

Commentary

Evolving Curriculum to Prepare Students to Solve Problems That Don't Yet Exist: The Application of Horizon-Scanning

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Abstract

Today's agribusiness curriculum allows students to stack competencies in economic principles, business foundations, analytical reasoning, and practice through experience. It prepares students to work through messy, but solvable, future problems. This commentary describes how the curriculum may evolve to lean on its agricultural economics and agribusiness history but adapt to stay relevant. Based on a horizon-scanning exercise, we foresee the curriculum's next iteration to emphasize "interconnected value chains." The analysis identified five emerging forces that will create interconnected value chains-related problems that don't exist today but likely will in the future: (1) connected economies, (2) clean technologies, (3) commodity and material scarcity and price risk, (4) regulation and legislative changes, and (5) business interruption. We also suggest the skills the curriculum should teach to prepare students for solving future problems. They include dynamic optimization, visual messaging, ethics, operations management, data science, and design thinking.

1 Introduction

Students learn about possible college majors from peers, faculty, advisers, and introductory courses (Beggs et al. 2008), and they gravitate to those perceived to be interesting and good training for future careers (Lent et al. 1994). To succeed in recruiting and instructing students, agribusiness teachers must not only understand present-day career options but also know how to prepare students for the opportunities and challenges an agribusiness career will hold 20 years into the future. What problems will arise, and how will a degree program prepare graduates to solve these problems?

Merriam-Webster defines a problem as "a question raised for inquiry, consideration, or solution." If an individual, group, business, organization, or institution resolves a problem, then it creates opportunity for itself, its industry, or society overall. For solutions to be obtainable, however, the problems can be complicated and complex but not chaotic (see the Cynefin Framework; The Cynefin Co. 2024).

Economists label some of the most complicated and complex problems as "wicked problems"—those that have interconnections with other problems, changing requirements, and no clear solution (Rittel and Webber 1973). Today's wicked problems may not look too different from those of 100 years ago (e.g., food security, land use, public versus private needs). However, the scale of the problems is larger and sometimes global (e.g., climate change). Also, more advanced analytical tools are available today to address the problems.

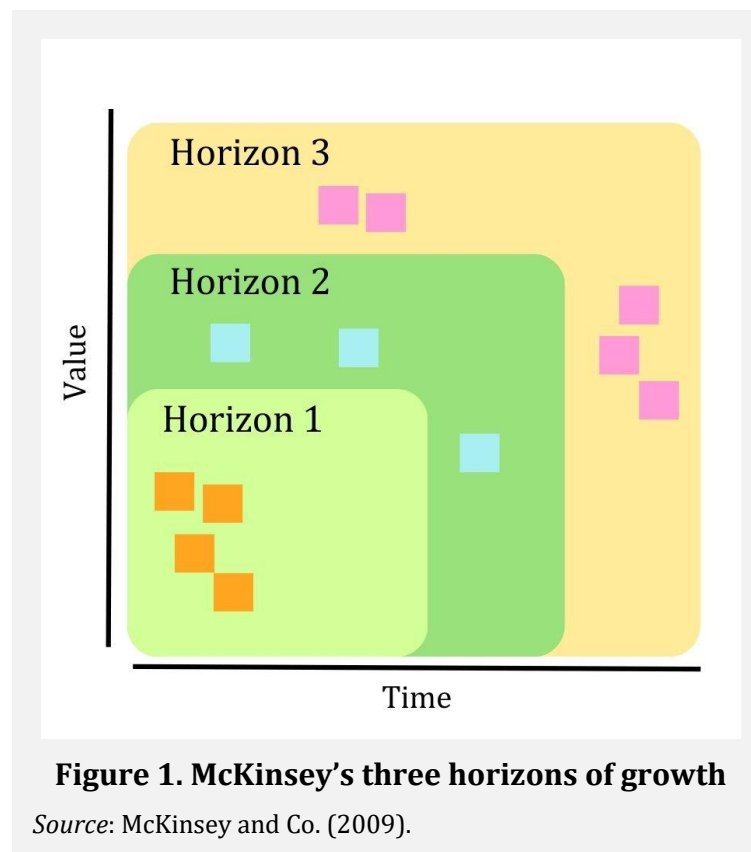
Barnes and Chalmers (2024) review how agricultural economists solve today's wicked problems by bridging economic (sub)disciplines (e.g., development economics, public economics, econometrics, industrial organization) and other subject matter (e.g., political science, mathematics and statistics, physics, psychology, data science, ecology and geosciences). The economics and business education

offered by agribusiness management and agricultural economics programs equips students to thrive in solving complex and wicked problems. That's because unpacking multifaceted economic problems (i.e., multivariate factors affect a single item of interest) forces students to evaluate the rationale of a problem's causalities, assess the magnitude of each cause–effect relationship, and prioritize cause–effect relationships. Adding business training to the curriculum builds foundational knowledge for connecting cause–effect relationships to firm performance and refines abilities for forming strategies that solve problems or turn problems into opportunities.

