

Accelerating Sustainability-Oriented Innovations in Agribusiness:

A Set of Proposed Best Practices for Corporations, Investors, and Entrepreneurs

by

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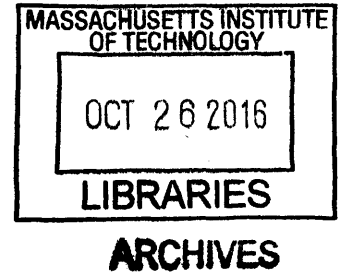
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Abstract

The agribusiness industry is under pressure and on the brink of transformation. The current environmental and social impacts of the agribusiness industry are huge, increasingly visible, and problematic. Demands on this system are increasing as the population grows, urbanizes, and demands more protein, healthier food, and more transparent supply chains. Yet simultaneously climate change, decreasing quality and availability of natural resources, and tougher standards on the use and environmental impact of agrochemicals are constraining supply. Together, these demand drivers and supply constraints create an urgent need for economically viable innovations that deliver environmental and social benefits. Corporations, investors, and entrepreneurs are currently trying to accelerate these sustainability-oriented innovations (SOIs) in various ways. *Agribusiness corporations* are losing market share, and in response are deploying strategies such as M&A, R&D, and updated internal processes (e.g., marketing, CSR, cost cutting) in a desperate attempt to become more innovative. *Investors* see an opportunity for financial returns and/or positive impact, and are therefore deploying increasing amounts of capital to accelerate technologies that address the above supply/demand challenges. *Entrepreneurs* have noticed that consumers no longer trust “Big Food”, and see this an opportunity to create a better food system through innovation. It is not clear, however, if these strategies are sufficient. Further, if they are not sufficient, it is crucial to identify gaps and propose solutions. This study, through semi-structured interviews and review of academic and gray literatures, analyzes the current strategies of corporations, investors, and entrepreneurs to accelerate agribusiness SOIs. After identifying where existing approaches are insufficient, I propose a series of solutions- in the form of best practices for each stakeholder- that address the identified gaps and challenges. By identifying and addressing the limitations of current approaches, corporations, investors, and entrepreneurs can more effectively accelerate SOIs and improve the environmental and social impacts of the agribusiness industry.

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Preface

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And to David, thank you for being you. I could not ask for a better sidekick. My thesis has been only one of many adventures over the last two years that would not have happened- or been any fun- without you. I cannot wait for many more together.

“With agribusiness, you have to understand the market. Just like cleantech investors needed to understand that you’re selling electrons to a utility. People are increasingly investing and starting companies in food and agriculture because they want to make a difference in the world. That makes the space more interesting. But everyone has an opinion about food, and if they don’t do their research to understand the technologies and the context in which they will operate they will bust. And similarly they can’t lose focus on creating a financially stable business. We’re already seeing it- some will go big, some will go home, and the smart ones will be left to pick up the pieces”

Serial Entrepreneur and VC investor

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Motivation and Research Questions

Overview

The goal of this thesis is to provide actionable insights that will help various stakeholders to improve the environmental and social sustainability of the food system by increasing sustainability-oriented innovations (SOIs) within the Agribusiness industry. Increasing food system SOI is particularly relevant given not only the importance of feeding the growing population while reducing the environmental and social impact that agribusiness has on the world, but also the extreme vulnerability of the food system to climate change. The agribusiness industry as a whole, led by individual players such as corporations, investors, and entrepreneurs, has huge potential to help create a more sustainable, equitable future. This thesis therefore seeks to understand: how can corporations, investors, and entrepreneurs help create this future by accelerating SOIs? My approach is to first provide context as to why the food system is ripe for disruption, and why sustainability and innovation are integral to the future of food and agriculture. I then examine the existing approaches that corporations, investors, and entrepreneurs are using to respond to the challenges, and take advantage of the opportunities created by new sources of demand and exacerbated by significant supply constraints. For each stakeholder, I identify the limitations to current strategies. Finally, I propose a set of best practices for corporations, investors, and entrepreneurs that will help these key players to accelerate SOIs.

The Impact of the Agribusiness Industry

This section provides an overview of the agribusiness industry and explains the environmental and social impacts that are becoming increasingly visible and material risks to the industry.

What is Agribusiness?

The agribusiness industry includes, “businesses that directly engage in or directly benefit from agricultural activities” (McCormack, 2015). Agribusiness therefore includes business that “produce agricultural commodities, buy agricultural produce or supply goods and services to farms and the agriculture industry”(McCormack, 2015)(See Figure 1, below). Such a broad definition, including everything from production to ready-for-consumption, includes many different players along the value chain, but does not include food retailers such as supermarkets, convenience stores, and restaurants.

