

# Transitioning to the Long Term

*By Michael Gunderson*

**A**cross the world, agricultural producers and businesses will need to adapt their operations to myriad factors as they seek to position themselves for long-term profitability. Persistent changes in consumer food preferences will continue to play a role in shaping the nature of demand for agricultural products. Production conditions will also continue to evolve alongside effects associated with climate change, and technology will likely play an increasingly prominent role in the structure and operation of agricultural businesses. This paper will explore how the agricultural sector might bridge the gap between its current state, where commodity prices and revenue generally have been low, to a longer-term future with greater economic potential. Using Treacy and Wiersema's (1995) work on the three areas of market leadership—cost leadership, product leadership, and customer intimacy—this paper will attempt to answer how the agricultural sector might transition from its current state to a longer-term state with greater economic potential.

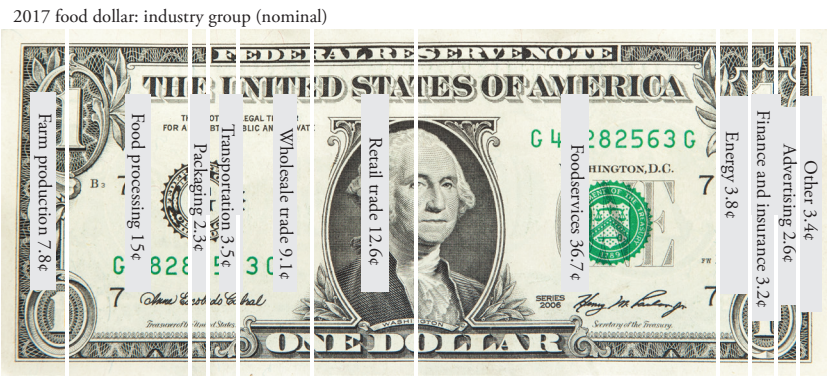
## *The agricultural and food value chain*

The most recent version of the U.S. Department of Agriculture (USDA)'s "share of the food dollar" graphic indicates that farm production receives just 7.8 cents of the nominal food dollar (Figure 1). Indeed, according to the USDA Economic Research Service, the share of the real dollar received by farm production has been declining (Chart 1).

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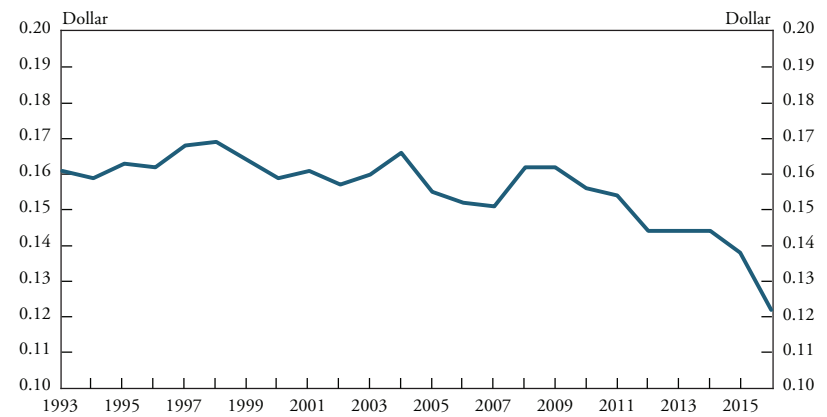
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Figure 1  
Share of the U.S. Food Dollar



Source: USDA Economic Research Service (ERS).

Chart 1  
Farm Production Share of the U.S. Food Dollar



Source: USDA ERS.

One common error associated with this food share calculation is that the total revenue generated by farm production must likewise be falling. When end consumers are willing to pay more for value-added activities, the total revenue generated by the value chain will grow faster than population. In fact, the total value (revenue) generated in the agricultural and food value chain is increasing with population, purchasing power, and additional value-added activities. In this environment, any player in the value chain can create additional value and capture premiums as a result.

