

# 11 Steps to Aligning Your Distribution Network for Competitive Advantage

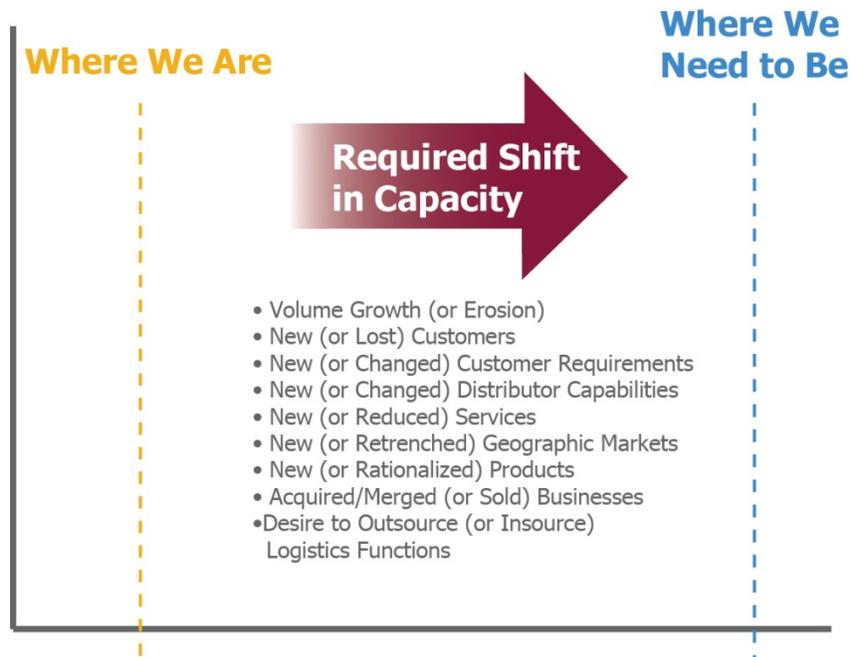


Your distribution network may hold the key to competitive advantage and market success. But designing the best distribution network for your business -- one that will maximize customer service and flexibility and minimize operating costs, capital investment and risk, can be challenging. This step-by-step guide will help you understand how to design a distribution network that lines up with your unique business model and unlocks competitive advantage for your company.

Distribution networks are receiving more of the recognition they deserve as drivers of market success. Adapting your distribution network to changes in business strategy and growth is a path to competitive advantage. But choosing the best distribution network design from the myriad of options is a challenge. And making a change to your distribution network without understanding the impact on cost and service could result in unnecessary operating and capital investment costs throughout a supply chain, and/or potentially decrease customer service levels. How do you design your distribution network to maximize customer service and flexibility and minimize operating costs, capital investment and risk? This article will guide you in understanding what it takes to design the right distribution network for your company.

## Step 1: Identify Scope and Current Network Constraints

Determining the scope of design in a distribution network strategy is crucial. One reason is that the distribution network needs to realign with shifts in business. For example, a change in your sales volume, customer base, requirements, geographic markets, etc. may necessitate a change in your network strategy.



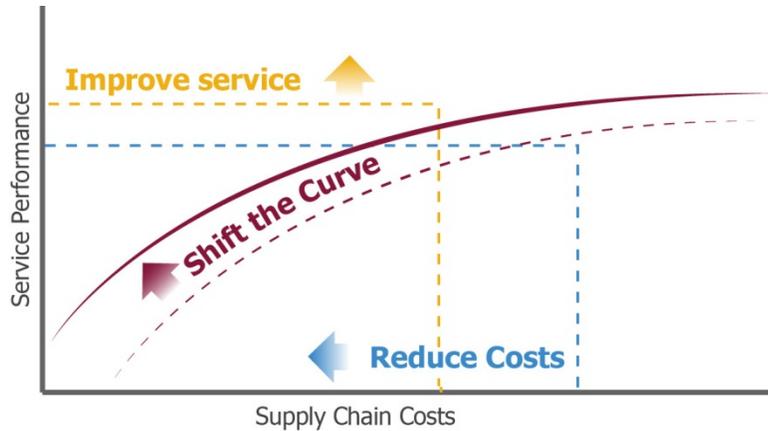
Outlining the constraints under which the network currently operates is also important for creating a design that provides implementable results. Some common constraints include:

- Distribution throughput and storage capacity
- Expansion potential at existing sites
- Material handling requirements for products being manufactured and distributed
- Budgetary constraints on capital investment
- Production line capacities
- Remaining lease timeline and remaining life on facilities and equipment
- WMS and WCS constraints for distributing a SKU out of multiple facilities versus a single facility
- Customer service requirements (next-day, two-day, standard, etc.)
- Order characteristics
- Limitations on transportation carrier availability
- Private fleet capacity
- Limitations on labor availability in current locations (to potentially expand operating shifts)
- Tolerance for risk

### Step 2: Determine Your Goals

If you are experiencing customer service problems, you may be trying to shift your cost versus service curve. Or perhaps you are simply trying to reduce costs. Identifying these goals up front will drive decisions about where the distribution network strategy may be concentrated.

In order to align your distribution network with shifts in business or long-term growth plans and justify the capital investment, quantifiable benefits must be shown. While shifting the cost versus service curve is the fundamental goal of all distribution network strategies, some of the tactics used to do so may work against each other. For example, improving customer service levels might lead to a decision to expand the number of facilities in a distribution network. While this may increase operating costs, improved customer service might result in increased revenues that would offset the increased distribution costs.



### Cost Reduction Tactics

- Rationalize Inventory Investment
- Minimize Transportation Costs
- Minimize Warehouse Space Costs
- Minimize Warehouse Labor Costs
- Minimize Administrative Costs
- Minimize Tax Burden
- Minimize Fulfillment Error Rates

### Service Improvement Tactics

- Increase On-time Performance
- Increase Fill Rate Percentages
- Increase Flexibility

## Step 3: Gather Data on the Current Network Situation

Understanding the current network is the most difficult and time-consuming step associated with any distribution network strategy. When done properly, it allows informed decision-making and confidence in the output of the modeling tools. The saying, “garbage in, garbage out,” applies here.

Volumes of data must be collected, analyzed and verified for accuracy. The resources that maintain this data may be spread throughout an organization. Data that needs to be collected and verified may include:

- Description of all items distributed— dimensions, weight, classifications, units/carton, units/pallet, unit of measure, unit cost, etc.
- Physical addresses of suppliers, customers, and facilities
- Historical line-item demand by SKU by customer for a 12-month period
- Historical line-item supply by SKU by vendor for a 12-month period
- Historical line-item production and/or throughput by SKU by facility for a 12-month period
- Historical transportation costs and modes (LTL, parcel, truckload, rail, etc.) for all shipments being analyzed
- Historical facility labor and operating costs for each facility in the network
- Historical inventory level snapshots by SKU or product category
- Historical storage and production utilization rates
- Current productivity measures for each facility or process being studied
- Current throughput and storage capacities for each facility being studied
- Transportation rate tables for any mode of transportation being used in the network
- Service level requirements by customer and product category
- Growth forecast information for a planning horizon, including:
  - a. SKU growth
  - b. Sales demand growth



- c. Unit demand growth
- d. Customer growth
- e. Regional/local growth trends differing from overall growth
- f. Inventory growth and goals

Depending upon the type of network design being conducted, other data may be required, such as production line rates and capacities, retail store locations, private fleet information, etc.

If some of this data is not available, there are a couple of ways to bridge the gaps. The first is to make assumptions about the required information. For example, vendor ship-from addresses might be unavailable. However, if you know the state or region from where the product is supplied and estimated volumes, you might use a centrally located point in each state where product is supplied to establish an approximation of inbound costs.

Another approach is to conduct field tests or measurements. For example, if product weight and dimensions are unavailable, products might be split into categories, with a couple of representative SKUs within each category measured and weighed to provide a basis for all of the products in a particular category. Whenever assumptions are made about data, it is always a good idea to conduct sensitivity analyses around that information to determine the impact on a network if the assumptions are found to be inaccurate.

