



## Building the Business Case for Automation: How to Evaluate Automation Investments

*Benefits beyond pure dollars and cents are needed to drive the investment request across the finish line*

## Introduction

*Gaining authorization to invest in distribution center (DC) improvements, including automation, is a challenging endeavor in most organizations. Overall economic conditions, along with individual business concerns such as availability of capital, competing capital projects and myriad obstacles potentially stand in the way.*

Reasons commonly cited for rejecting or delaying investments to substantially improve DC operations include:

- Prioritization of capital toward top line growth, e.g., manufacturing capacity expansion, new product development, sales and marketing initiatives, etc.
- Concern about temporary decline in sales or reduction in sales growth due to competitive pressures and/or economic conditions
- Limited availability of capital due to recent business conditions
- Unwillingness to put capital at risk due to an unfavorable regulatory climate

Given these immediate obstacles to obtaining investment approval, the development of a sound, thorough business case is essential for the distribution operations management team that wants to move this project forward successfully. This white paper outlines the key requirements for development of an effective business case that will increase your likelihood for receiving senior management support.

A project business case solely based on financial impact will have little hope of successfully navigating its way through the array of capital competition and other business issues blocking its path to approval. Inclusion of relevant benefits beyond the pure dollars and cents, such as increased storage and throughput capacity, improved order accuracy, ability to better meet customer ship date requirements, etc., are generally needed to drive the investment request across the finish line.

## Financial Impact

The primary factor when considering capital authorization within most companies is the financial impact of the investment: What is the resultant additional profit or reduction in costs? If this hurdle can be overcome to the satisfaction of the senior management and/or board, the additional factors outlined below become less critical, yet still important.

Understanding the required criteria for approval is the first step in the process of developing the financial portion of the business case. Many companies focus on Simple Payback Period (payback) as the primary measure of financial impact, with some organizations rejecting out-of-hand any initiative not providing a minimum payback within a 1.5- to 2-year time frame. When considering investment in software or automation through material handling systems, these hard and fast requirements are challenging to meet with projected labor savings alone. Other, less obvious savings often need to be quantified to drive estimated return high enough to gain approval. Listed below are quantitatively verifiable opportunities for savings through software and material handling systems that are often overlooked during the business case analysis:

- Reduction in customer-related, non-compliance penalties through improved control of order accuracy
- Reduction in outside storage (warehouse and/or storage trailers) expenses, as well as the associated loading, unloading, handling and administrative/clerical labor. By more efficient use of existing warehouse space, elements that have previously been outsourced may be able to be brought back inside the four walls of the operation.
- Avoidance of labor cost increases by containing (if not reducing) operational cost per unit, cost as percent of sales and/or other pertinent metrics. (Note: The projected additional cost of not making the investment should be included in the analysis.)
- Compliance with government or regulatory agency requirements for recall or information-tracking initiatives. The penalty for non-compliance not only impacts the bottom line, but also the ability to continue day-to-day operation of the business.
- Reduction in inventory and related carrying costs. With more efficient processes and improved inventory visibility, it may be possible to reduce safety stock levels, improve inventory turns and reduce the amount of product stored on hand.
- Reduction in disposal of expired product or product that is nearing the end of its shelf life
- Transportation savings related to improved equipment utilization through more accurate cartonization and pallet-build functionality
- Improvement in workforce quality by making strategic reductions in the workforce, thereby raising the collective average productivity of those who are retained

Many of these ancillary benefits will require support from management/staff outside the DC operations team. Through involvement of these non-operations experts and inclusion of their input into benefits calculations, the buy-in for the initiative begins to spread through other areas of the organization. In particular, involvement of the finance/accounting team members and their consensus on calculations is extremely beneficial.

Beyond simple payback, different capital budgeting calculations known as discounted cash flow (DCF) techniques can better portray the real downstream financial impact of the initiative being considered. These DCF techniques include the net present value (NPV)<sup>1</sup> method and the internal rate of return (IRR)<sup>2</sup> method. Although payback period is a relatively simple calculation that most everyone readily understands, use of these DCF methods in conjunction with payback has the potential to powerfully influence the decision to move forward.

Below are examples of how NPV can depict a very different picture than the payback method. In the example, the payback period for each of the two optional investments does not vary with the cost of capital. However, the cost of capital has a very substantial impact on the NPV and, depending on the cost of capital used in the calculations, NPV can provide a much more attractive result than the payback method.