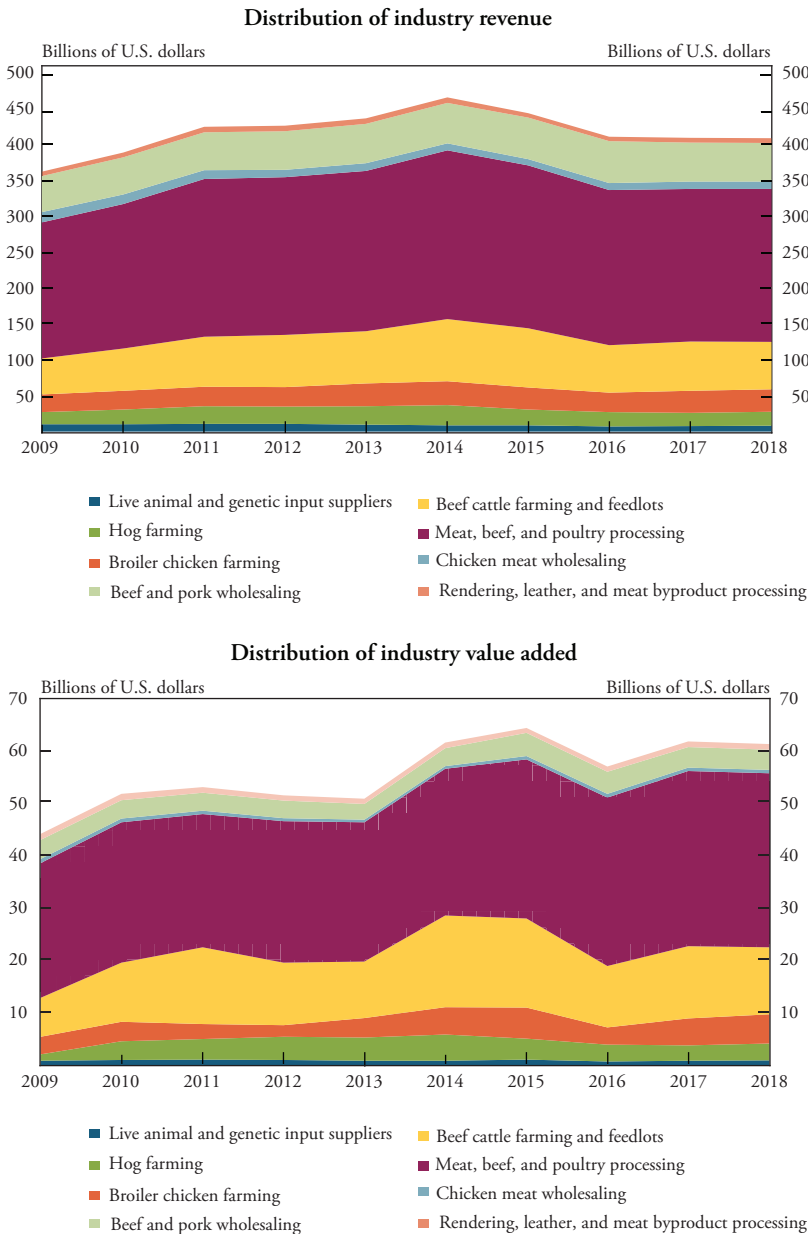
The protein value chains of beef, pork, and chicken illustrated in Chart 2 show where the total value created and captured in the value chain is shared. Several value chain actors coordinate to bring food to consumers' tables. While one might automatically assume that the farmer receives the smallest share in the value chain, the genetic input suppliers receive the smallest share.

When food processors create new products or innovate packaging to be more convenient, premiums are typically associated with the innovations. Food producers who grow crops meeting USDA organic standards nearly always earn premiums of 20 percent or more (Carlson 2016). In the agricultural and food value chain, one particularly innovative disruption near the consumer has been the delivery of food items. As dining at restaurants has grown, simultaneous growth has occurred in the grocery market (Chart 3). This is likely due to growth in the grocery delivery market, both through online ordering and delivery from local stores as well as the rise of meal kit delivery companies such as Blue Apron and Hello Fresh (Packaged Facts 2016).

A transition from a present state of low commodity prices and revenue to a longer-term future with greater economic potential necessitates a continued focus on reducing per unit costs, greater value creation and capture, or a combination of both. In their work on market leaders, Treacy and Wiersema (1995) suggest there are three areas of market leadership: cost leadership (operational excellence), product leadership, and customer intimacy (Figure 2). Agricultural producers choosing to lead cost per unit (operational excellence) will have to invest in technology that improves productivity and leverages economies of scale. Alternatively, agricultural producers could choose to lead on product quality or customer intimacy to create and capture additional value (revenue).