### Step 4: Cleanse and Verify the Data

Once the data has been collected, it must be cleansed, verified for accuracy, and formatted to work with the tools that are going to be used to model the network. While it will be virtually impossible to ensure that every piece of data gathered is 100% correct, here are some steps to help you determine if there are glaring errors that might change the design recommendation:

- Look for text entries in numerical fields and vice versa, make sure zip codes have leading zeros, determine cause of blank fields or line items in data, and make sure line item information is properly aligned with the correct field designator. Do this for every data file.
- Look for anomalies in historical databases. Examine shipments to the top 10-20% of customers and verify that the data totals match historical totals. Do the same for inbound shipments from top vendors.
- Determine timing of peak demand and supply periods for top customers and vendors and make sure that these appear accurate.
- Examine production and distribution by SKU or product category at each facility being studied.
- Examine quantities of units shipped by transportation lane and mode between facilities, to customers, and from suppliers. Look closely at specific product categories and SKUs as well to see if their data volumes match your actual performance.
- Examine historical inventory information by product category and by location for accuracy.
- Make sure location addresses are correct for vendors and customers. If billing addresses are inadvertently used instead of shipping addresses, a completely different (and incorrect) set of recommendations could result.
- Examine transportation and operating cost tables for accuracy. A slight error in cost per unit or pound calculations can change a location recommendation or cause misstatement of potential savings.

All inconsistencies in the data need to be rectified with the source closest to the data. After the data has been verified for accuracy, it must be formatted to the specifications required by the design tool(s) you will use. Each tool has different specifications. Depending on the modeling tools you are using and your design requirements, you may not have to do any formatting, or you may need several days of formatting to get the data ready for input.



### Step 5: Select Design Tools

There are several tools that can shorten the time it takes to develop the network design, provide greater insight into the current network situation and how changes will impact the network, and provide better decision-making information. Network design tools include:

- **Database analysis software and spreadsheet software:** used to cleanse and verify data and to analyze alternatives for simple networks or small segments of large networks.
- **Mapping software:** illustrates changes in network structure without relying solely upon tables and graphs. Software that can illustrate changes in product flow and costs from location to location within a network provides valuable insight into the impact of “what if” type questions.
- **Transportation rating packages:** used for rating thousands of shipments at once for different transportation modes. Parcel and LTL rating packages are particularly useful as different weights impact the cost of a shipment (unlike truckload, rail or container shipments that operate primarily on a cost per mile or a cost per shipment basis).
- **Mileage calculation software:** provides distance calculations between addresses, zip codes, or cities. These are extremely helpful with a network realignment in determining the impact on overall transit time and transportation cost (if lane costs are provided on a cost per mile basis).
- **Supply chain optimization software:** does an excellent job of providing the best answer for particular time snapshots of a network, while taking into consideration the constraints outlined in Steps 1 and 2 (minimize cost, maximize revenue, improved customer service, etc.) There are a number of optimization tools available at varying levels of price and complexity.
- **Dynamic supply chain simulation software:** simulates the day-to-day operation of a network. Simulation software goes a step beyond optimization software by using randomized order profiles based on your network constraints. Network costs, volumes, inventories, production capacity, distribution capability, and customer service can be evaluated at a tactical level with this type of software.