	2012 Year 0	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
<b>Cost of Capital</b> 13%	Amounts in thousands										
<b>Option A Investment</b>	(\$2,850)										
Storage Cost Avoidance and Base FTE	\$0	\$60	\$230	\$280	\$300	\$400	\$430	\$460	\$570	\$620	\$670
Operating Efficiencies	\$0	\$400	\$420	\$440	\$450	\$540	\$540	\$560	\$590	\$650	\$720
Total	(\$2,850)	\$460	\$650	\$720	\$750	\$940	\$970	\$1,020	\$1,160	\$1,270	\$1,390
<b>10-Year NPV</b>	<b>\$1,507</b>		\$1,110	\$1,830	\$2,580	\$3,520	\$4,490	\$5,510	\$6,670	\$7,940	\$9,330
Net Impact		(\$2,390)	(\$1,740)	(\$1,020)	(\$270)	\$670	\$1,640	\$2,660	\$3,820	\$5,090	\$6,480

<b>Option B Investment</b>	(\$2,200)										
Storage Cost Avoidance and Base FTE	\$0	\$60	\$230	\$280	\$300	\$400	\$430	\$460	\$570	\$620	\$670
Operating Efficiencies	\$0	\$290	\$330	\$340	\$350	\$430	\$440	\$470	\$480	\$520	\$600
Total	(\$2,200)	\$350	\$560	\$620	\$650	\$830	\$870	\$930	\$1,050	\$1,140	\$1,270
<b>10-Year NPV</b>	<b>\$1,583</b>		\$910	\$1,530	\$2,180	\$3,010	\$3,880	\$4,810	\$5,860	\$7,000	\$8,270
Net Impact		(\$1,850)	(\$1,290)	(\$670)	(\$20)	\$810	\$1,680	\$2,610	\$3,660	\$4,800	\$6,070

At a rate of 13% cost of capital, the payback periods for Options A and B occur during year 5, and based on the requirements of many organizations, it would not be funded. The NPVs for Option A, \$1.5 million, and Option B, \$1.6 million, are also marginal at 13% cost of capital, so not necessarily more attractive than the payback.

	2012 Year 0	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
<b>Cost of Capital</b> 5%	Amounts in thousands										
<b>Option A Investment</b>	(\$2,850)										
Storage Cost Avoidance and Base FTE	\$0	\$60	\$230	\$280	\$300	\$400	\$430	\$460	\$570	\$620	\$670
Operating Efficiencies	\$0	\$400	\$420	\$440	\$450	\$540	\$540	\$560	\$590	\$650	\$720
Total	(\$2,850)	\$460	\$650	\$720	\$750	\$940	\$970	\$1,020	\$1,160	\$1,270	\$1,390
<b>10-Year NPV</b>	<b>\$3,866</b>		\$1,110	\$1,830	\$2,580	\$3,520	\$4,490	\$5,510	\$6,670	\$7,940	\$9,330
Net Impact		(\$2,390)	(\$1,740)	(\$1,020)	(\$270)	\$670	\$1,640	\$2,660	\$3,820	\$5,090	\$6,480

<b>Option B Investment</b>	(\$2,200)										
Storage Cost Avoidance and Base FTE	\$0	\$60	\$230	\$280	\$300	\$400	\$430	\$460	\$570	\$620	\$670
Operating Efficiencies	\$0	\$290	\$330	\$340	\$350	\$430	\$440	\$470	\$480	\$520	\$600
Total	(\$2,200)	\$350	\$560	\$620	\$650	\$830	\$870	\$930	\$1,050	\$1,140	\$1,270
<b>10-Year NPV</b>	<b>\$3,712</b>		\$910	\$1,530	\$2,180	\$3,010	\$3,880	\$4,810	\$5,860	\$7,000	\$8,270
Net Impact		(\$1,850)	(\$1,290)	(\$670)	(\$20)	\$810	\$1,680	\$2,610	\$3,660	\$4,800	\$6,070

Using a 5% cost of capital, the payback period for Options A and B still occur during year 5, and would not be funded within most organizations. However, the NPVs at 5% for Option A, \$3.9 million, and Option B, \$3.7 million, could alter the financial picture and drive more support for funding.

1 Net present value (NPV) is defined as the present value of future returns, discounted at the cost of capital, minus the cost of the investment.

2 Internal rate of return (IRR) is defined as the interest rate that equates the present value of future returns to the investment outlay.

## Increased Capacity

Ensuring sufficient capacity to meet customer requirements, particularly for fast-growing companies, is a critical and, to some degree, predictable operating variable. Nothing can constrain a rapidly growing company as quickly as its inability to meet demand. A warehousing initiative providing additional order processing capacity or higher service levels can support or lay the groundwork for a new marketing project, or business expansion requiring multi-channel fulfillment capabilities. The value of dynamic distribution operations and networks that are able to react to and accommodate changes in the business may only be apparent when an operation fails to adapt.