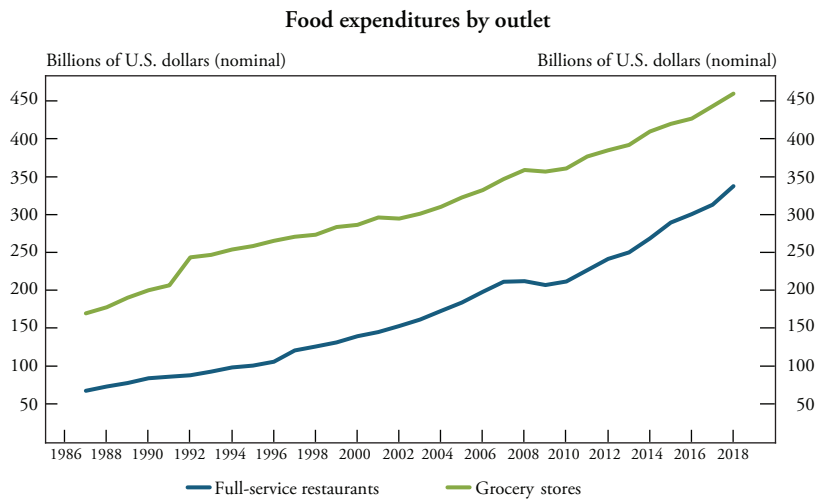
Chart 2

Animal Protein Value Chain Distribution of Industry Revenue and Industry Value Added



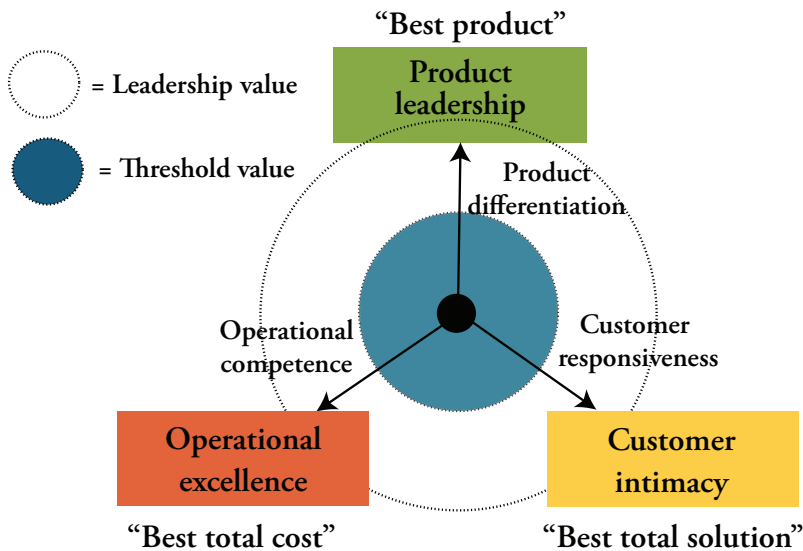
Note: Reproduced from Davis (2019).  
Source: IBISWorld and author's calculations.

Chart 3  
Food Expenditures by Outlet, 1986–2018



Source: USDA ERS.

Figure 2  
Value Disciplines



Source: Treacy and Wiersema (1995).

*A word of caution on strategy*

One strategy suggested for farmers in the short run is to diversify their enterprises by seeking new streams of revenue. This often comes with proposals to find new uses for underutilized resources such as custom harvesting with equipment already owned. Others suggest diversifying across enterprises and raising livestock that can add value to grain crops already being grown. Still others recommend that farmers diversify into adding value by transforming some goods into products for the end consumer.

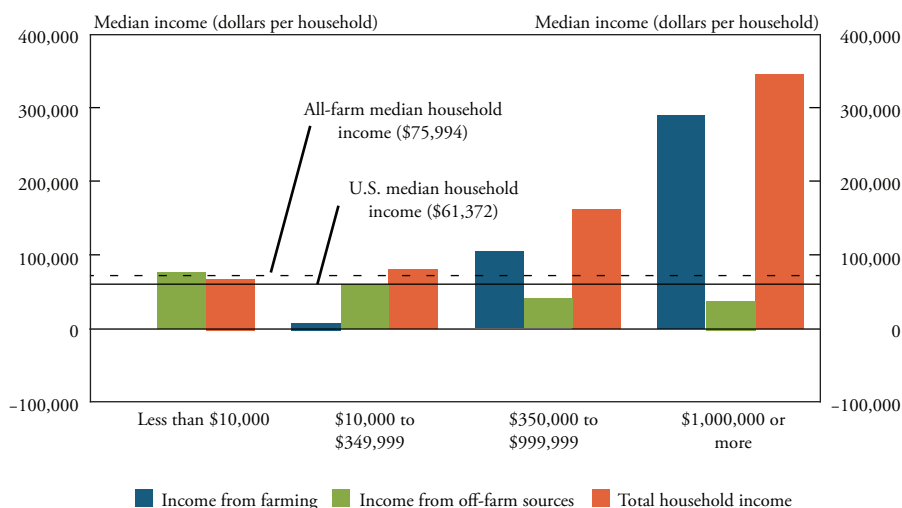
The study of strategy is young relative to other more established fields of study such as economics, biology, sociology, and agronomy (Rasche 2008). Despite its relatively small collection of empirically tested theories, one main conclusion rises above all: strategy requires focus (Rumelt 2011; Lafley and Martin 2013; Christensen 1997; Kiechel 2010). Even in large, sprawling organizations, strategy requires many employees to simultaneously execute a narrowly defined vision and mission. Strategy is as much about what the firm chooses not to do as it is about what the firm will do. Agricultural producers that will be profitable in the long run likely need to transition efforts from excellence in production (for example, agronomy or animal husbandry) to thinking like a chief executive officer or chief marketing officer focused on excellence in delivering value.