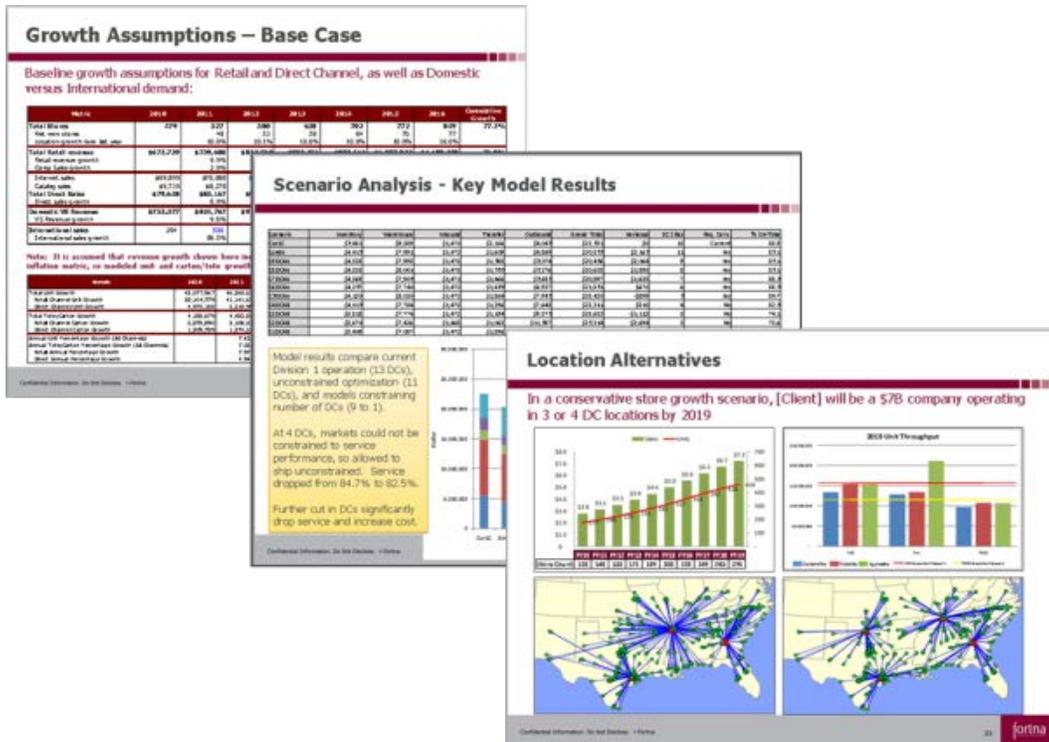
### Step 6: Build Baseline Models

The most time-consuming task in the network design process is building a baseline model that accurately reflects the current operation and capabilities of the distribution network. A baseline model is typically built on data from the previous 12 months of operations. When complete, it should provide results that match historical results within a pre-determined confidence level. This step is actually a continuation of data verification, as any significant errors in the data that were missed during Step 4 will show up at this time.

Once the baseline model for the previous 12 months has been completed, it should be run for at least the final year of the forecast planning horizon, and if possible for several intermediate years. The purpose is to show the impact of growth on existing operations and capabilities. This is typically the first option you will consider, also known as the “do nothing” scenario.

Next you want to develop an “Optimized Baseline” scenario. This is to help you understand how your distribution network would operate under perfect conditions with current capacity constraints – inventory is always in the right place at the right time, cheapest transportation carrier is always available, no unscheduled downtime in production lines or distribution centers, labor pool optimized for the daily workload, etc. There will be lots of operating cost savings in this scenario, but remember that this is a “perfect world” scenario --not all of the savings can be attained in the real world. But this model is useful in that it provides indicators of how the current network’s service and operating cost might be improved. The results serve as the basis for comparing potential cost reductions found in other network scenarios.





## Step 8: Conduct Further Analysis of Your Top Options

After a set of scenarios are developed and evaluated, the top 2-5 options should be selected for further analysis. This further analysis might include:

- determining capital investment
- transition cost requirements
- financial and qualitative justification
- design recommendations for future supply chain processes