A recurring mistake made during the development of plans to build capacity for future growth is to focus exclusively on a bottleneck area, whether a specific DC in the network or a particular function within the DC. The current capacities for all storage areas, work functions and work spaces need to be thoroughly assessed early in the planning process. An all-encompassing plan should be developed to ensure that each function within the DC can meet future design requirements with either its current or augmented capabilities. Without a comprehensive plan, there is a danger that investment to eliminate one bottleneck can result in creation of a second, third or more bottlenecks. For example, investment in automation to increase picking throughput capacity without considering the potential bottlenecks in packing, manifesting or other downstream processes will not necessarily increase overall capacity for the DC.

When including capacity increases as a contributor toward the overall business case, it is critical that the overall ability for the distribution network or DC to accommodate your company's growth projections be understood. Otherwise, the business case will not be approved, or even worse, the investment will be made with the potential to fail to meet senior management's expectations.

## Improved Customer Experience

According to Gartner analysts in a webinar entitled, Supply Chain Solutions: Growth Opportunity for Software Providers, conducted in July 2012, the desire to improve customer service and the customer experience is the number-one business priority for companies today. There is obviously the perception of a high correlation between the customer experience and top line growth among today's senior level executives.

We could go one step further and state that many distribution center network and/or DC initiatives must provide meaningful favorable impact on the customer experience. For investments that have marginal financial return, inclusion of the specific service improvements that will be achieved in the business case can make the difference between approval and failure. Below are some examples of customer-related benefits that should be incorporated into the business case if applicable.

- Improved customer retention and same-customer growth through demonstration of accurate, consistent and timely fulfillment
- Turning improved distribution operations into a superior customer experience to drive growth as a differentiator over competition in the marketplace

Investment in distribution capabilities can enhance the customer experience through:

- Improved order accuracy: shipping the right product, in the right quantity, to the correct address, at the right time
- Customer-specific labeling and/or other value-added-services (VAS)
- Improved communication of relevant information, i.e., carton/pallet level detail, license plate data, delivery contents and advance shipping notices
- Consistency of packing, cushioning, labeling, and carton-sealing quality, leading to reduced damage and improved appearance of package to end customers
- Shortened delivery lead time. By becoming more efficient and increasing distribution capacity, product gets to the customer faster than the competition

## Business Priorities Shift Toward Customer Satisfaction and Growth Initiatives

	2008 study	2009 study	2010 study	2011 study
Improve customer service	3	3	3	1
Target SC contributions to drive business growth	5	4	6	2
Innovation	*	*	*	3
Improve efficiency or productivity	2	1	1	4
Reduce costs	1	2	2	5
Improve business processes	*	*	*	6
Support corporate or SC sustainability	*	*	10	7
Optimize SC throughput and cash-to-cash cycle time	*	*	9	8
Improve asset utilization/return on assets	*	*	8	8
Improve business continuity, risk + security	*	*	7	10

\* New response category

Ranked by sum percentage of top three priorities

Source: Gartner Supply Chain Solutions: A Growth Opportunity for Software Providers by Chad Eschinger and Dwight Klappich

## Employee Safety/Ergonomics/Environment

Reduction of employee exposure to physically demanding and/or extreme repetitive motion activities is a key benefit of introducing technology and automated equipment into the DC work environment. Through automation, fatigue and exposure to work tasks that have the potential to result in injuries can be greatly reduced. Additionally, the introduction of technology, such as voice recognition technology, can eliminate the need to carry replenishment reports, pick lists and other documents so workers have both hands to lift, transport and place product.

Obviously, any improvement in employee safety and ergonomics would be viewed as an extremely favorable impact and enhance a marginal business case.

Workplace environment is another potential benefit of streamlining product flow through automation or other technology as DC employees can work much more efficiently. The ability to move more product through the various areas within the DC with less effort is typically viewed positively by, and fosters a “winning” mentality among, the workforce. This type of environment is critical to attracting and retaining successful employees.