Thus, agricultural producers of the future who wish to manage the farm as a business rather than a way of life must face this reality of corporate strategy. Dallying in side jobs to supplement income means the farm may never evolve into a sustainably profitable enterprise. Indeed, the USDA suggests that “most farmers receive off-farm income, but small-scale operators depend on it” (USDA ERS 2019) (Chart 4).

Successful producers are those that focus almost entirely on a narrow set of activities and perform them at the highest level of leadership among cost, product, or relationship. While moonlighting as a custom harvester might be intuitively appealing, and the activity might in fact provide needed short-run cash flow, the hidden costs of such unfocused activity are rarely noted. Producers who focus narrowly and intensely will move to the frontier of leadership across their selected means of competing in the sector more quickly than those distracted by side jobs.

Chart 4

### Median Household Income of Farm Operators by Source and Sales Class, 2017



Notes: Sales equal annual gross cash farm income before expenses (the sum of the farm's crop and livestock sales, government payments, and other cash farm-related income). Data as of November 30, 2018.

Sources: USDA ERS, USDA NASS, and U.S. Census Bureau.

This is not to suggest that a farming operation cannot be successful in diversifying across enterprises or running multiple business units. In fact, many of the most successful farms already do. This type of structure, however, is different than the idealized Old MacDonald's farm with a few hogs, a couple of cows, some chickens, and crops grown on a couple hundred acres. A successful diversified operation today is unlikely to do all of those activities, but it is easy to point to large farms with multiple operating units diversified across many commodities. These farms are typically organized with a leadership team, each focused narrowly on an individual enterprise rather than one individual providing leadership to multiple enterprises.

Just as leadership in operational excellence demands narrow focus, so, too, does leadership in product and customer intimacy. It would be foolhardy for a farm that produces undifferentiated commodities at the lowest cost possible to dilute the focus by beginning a small scale agritourism enterprise. Similarly, one choosing to focus narrowly on product leadership should not transition from a focus on low-cost commodity production to a focus on creating value added. Creating

additional value typically requires additional resources. A farm making such a transition should be prepared to commit entirely to the new strategy and transition as quickly as possible.

### *Operational excellence using the experience curve*

If an agricultural producer is intent on leading in a way so many agricultural producers have led in the past, emphasizing operational excellence and low-cost leadership, the path forward is fairly predictable. Gottfredson and Schaubert (2008) describe the experience curve, noting that for all industries, costs per unit always decline. As firms produce more units of product, the accumulated experience results in lower costs per unit. Calculating the experience curve for any agricultural commodity will establish where a farm must have its per-unit cost structure in about 10 years.

The experience curve concept has been applied across a broad array of industries, including those with steep learning curve slopes (such as microprocessors), moderate learning curve slopes (such as airlines), and flat learning curve slopes (such as milk bottles). More mature industries tend to have flatter slopes for the experience curve. For example, the butter experience curve required about 35 years to cut butter prices in half from just above \$4 per pound in 1970 to nearly \$2 per pound in 2005. Gottfredson and Schaubert (2008) note that to some extent government regulation of and volatility of inventories in the butter markets increased the year-to-year volatility in price declines, but the downward march was steady in the long run.

In agricultural production, experience curves exhibit relatively flat slopes given the large amount of experience already accumulated. The innovations of the twentieth century, such as mechanical planting and harvesting, improved seed genetics and technologies, synthetic fertilizers, and high efficacy crop protection chemicals rapidly increased yields and decreased cost per unit of production. In animal agriculture, improved genetics, nutrition, and animal comfort delivered similar cost savings. This steady march downward in real, per-unit costs is likely to persist. Thus, by calculating the curve, one can reasonably forecast the cost per unit of any agricultural commodity into the future.