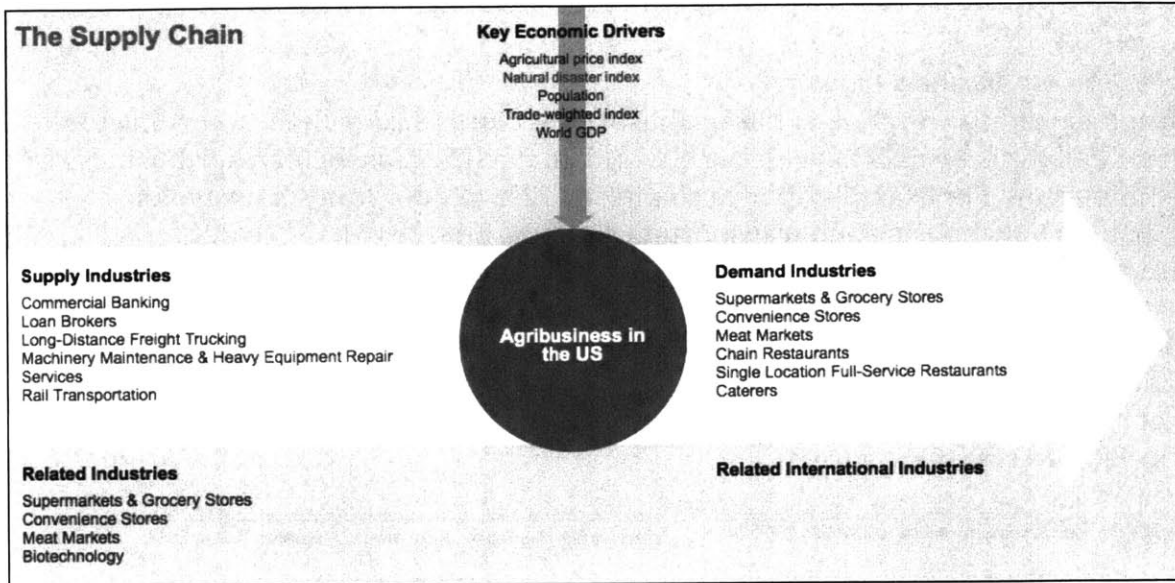


Figure 1: Agribusiness Supply Chain (IBISWorld, 2015)

The Agribusiness value chain is comprised of a number of different products and services. As shown in Figure 2 below, the main segments are Food Processing (34.1%) and Food and Supplies Wholesaling (37.9%). In this thesis, “producer” is used to refer to crop and livestock famers, “manufacturer” is used to refer to companies such as General Mills and Unilever that turn agricultural outputs into branded products, and “processor” is used to refer to mid-stream players that process agricultural commodities (e.g., extracting high fructose corn syrup from corn)¹.