Several examples of how automated solutions and investment in technology can enhance the workplace environment include:

#### **Pick module with shipping sorter:**

- Reduces employee travel time and reliance on order-picking trucks or powered pallet jacks
- Reduces/eliminates need for lift trucks in the picking operation altogether; eliminates the need to pick at dangerous elevations
- Improves the ergonomics associated with reaching into pallet racking and stacking to pallets during the picking process
- Separates pick travel on foot from put-away and replenishment travel on lift trucks

#### **Goods-to-man picking methods:**

- Eliminates foot or lift truck travel during the picking process
- Ensures that picking tasks occur at ergonomically correct heights and reach-ranges at engineered workstations as opposed to bending/stretching to reach low/high shelves in bin shelving/carton flow racking or pallet racking

#### **Automated picking systems/technology:**

- Eliminates the need for manual picking altogether for certain items; examples include:
  - A-frame/V-frames for unit picking
  - AS/RS for pallet loads
  - Mini-load/shuttle systems for case picking

#### **Automated data capture:**

- Eliminates the need for paper-based work tasks through RF terminals with bar code scanning, voice-recognition technology and/or automated label print and apply systems
- Eliminates the need to manually write information and handle documents; with voice technology, both hands are free for handling product

#### **Automated pallet building technology:**

- Eliminates the physical effort to lift and stack cases or totes to build shipping pallets

## Conclusion

In today's business environment, most DC initiatives requiring substantial investment are closely scrutinized. To increase the likelihood that your project will be funded, when it is competing with multiple initiatives from sales, marketing, manufacturing and information technology, a compelling business case is essential. Inclusion of all potential financial impacts, measured from multiple perspectives, along with other relevant business benefits, will provide a much more effective case for investment in DC improvements.

Collaboration with other functional areas in your company, for example, sales and finance, during the development of the business case will create buy-in and a feeling of ownership among key executives, which will foster support for your initiative. By developing a comprehensive business case with active support from your peers in other sections of the company, you will greatly enhance your chances for approval, funding and a successful project.

### Strategic Planning Expedites Expansion

An example of an organization that considered all of the relevant factors in the strategic planning and design of a DC with potential for multi-phased capacity expansion is a women's fashion and accessories retailer. In this example, FORTE was engaged to design a 200,000 sq. ft distribution center (DC), including an overarching warehouse management system (WMS) with a high degree of material handling automation.

The strategic plan and business case, jointly developed by FORTE and the client, included a flexible, scalable approach to facility expansion over a multi-year period. This foresight has proven to be invaluable, as the retailer has recently expanded its DC to accommodate accelerating sales, rapid SKU growth and a dramatic increase in ecommerce.

Completed in 2012, the 190,000 sq. ft facility expansion has made room for additional reserve storage, automated picking and additional shipping capacity. An innovative put-to-light order sort/pack area for ecommerce has greatly improved packing capacity efficiency and productivity. Additional shipping sort lanes for fluid loading and pack and hold, a secondary sorter for LTL shipments with surrounding pallet build area and a separate ecommerce shipping sorter were also part of the expansion. A new mezzanine structure over the ecommerce expansion became the new home for value-added service (VAS) processing with intelligent conveyance for cases and totes.

An advanced simulation and emulation tool was deployed prior to implementation to help forecast system performance by creating "real" conditions that strained every element of the automated warehouse – from conveyor systems to system data flows to WCS integration.

#### Results:

The expanded facility with additional automation performed as expected and with impressive metrics.

- Picking accuracy improved to 99.5% from 89%, with visibility of in-process order status available at the item level
- Labor productivity has increased by 25%, while training time for seasonal help has been dramatically reduced
- Order fulfillment was reduced from two days to as little as one hour
  - Peak order processing increased from 1,500 to 3,000 orders per day
  - During peak seasonal period, 140,000 items per day have been shipped





## Why FORTE

### Single-Source Accountability

Whether we're helping you develop a strategic plan, design and build a distribution facility, or optimize a distribution operation through performance metrics and analytics, FORTE provides a true single point of contact responsible for the complete performance of your distribution network. No finger pointing. No fragmentation of responsibility. No multiple suppliers for technical support. You have performance goals, and it's our job to make sure they're met on an ongoing basis.

### Total Objectivity

We don't manufacture equipment. We don't develop WMS software. We don't have commercial arrangements with any suppliers for expected volumes of business. We're simply interested in delivering the most efficient distribution solutions at the lowest total cost. Our client-side service approach means our only allegiance is to our customers. So with every engagement, you know we'll choose the most appropriate level and blend of technologies integrated into an effective operational system.

### Expertise

Our team is deeply rooted in the hands-on implementation of distribution center design and warehouse automation. FORTE's engineers and technicians integrate today's best practices in supply chain management and distribution center operations while developing next-generation technologies. As a result, our solutions employ the best combination of practical advice, data-driven analysis and technology-enabled systems. With FORTE, you get:

- More accountability than a consultant
- More experience than a systems integrator
- More objectivity than a manufacturer

***That's why the world's fastest-growing companies are making distribution their FORTE.***