### *Corn production experience curve*

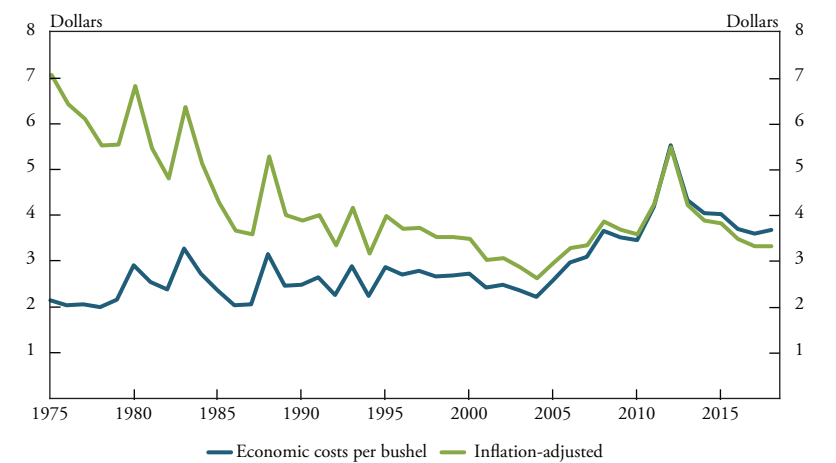
Following the method outlined in Gottfredson and Schaubert (2008), I estimate the corn production experience curve using publicly available data on annual U.S. corn production costs, U.S. corn production, and the GDP deflator. Corn price and production data are available from the USDA National Agricultural Statistics Service (NASS), and the deflator is available from the Federal Reserve Bank of St. Louis's FRED database.

U.S. corn production nominal economic costs appear to have increased over the 1975–2018 period (Chart 5). A noticeable spike in nominal economic costs started around 2006, undoing a 30-year trend of relatively flat nominal values. When adjusted for inflation, the downward trend from 1975 to 2005 is more pronounced, and the spike from 2006 to 2018 is slightly muted. The spike is nearly erased once the U.S. corn experience curve is mapped using the Gottfredson and Schaubert (2008) method (Chart 6). Starting with just fewer than 6 billion bushels produced in 1975 and cumulatively 423 billion bushels produced during the 1975–2018 period, the slope of the 40-year experience curve is about 87 percent. This means that as the accumulated number of bushels of corn produced doubles, the cost per bushel of corn will decline by 13 percent. This is consistent with the slope of many other experience curves, though notably on the flatter end of the distribution of experience curve slopes. What is notable here also is that the experience curve runs such a long horizon.

### *Dairy production experience curve*

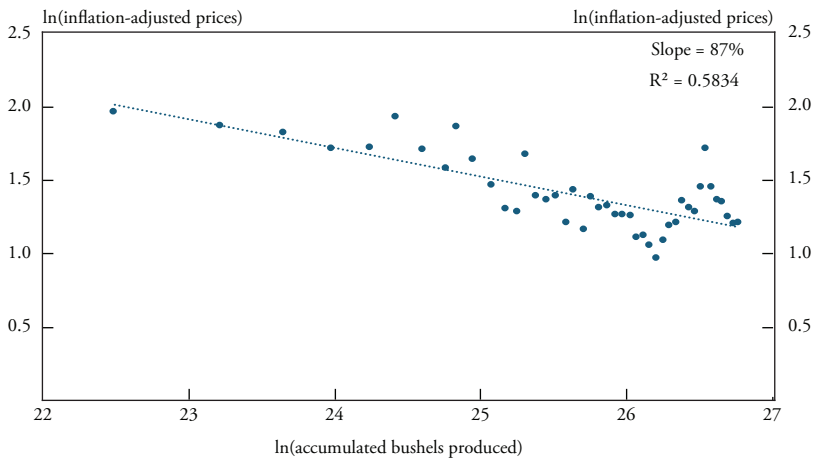
To estimate the dairy production experience curve, I use milk statistics from USDA NASS and deflator information from the Federal Reserve Bank of St. Louis since 1980. The variability in the experience curve began to increase more recently, likely due to changes in regulation of the global milk market and the variability in input costs, primarily feed (Chart 7). Despite the variability, the slope of the dairy industry is similar to corn and is flat relative to other industries. If one assumes that milk production has peaked at 2 billion hundredweights (cwt) (an amount produced steadily for the past three years), then in 30 years, milk prices will decline to \$13.19 in 2012 dollars.

Chart 5  
U.S. Corn Production Nominal Economic Costs



Source: USDA.