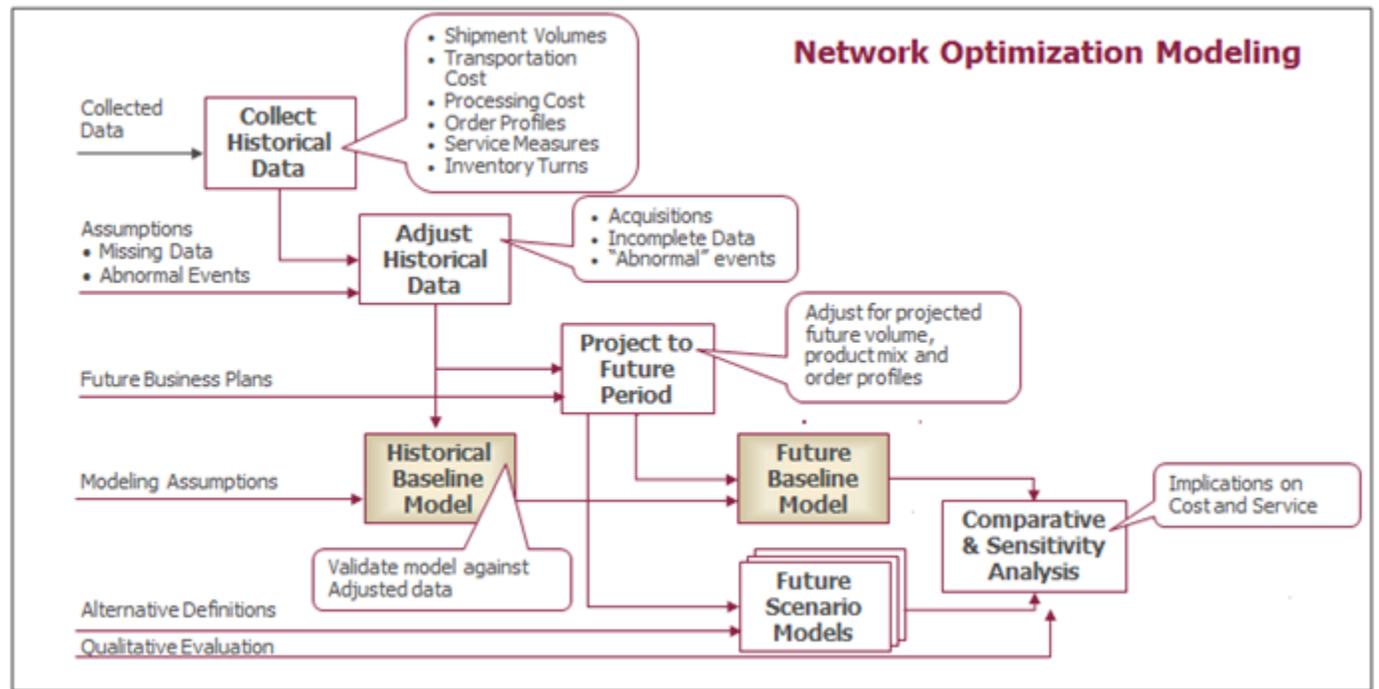
## Don't forget your Tipping Points

Sensitivity (or tipping point) analysis should be conducted on critical variables to understand the impact on costs and service levels of the network. Make sure you include tipping point analysis on assumptions made where data was unavailable. Typical variables studied during this type of analysis include:

- growth
- seasonality of demand
- freight cost
- freight mode profile
- wages
- inventory levels
- tax burden
- facility operating costs



There is as much art as there is science in making the correct assumptions and verifying the data within the model on the front end of the process, then correctly applying the results of the model on the back end of the process. This diagram illustrates the overall modeling process:



### Step 9: Determine Capital Investment Requirements

Everything that has been done to this point involves understanding how network changes impact operating costs, service levels, and inventory requirements. But some capital investment will likely be required to realize any reduction in operating costs. The following information will provide the basis for a budgetary capital estimate and financial justification:

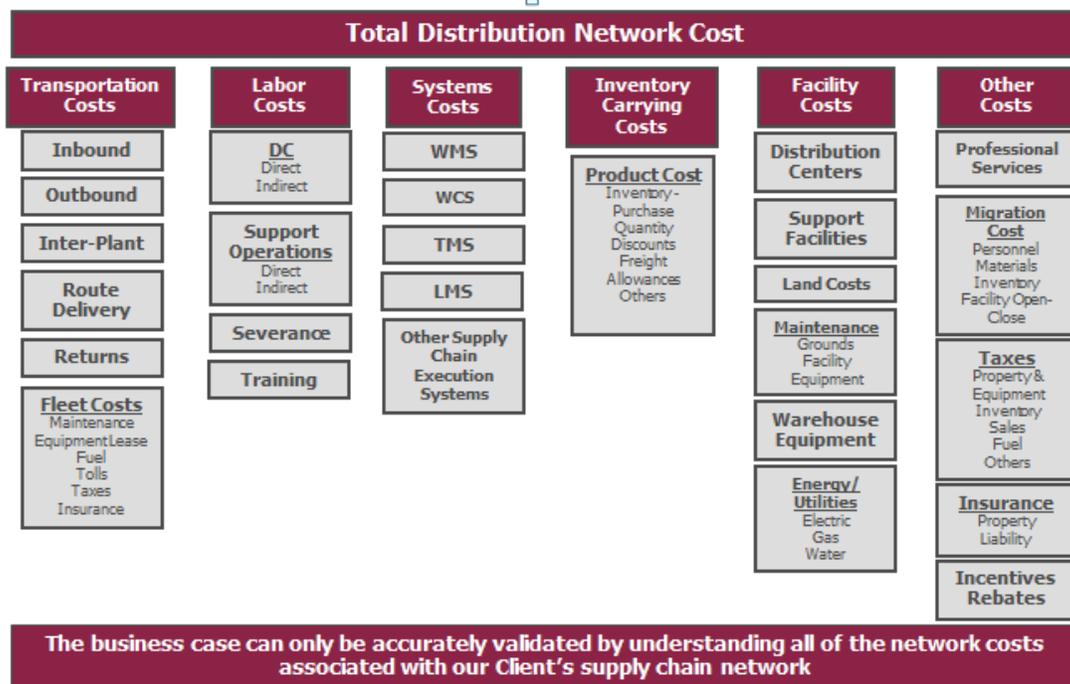
- Throughput and storage capacity requirements of each facility based upon modeling tool outputs
- Facility size and equipment requirements based upon those capacities
- Inventory requirements for a new network alignment compared against existing inventory levels. This step can be done at a high level during the network design, or a separate initiative can be undertaken to optimize inventory levels by SKU at each facility.
- Costs associated with facility acquisition or expansion and material handling equipment procurement
- Systems costs associated with network changes — this can be order management, warehouse management, warehouse control, demand planning, labor management, and transportation management, among others.