Academic departments must decide how to sustain current performance, which means developing skills to solve present-day problems. At the same time, their curricula must signal that students will prepare to manage future problems, including wicked ones. This commentary offers perspective into re-envisioning agribusiness programs to prepare students for differentiating themselves as future problem-solvers. It has three objectives. First, it introduces horizon-scanning as a method to look into the future (Institute of Risk Management 2018). Second, it uses this method to determine problems that don't exist today but will likely emerge or persist as disruptive forces during graduates' careers. Third, it explores skills graduates must possess to solve future problems.

2 Horizon-Scanning Approach

McKinsey's (2009) model of three horizons of growth informs the process by which we identify critical business problems and the short-, intermediate-, and long-term skills needed to solve them (Figure 1). For departments planning their curriculum, the model offers a framework to consider internal and external factors causing industry change—a practice called “horizon-scanning.” Businesses conduct their own horizon-scanning. Departments can emulate the process to gather information about forces projected to affect businesses, outline the skills needed to manage through those forces, and design curricula that align with the skills and knowledge areas that businesses have on their radars.



Problems embedded in horizons 1 and 2 are currently present or on the minds of leaders. The third horizon is the future. In terms of how an agribusiness or academic department would use the model, an agribusiness at horizon 1 would identify its current products and services that optimize performance. An academic department would offer undergraduate, graduate, research, and extension programs that optimize department stature, rankings, and student enrollment. Each department optimizes differently to achieve institutional goals.

At horizon 2, an agribusiness would take stock of emerging business, such as expansion of successful products and services. For an academic department, horizon 2 calls for positioning people to expand areas of present success. Examples include supplementing an existing research team by establishing a center that addresses an emerging policy need (e.g., carbon farming or water), adding a certificate or online program to meet an emerging need (e.g., data analytics), or innovating an extension program to align with an emerging need (e.g., absentee landowner conference).

Horizon 3 is where horizon-scanning occurs. For an agribusiness, it involves ideating for the future and often launching new business lines or processes that take years to scale and realize. Ideas may be driven by factors such as changes in end-user needs, access to disruptive technology, or expected change in how commerce occurs. For an academic department, horizon 3 is most challenging. It requires institution and college dedication to adapt to emerging industry needs. Because control over curriculum—and typically hiring—rests at the department level, a department should lead on aligning curriculum with long-term needs.

3 Future Problems to Be Solved

To understand how businesses view the future, we conducted a horizon-scanning exercise. It involved reviewing consulting firms' outlook reports and identifying what business leaders and managers consistently predicted to be future emerging forces shaping how commerce and trade will occur, businesses will operate and economies and societies will function from 2030 to 2050. These forces will likely form the underpinnings of future or sustained wicked problems. See the appendix for details about the reports reviewed. Because problems are often associated with risk or overcoming risk, the sample included outlook publications related to risk. Collectively, these reports draw on more than 10,000 survey responses submitted by global executives.

This paper shares five emerging forces (Table 1)—connected economies, clean technologies, commodity and material scarcity and price risk, regulation and legislative changes, and business interruption—and the underlying themes for each of these forces thought to affect businesses, economies, and societies in the future. Of all the topics addressed by survey responses in the reviewed consulting reports, these five were mentioned frequently across the reports. They also ranked relatively high in terms of their potential impact on future conditions.

Collectively, these five forces suggest priorities to embed in the next iteration of agribusiness curriculum. The curriculum iteration can occur over time as long it responds in a timely manner to changes in problems faced by companies and society—an essential criterion for capturing the attention of next-generation learners. The five forces suggest the next iteration of agribusiness curriculum should feature concepts relevant to interconnected agricultural value chains. For example, future curricula may show how value chains have circularity instead of operating in the historical linear fashion. Taking the example further, an emerging example of value chain circularity is blockchain technologies used for regulating commerce, proportionately connecting value chain participants, fostering transparency with participants and regulators, and managing risk. Event markets are evolving quickly, use blockchain innovation, and are starting to appear for events important to agricultural and food production, processing, distribution, and consumption.

