What will this give you?

After this phase, the system will have been fully tested and your employees will be prepared for the new working method. There's now nothing to stop you using the system.

Final Commissioning.



Automation may have been completed, but handover does not mean that the project is over just yet. The question is now how to move stock to the new system and upscale volumes until all orders are processed using the new working method. In this initial period, there may still be teething problems, despite careful testing procedures, which will need to be rectified as quickly as possible.

How should you approach this?

Handover of the system is a memorable moment. When you sign for the handover, you become the formal owner of the system. Before signing, ensure that the system works as expected. Remember that your signature confirms that the system has been delivered properly and that the capacity tests have been passed.

Once handover is complete, it is a signal for the supplier to move his team onto another project so ensure that everyone is in place by that point and that you can be 'self-supporting'. In other words, you need to know how the system works, how to maintain it and how to rectify faults. If you need support from the supplier post-sign-off, it could cost you extra.

Before signing, double-check all agreements, conditions and clauses in the contract. Has the supplier kept the promises made? Tip: agree an option at contract approval to delay payment until a few weeks/months after handover. This will help you to get the supplier to help you if something needs to be done.

There are now two remaining issues:

1. Migration: How will you transfer all stocks to the new system? In many cases, much of the stock will have already been moved during testing. Will you run the old system down? If so, you'll need to have two systems up and running for a longer period of time, which will require additional personnel. Perhaps you're planning to move the remaining stock over a weekend? This is a separate logistical challenge in itself.

Consider whether you can access your stocks manually if you need to. If not, it might not be a good idea to relocate all stock at once, especially if the system is still causing you problems. If you choose to run the old system down while the new one is already filled, you will temporarily have to deal with two stocks. Could that cause problems with things such as expiry dates?

2. Ramp-up: How quickly will you ramp up volumes until the new system is running at full capacity? Will you keep the old system running as a backup, or to plug gaps in capacity? Think ahead to peak season. Will the system be fully operational by the time peak season arrives? Is the availability of the system sufficient? Can you resolve any problems quickly and by yourself? A final tip: plan the handover early enough – before the peak – so you have the time to familiarise yourself with the system and the new working method and can slowly increase capacity.

Once you have successfully resolved these issues, you will be the proud owner of a new, fully functional, automated system. By this point, you'll have invested a lot of effort over a prolonged period of time. Those efforts have now paid off. Congratulations!

Choose a reliable partner.

6.

For a streamlined operation, it is essential that your automation system works properly. As this roadmap shows, much of this is in your own hands. Just as important, however, is the role of the partner you choose. Opt for a reliable partner that understands your concerns and your needs.



Get the answers you need with our automation survey.

7.

Any warehouse automated system study should start by mapping the current situation. How is the warehouse set up? How effective are processes? What are the characteristics of the material flow?

With this inventory list, you can then map much of your operation by yourself. Your answers will give you a clearer picture of how things currently stand. In addition, the list will enable your supplier to give you some initial advice on points for improvement in your operation and on possible automated system solutions.

Take a few minutes to complete our online questionnaire and take the first steps to optimising your operation.

[Start survey >](#)



Jungheinrich Intralogistic Solutions

Jungheinrich Intralogistic Solutions is the division of Jungheinrich that is responsible for the design, sales and realisation of warehouse equipment projects. Jungheinrich is one of the largest suppliers of intralogistics solutions in the world. We are specialists in the equipment and optimisation of warehouse and distribution centre logistics; from installing warehouse racks through to warehouse software, warehouse automation and robotisation.

We not only offer a wide range of warehouse and transport systems, but also retain all expertise in house. We analyse existing processes, identify potential and develop optimised strategies, including for your future requirements. And we do all of this on the basis of your individual needs.

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