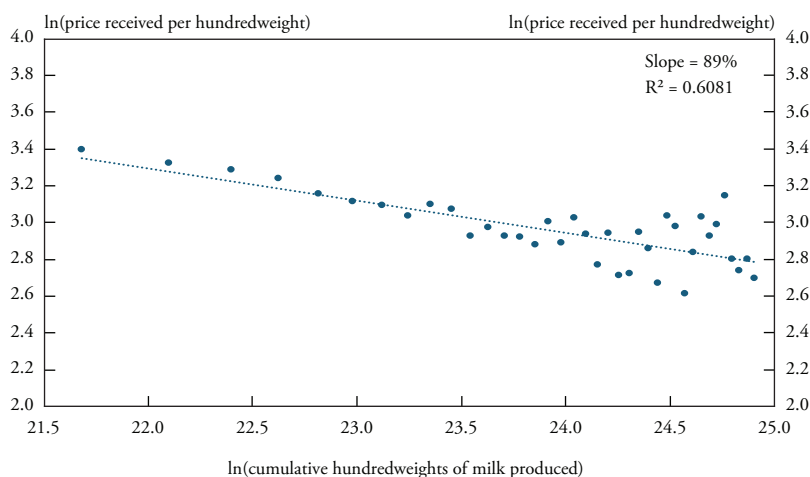
Chart 6  
U.S. Corn Experience Curve



Sources: USDA NASS, U.S. Bureau of Economic Analysis, Federal Reserve Bank of St. Louis FRED, and author's calculations.

Chart 7

## U.S. Dairy Experience Curve



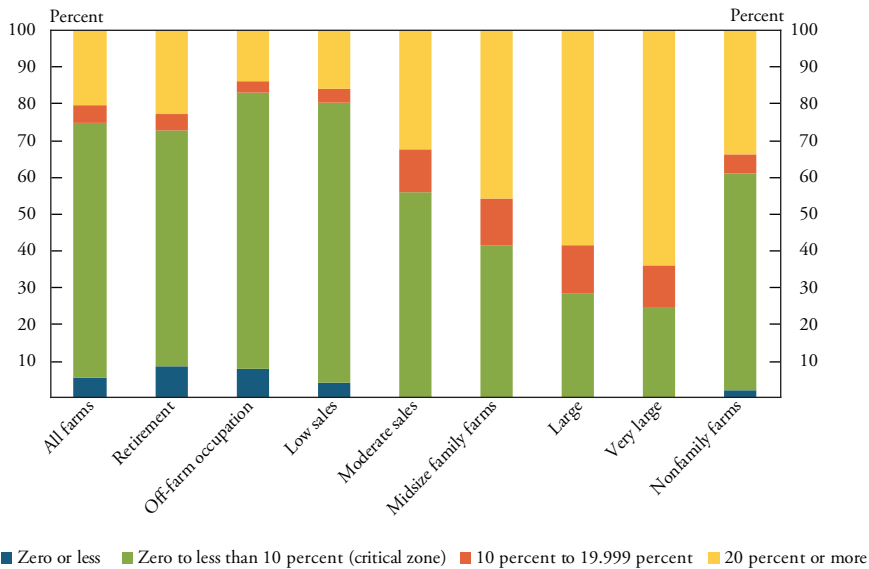
Sources: USDA NASS, U.S. Bureau of Economic Analysis, Federal Reserve Bank of St. Louis FRED, and author's calculations.

*Pursuing low-cost leadership (operational excellence)*

Farms that strategically choose low-cost leadership will most likely win with scale. Data from the USDA's Economic Research Service suggests that the largest producers are most likely to have the largest operating profit margins (Chart 8). These firms have the scale to make returns attractive on a per-unit basis when substantial investments are required for new technologies. These same firms will likely also have more access to financial capital at lower rates to be able to commit to investing in technology.

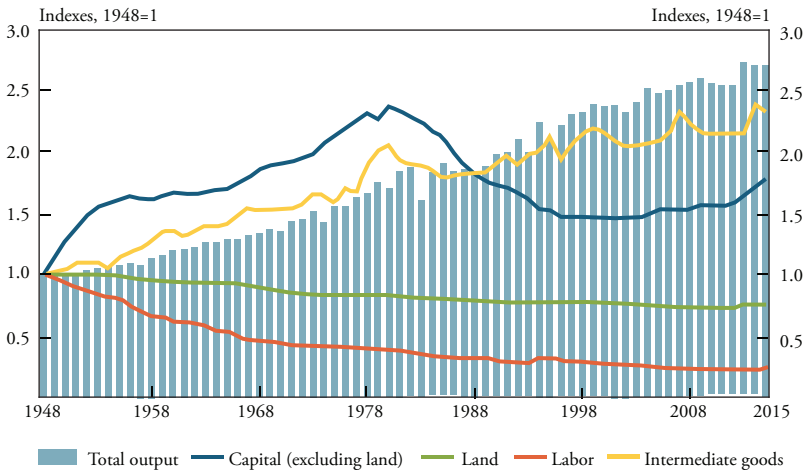
Indeed, the USDA analysis of total factor productivity indicates that total output has grown using more non-land capital and less labor (Chart 9). The analysis also shows that the contribution of the quantity of labor to total factor productivity has declined, while the contribution of the quality of labor has increased. This suggests that agricultural producers will continue a pace of having more formal education to improve decision-making.