Additional costs that must be taken into account include transition costs that will be incurred during implementation, such as:

- Site acquisition costs — commercial real estate provider, site selection services, site engineering, etc.
- Facility construction costs
- Facility modification or up-fit costs for existing facilities
- Relocation packages
- Severance packages
- Recruitment and training cost
- Inventory relocation expense
- Lease break costs for existing facilities
- Sale of existing facility and equipment

Revenues generated from a facility sale should also be incorporated into financial justification of the implementation of a distribution network strategy.



## Step 10: Prepare to Justify the Recommended Network Changes

Every company has a methodology for approving and allocating funds for capital projects. At this point, all financial inputs should be ready for a financial model to be created for the top network strategies identified. This step can be an iterative one. Changes to the network structure may be necessary if financial results do not meet acceptable levels.

You may have to provide more than just financial justification for your proposed network changes. There may be political implications associated with your changes, especially if a facility function is changed or if a facility is shut down altogether. Your company's tolerance for risk needs to be considered as well. Is it acceptable to have all of your inventory in one location or should there be multiple facilities for business continuity purposes?



The cultural impact of network changes may have to be evaluated. The ability to consolidate operations with another division might need to be evaluated. During the scenario development phase, these issues should be listed and considered alongside the quantitative results of your scenarios to determine early in the process whether any insurmountable conflicts exist.

### Step 11: Recommend and Develop Your Implementation Plan

Once justification of the scenarios is complete, a single scenario or a couple of scenarios may rise to the top. Two scenarios may be very similar. If one scenario is best under certain constraints and another is best under a different set of constraints, it may be prudent to move forward into design and implementation with a dual recommendation and eliminate one during a future phase of the implementation.

As part of a recommendation, an implementation plan and timeline should be developed in order to provide structure to the implementation process and start involving company resources who weren't part of the network design process. Several questions need to be answered while developing the implementation timeline:

- Does a building have to be constructed, or can an existing building be used? This can alter the timeline by several months to more than a year.
- What systems upgrades and implementations are required? Are radical changes in operations required? This can affect the length of time required for facility material handling equipment design and equipment installation.

During implementation planning, time must be set aside for site selection, facility construction or up-fit, facility equipment design, material handling equipment installation, systems development and installation, organizational development, hiring and training of personnel, and inventory strategy and relocation. When compared with existing facilities, new construction may take several additional months until a facility is operational, so this must also be factored into your timeline. Consider these factors as part of your overall evaluation of different scenarios.

### Summary

Your distribution network can provide the key to unlocking competitive advantage for your company. Following these 11 steps to network design will help you identify the best distribution strategy for your business, minimize operating costs and tax burden, maximize customer service, and improve flexibility to adjust to changes in business strategy and growth.

While this article outlines a general roadmap, much of the distribution design process is contingent on the unique constraints of your business. Assumptions made on missing data and/or the modeling toolset used to evaluate alternatives can radically change how a design evolves. Pitfalls and delays can occur without experienced professional help to navigate the process and integration points. Before you make a change in your distribution network, make certain you get help to understand the full impact on cost and service, or you could end up adding operating costs and expending capital and fail to achieve the expected returns.



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### How Can We Help?

Fortna helps companies develop a business case for supply chain investment, including distribution network design and strategy. To learn more, ask to speak with one of our consultants.

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