Table 1. Five emerging forces that will define future wicked problems for agribusiness students to solve (2030–2050)

Emerging Forces	Themes	Sources (hyperlinked)	Skills/Characteristics
<i>Connected economies</i>			
	Sharing economies	Aon	dynamic optimization, visual
	Security	EY Consulting	messaging, digital twin modeling,
	Consumer-centric	CriticalStart	security studies (including cyber),
	E-commerce	protiviti	collective resilience, human
	Blockchain	RiskInsight	dimension, design thinking
<i>Clean technologies</i>			
	Planet-first	Visual Capitalist	financial, adoption pathways,
	Sustainable fuels	Deloitte	incentives, contracts, intellectual
	Climate change	EY Consulting	properties, environmental dimension
	Climate-smart commodities	World Economic Forum	
	Circular bioeconomy		
<i>Commodity/materials scarcity and price risk</i>			
	Non-human risk	Aon	blockchain, organizational models,
	platforms		market performance, marketing,
	Efficient markets	Deloitte	physical dimension, data science
	Smart farming/ag tech	pwc	
	Regenerative technologies		
	Emerging markets		
<i>Regulatory or legislative change</i>			
	Water	Aon	agricultural, food, and resource law;
	Data as regulation	Deloitte	business law; cost-benefit analysis;
	Trade	protiviti	lobbying; institutional dimension;
	Ad hoc support	pwc	market models; ethics
	Technology		
<i>Business interruption (including value chain)</i>			
	Biodiversity	AlixPartners	strategic communication, systems,
	Disease	Aon	value chain, operations research,
	Resilience	Deloitte	models, digital twin, finance,
	Complexity	Future Agenda	epidemiology modeling, complexity
	Sustainability	RIMS	theory, risk-informed decision-making

While rewriting curricula, today's academic departments should reflect on areas highlighted in Table 1. They may consider tweaking a curriculum's focus areas or modifying course requirements, but they shouldn't pivot from core strengths merely to appease an emerging force or one of its themes. As examples, an agribusiness program with a commodity focus can stay commodity-focused, an agribusiness program with a food focus can remain food-focused, and an agribusiness program with a finance focus can stay finance-focused. Agribusiness programs can ease into identifying which emerging forces and themes apply to their programs, universities, and employment regions.

4 Skills Needed to Solve Future Problems

Appreciating and understanding how to manage the five forces requires a well-balanced understanding of economic principles, business principles, and specialized training. Table 1 lists specific skills that professionals would need in order to work through the emerging forces. These would be potential skills to embed in revised curriculum.

To effectively instruct, many agribusiness teachers also will need to acquire the skills they want students to learn, or they can partner with others who have these skills. Some skills listed in the table are taught in engineering schools rather than economics or business schools. Agribusiness students shouldn't be engineers, but they should be aware of these concepts and understand what persons with these skills can accomplish. Engineering colleges rarely offer service courses due to accreditation requirements, but because business schools and agribusiness programs would benefit from exposing their students to similar problem-solving skills, the two can partner and hire adjunct teachers to meet certain skills training needs. For instance, an engineering adjunct instructor who has several years of business management experience, a BS in engineering, and an MBA has the expertise to help students apply engineering principles to interconnected agricultural value chain performance.

To facilitate skill-building and enable students to receive specialized training, the agribusiness curriculum may further evolve to encourage or require co-op internships—learning experiences that are 6–8 months in length instead of the traditional 10–12-week summer internship. The on-site co-op internship would replace in-seat coursework and provide an experience that makes students more career-ready.

5 Discussion and Recommendations

Although academic departments rightfully have concerns about enrollment, the agribusiness curriculum (i.e., what is taught, how it's taught, who teaches what) holds the opportunity to sustain interest in the degree. Its focus on equipping graduates to solve problems helps with recruiting students, sustaining student engagement, and attracting diverse employers to recruit graduates. Based on industry outlook, the next opportunity for agribusiness programs lies in preparing students to solve integrated value chain problems.

Because the agribusiness degree is unique and meant to evolve—similar to a STEM field—departments can adjust curricula so graduates have what they need to solve emerging, future, or wicked problems. Offering students a choice to stack competencies in economics (liberal arts), business (professional), and analytics/quantitative (STEM) fields prepares them for such problem-solving. As needed competencies change, teachers also must retool courses, so they cover the topics viewed as inherent to the problems students will solve in the future.

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Appendix

Table A1. Details associated with consulting reports used to arrive at emerging forces and themes

Company / Organization	Report Publishing Frequency	Publication Date of Reviewed Report	Geographic Coverage of Report	Number of Leaders Surveyed for Perspectives About Future Outlook
AlixPartners	Biennial	2023/2025	Global	1,000 executives
Aon	Biennial	2023	Global	2,842
CriticalStart	Annual	2024	Global	1,000 +
Deloitte	Ad hoc	2024	US and Europe	350 executives
EY Consulting	Biennial	2024	NA, Europe & Asia	unreported
Future Agenda	Ad hoc	2025	Global	1,500 organizations & 50,000 + digital responses
protiviti	Annual	2024	Global	1,100 + board-level
pwc	Annual	2023	Global	3,800 +
RiskInsight	Ongoing	2025	Topical	Publish on trends, no survey
World Economic Forum	Annual	2024	Global	1,500 global leaders

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