Chart 8  
Operating Profit Margin by Farm Typology



Source: Hoppe (2015).

Chart 9  
Input Composition of Capital (Excluding Land), Land, Labor, and Intermediate Goods



Notes: Data are expressed with an index calculated relative to the data in 1948, where data in 1948 are set to equal 1. Intermediate goods include feed and seed, energy use, fertilizer and lime, pesticides, purchased services, and other materials used. Reproduced from Wang, Nehring, and Mosheim (2018).  
Source: USDA ERS.

*Pursuing product leadership as a differentiation strategy*

Product leadership could come in several forms for agricultural producers. In crop production, differentiation can happen by appealing directly to the end consumer or producing a crop that aligns more closely with a processor pursuing its own differentiation strategy. Select agricultural producers have provided leadership in products by growing crops for seed companies, producing crops of a specialized quality or type for a particular food grade use, or growing agricultural commodities using methods demanded by consumers, such as organic production or animal welfare certification.

Agricultural producers could provide leadership to product quality by most closely meeting the needs of food processors, retailers, or even end consumers. For example, producers in Indiana have chosen to produce food-grade corn for Frito-Lay. Some even choose to grow blue corn for use in tortilla chips. Some producers are tailoring the growth of soybeans for export to Japan and other countries for use in tofu. Producers in Indiana have chosen to grow tomatoes on contract for Red Gold tomatoes for use in canning and ketchup production. Some producers are leading the way on products that have no established commodity market, such as ancient grains and hemp. In animal agriculture, producers specialize in delivering milk components rather than the largest volume of fluid milk. Dairy producers deliver milk with high butter fat or protein content for use in specialty dairy products. Livestock growers opt into producing Waygu beef because of its quality, not because it is inexpensive to produce.

*Pursuing customer intimacy as a differentiation strategy*

Customer intimacy is foreign to a commodity business built on spot transactions and standardized products. The standard growing season of many row crops provides little opportunity to differentiate oneself by partnering closely with customers on tasks like inbound and outbound logistics. In the livestock sectors, producers and processors have a relationship that is more frequent and ongoing, which lends itself to an opportunity for greater customer intimacy.

One means of pursuing customer intimacy is to commit to agritourism. Heavily supported by government actions, Italy's *agriturismos* are examples of profitable small-scale farms. This strategy, however,

requires a focus on the needs of the tourist. The farming aspect of this particular tourism is just one component of managing reservations, meals, maintaining lodging facilities, and marketing to customers. In Italy, nearly all of the agricultural production that occurs on the farm must be incorporated into the tourism business to remain certified. Similar enterprises in the United States exist, but are usually day trips rather than overnight stays. “U-pick” orchards and corn mazes are more typical forms of agritourism in the United States.

Besides tourism, there are other opportunities to consider customer intimacy in the food and agricultural value chain. Working closely with end customers has boosted the adoption of the Community Supported Agriculture (CSA) model in addition to more traditional farmers markets. Whereas the farmers markets typically bring the farm closer to the end purchaser (consumer), the CSA often becomes a true intimate relationship. Producers who run CSAs will often invite members to the farm to see the production as it occurs. Some have even invited members to help in peak labor demand seasons such as planting, weeding, and harvesting. The success of CSAs has resulted in rapid growth to over 1,300 as of a few years ago (Eise and Foster 2018).

Some livestock producers in Indiana have chosen to partner with restaurants to provide locally grown meat with attributes that diners prefer. One such farm operation, Fischer Farms in Indiana, markets its beef as “naturally raised.” Owners Dave, Diana, and Joseph have established close relationships with restaurants. This results in Fischer Farms branding on restaurant menus and close collaboration with restaurateurs and chefs to provide cuts of meat consistent with fine dining and innovative cooking.

