

Leading U.S. Pork Producer Optimizes Supply Chain

Challenge

- Determine the best regional business structure for optimal oversight and lowest cost
- Automate logistics to leverage real-time capacity at contracted sites, facilitate site selection and reduce operating costs

Solutions

- Arena® Simulation Software – Simulation provides flowchart modeling methodology, flow/continuous process modeling, graphic dashboards, scenario analysis, custom templates and reports

Results

- Improved Space Utilization – Weekly flow and capacity updates capture lowest regional yardage costs and space availability, cutting costs and enhancing flexibility
- More Informed Business Decisions – Scenario analysis feature rapidly integrates complex variables, facilitating fast and accurate operating decisions
- Extended Forecasting Ability – Automated flow modeling extends forecasting from one to five years



Background

From the popularity of baby-back ribs to the national obsession with bacon, Americans have an avid appetite for pork. The Maschhoffs -- the largest family-owned pork producer in the United States -- helps satisfy that hunger from its headquarters in Carlyle, Illinois. In 2014, the company sold nearly \$1 billion in pork -- enough to feed over 16 million average consumers annually.

Like many major agricultural operations, The Maschhoffs started with a single family farm. For five generations, The Maschhoffs grew row crops and raised cattle. But brothers Ken and Dave Maschhoff returned to the farm home from college with bigger dreams. In 1991 they bought their parents' share of the business and began expanding the operation.

Today, The Maschhoffs' pig operation employs about 1,500 employees. Contracting with production partners -- about 550 family farmers across the Midwest -- the company sells about 5

million live hogs annually. The buyers are packing plants and food producers such as Cargill, Hormel Foods and Farmland.

The Maschhoffs provide pigs and feed to their production partners, and pay the farmers for the time, labor and space necessary to raise the hogs.

Challenge

Running any large farming operation is a complex undertaking. That's particularly true in modern pig raising, which entails a continuous logistics challenge: the need to move pigs to specialized farm sites at different stages of growth.

Once small farmers commonly took on the entire farrow-to-finish operation – breeding sows, weaning piglets, growing feeder hogs and preparing them for market or “finishing.”

But rising transportation and feed costs – along with the complexities of hog genetics and health risks – have forced many smaller farms to specialize and contract their services to large producers.

And so, a large operation like The Maschhoffs must contend with a continuous flow of pigs between different types of farms – from sow (or breeding) facilities, to weaning, feeding and finishing facilities.

“We have 73 different sow farms, and when piglets grow to about 21 days old, we need to start looking for the best space to house them,” explained Morgan Dugan, director of supply chain management and logistics for The Maschhoffs.

Weaning farms are specially equipped for young pigs, with pen sizes that can accommodate the sows and the piglets. In six to 10 weeks, the young pigs are moved to finishing facilities that can accommodate the larger size animals.

“We were having a hard time measuring all the impacts of our space decisions,” said Dugan, who oversees the transport of 700 to 800 trailer truckloads of live pigs each week.

The company's logistical system consisted of Excel spreadsheets, providing only a small window into how many pigs were flowing through their system at any one time. Without more precise analytical tools, they couldn't project how much farm space they'd need in the next month, for instance, or compare the costs of their owned and leased facilities.

The Maschhoff's analytical and predictive limitations became even more apparent when company leaders decided to reorganize the business from a national to a regional management structure.

The company wanted to move to a distributed leadership model, with smaller geographic territories, to give managers a better line of sight into the business' leased assets and contracted farming operations.

The problem? Without modeling and predictive technology, they couldn't reliably determine the optimal number of divisions, or which facilities should be included in each region.

“We could ask a flow planner to project our flow to sites for the next 52 weeks, but that would require somebody three days to complete,” Dugan said. “And you can't really ‘war game’ different options if you have to wait that long,”

Solution

The Maschhoffs analyzed different supply-chain modeling packages in tandem with a group of graduate business students from Washington University at St. Louis. As part of a special project with the company, the students evaluated dozens of solutions. Arena[®] software was their No. 1 recommendation.

“The Arena application provided total flexibility that allowed us to model anything we needed,” Dugan said. “We also felt we'd get a good return on our investment.”

Arena's flowchart modeling methodology made it easy to build a logistics process flow. Drag-and-drop elements and structures simplify simulation building and visualization. The software also features built-in dynamic dashboards for model analysis.

The Rockwell Automation team, who began immersing themselves in the daily operations of the business, spent weeks on-site at the Carlyle headquarters to understand The Maschhoffs' operations and business parameters.

To create the baseline models, the Rockwell Automation team sampled the flow of pigs through the system for several weeks, tracking them by age. They also looked at the health status of the sow farms where pigs are born, which affects the quantity of pigs released into the system.

Arena's simulations matched flow size to site size and type, maintained that weaning pigs, for example, weren't sent to farms with large pens intended for finishing.

Other variables for the early models included the costs of different facilities, known as yardage costs, as well as facility capacity and annual feed costs. Feed costs were based on projected demand according to the size and age of pigs, and the nearest feed mill.

And because pigs from different sources can introduce new diseases, the project team also designed the models to identify and track the movements of common groups from one location to another.

In the midst of the build-out, The Maschhoffs issued a new challenge to the implementation team: They moved the final implementation date up by several months. The new target date reflected the growing urgency around the reorganization initiative and the need for a modeled regional analysis.

Results

The Rockwell Automation team met the accelerated deadline. The result? Regional modeling and analysis pointed to four management regions, balancing efficiencies in flow, transportation and feed costs with the utilization of contracted sites.

"It was exactly what we needed," said Dugan. "The data allowed us to make timely recommendations on our new regions."

After the first modeling phase was complete, the team made additional enhancements: loading live data and transforming the strategic application into a powerful operational decision tool.

"Going forward, we can use the Arena software to manage flow and capacity more efficiently, and give us the flexibility we need to adapt to changing site needs," Dugan said.

The project team created a real-world model by taking digital "snapshot" of the operation's existing number and ages of pigs and their locations, inputting the data into tables. By repopulating the system with current data, The Maschhoffs can now run the model forward to see occupancy rates or various sites and flows – on a weekly basis, instead of annually, as in the past.

Now the operation can make timely business decisions based on a real-world model that reflects all the variability in their system, clearly visualizing systemic effects of changes.

The Maschhoffs' leadership is confident in the decision-making behind their new regional structure. They also envision many opportunities to forecast future demands using Arena to drive better asset decisions.

The results mentioned above are specific to The Maschhoffs' use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.

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