The business model of Loftus Ranches in the Yakima Valley of Washington is an example in specialty crops. Before 2010, this organization largely produced commodity hops for export and national brewers. The boom of the craft brew market meant that the leadership of Loftus ranches chose to specialize production for thousands of smaller craft brewers each looking for its own unique flavor profile. Loftus Ranches has new opportunities to create and capture value for its customers, which comes with additional focus on the relationship. The key to the relationship is connecting to the brewers’ passion for flavor.

## Conclusion

Agricultural producers who take advantage of emerging technology can differentiate by leading on operational excellence, product quality, or customer intimacy. Some agricultural producers may continue to pursue smaller scale production of agricultural commodities, but they are likely to remain dependent on off-farm income and additional businesses to diversify revenue streams. A transition to an agricultural production system more focused on operating farms as a business rather than a way of life began many generations ago. Family farms continue to dominate agricultural production and are likely to do so for the intermediate future, but they are likely to operate in a more professional manner focused on how external factors influence the farm business and on marketing and controlling costs.

Large-scale agricultural producers stand to benefit the most from spreading the fixed costs of technology across many standardized units to continue to serve a portion of the market looking for safe, low-cost calories. Other agricultural producers should consider leveraging emerging technologies that enable low-cost tracking of differentiated goods. Producers that choose to focus on creating products that more closely meet the specifications of increasingly demanding food processors and end customers could capture premiums for agricultural products. Similarly, agricultural producers who choose to closely align with downstream clients to coordinate outbound and inbound logistics to create strong relationships could share the value created by such coordination.

The diversity of the soils and weather patterns that demand decision-making be done close to the crop's geographic location will slow the pace of farm consolidation. Any technology that enables low-cost, real-time monitoring of geographically dispersed crops will likely accelerate consolidation of farms among the most sophisticated operators who are able to drive down the per unit costs of production. Driverless equipment, including self-powered planters and sprayers, and affordable small-scale sensors are such disruptive technologies.

Consumer demands for local production of agricultural commodities and a desire to have a relationship with the people growing their food offers an opportunity for some producers to maintain profitability at a smaller scale. The consumers' preferences for local and small scale could supersede the need for low-cost, efficient production, allowing

producers with this focus to capture premiums to offset additional per-unit fixed costs.

Similarly, sensing technology will enable a transition from a commodity value chain driven by large volumes and standardization to one driven by differentiation and niche batches of production. Agricultural producers who are nimble enough to react quickly to shifting consumer demands will be well suited to capture premiums associated with the differentiated product. Partnering with additional players in the food value chain such as processors and retailers could have similar effects on farm profitability.



## References

- Carlson, Andrea. 2016. "Investigating Retail Price Premiums for Organic Foods." USDA Economic Research Service, *Amber Waves*, May 24.
- Christensen, Clayton M. 1997. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Boston: Harvard Business School Press.
- Davis, Wesley. 2019. "Animal Proteins in the United States: An Industry Profile." Master's thesis, Purdue University.
- Eise, Jessica, and Ken Foster, eds. 2018. *How to Feed the World*. Washington, D.C.: Island Press. Available at <https://doi.org/10.5822/978-1-61091-885-5>
- Gottfredson, Mark, and Steve Schaubert. 2008. *The Breakthrough Imperative: How the Best Managers Get Outstanding Results*. New York: HarperCollins.
- Hoppe, Robert A. 2015. "Profit Margin Increases with Farm Size." USDA Economic Research Service, *Amber Waves*, February 2.
- Kiechel, Walter. 2010. *The Lords of Strategy: The Secret Intellectual History of the New Corporate World*. Boston: Harvard Business Review Press.
- Lafley, A. G., and Roger L. Martin. 2013. *Playing to Win: How Strategy Really Works*. Boston: Harvard Business Review Press.
- Packaged Facts. 2016. "Meal Kit Delivery Services Usher in New Era of Culinary Convenience." Press release, May.
- Rasche, Andreas. 2008. *The Paradoxical Foundation of Strategic Management*. Heidelberg: Physica-Verlag.
- Rumelt, Richard P. 2011. *Good Strategy, Bad Strategy: The Difference and Why It Matters*. New York: Crown Business.
- Treacy, Michael, and Fred Wiersema. 1995. *The Discipline of Market Leaders: Choose Your Customers, Narrow Your Focus, Dominate Your Market*. Reading: Addison-Wesley Publishing Company.
- USDA ERS. 2019. "Farming and Farm Income." Last modified August 30, 2019.
- Wang, Sun Ling, Richard Nehring, and Roberto Mosheim. 2018. "Agricultural Productivity Growth in the United States: 1948–2015." USDA Economic Research Service, *Amber Waves*, March 5.