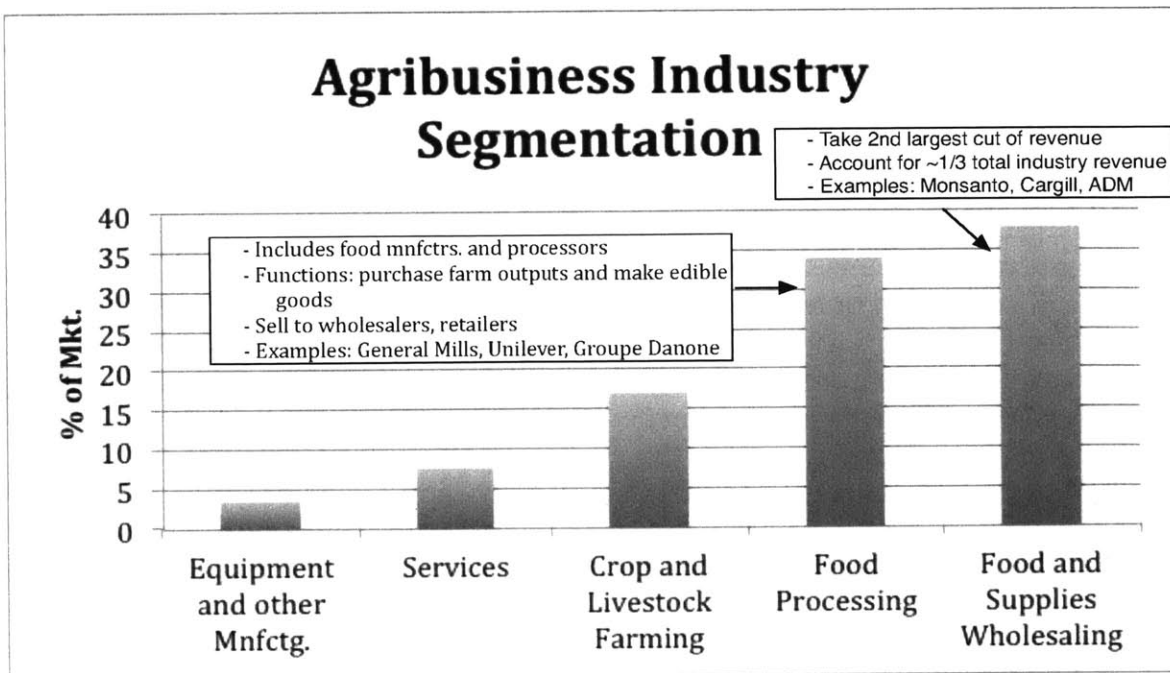


Figure 2: Agribusiness Industry Segmentation (Adapted from McCormack, 2015)

¹ The boundaries between these categories fluid, and many agribusiness corporations perform activities that fall into

How Large is the Agribusiness Industry?

The global annual revenue of the agribusiness sector is \$2.5 trillion, according to the 2015 industry analysis by data provider IBISWorld. In the U.S. in particular, agribusiness is extremely important. For example, food accounts for 12% of American’s household spending, behind only housing and transportation (USDA ERS, 2016). In the U.S., agriculture and its related industries produced \$835B in 2014, equivalent to 4.8% of gross domestic product (GDP)(USDA ERS, 2016). This figure underestimates the impact of agribusiness on GDP, however, as many other sectors that add significant value to the economy depend on agricultural inputs (e.g., cotton for textiles). Agribusiness is also a huge provider of jobs. In 2014, the industry provided 9.3% of total US employment, or 17.3M jobs (USDA ERS, 2016) (see Figure 3).

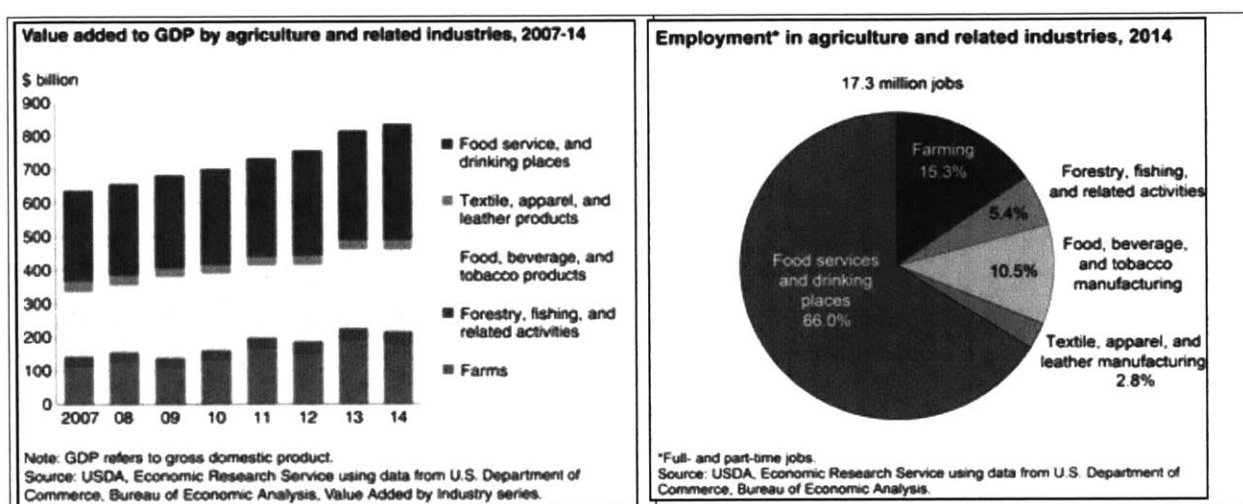


Figure 3: Agribusiness’s Contribution to U.S. GDP and Employment (USDA ERS, 2016)

Environmental and Social Impacts of Agribusiness

Due to its size and characteristics, agribusiness has a significant environmental impact. The degree of impact that each agribusiness operation has on the environment depends on the processes and practices under use, and there is significant controversy around which practices are best, worst, and entirely unacceptable. It is clear, though, that agriculture has the potential for negative environmental impacts such as soil erosion and degradation, biodiversity loss and ecosystem destruction through pollution and nutrient and pesticide runoff, and natural resources (e.g., water) consumption (Reynolds & Nierenberg, 2012). Table 1, below, summarizes key negative environmental impacts of the global agriculture sector. Further, the current agribusiness system contributes to negative social outcomes such as obesity, malnutrition, and slave labor (see Table 2). There is consensus that status quo practices need to change and become more environmentally and socially sustainable. Or, in other words, “business as usual is not an option”(MacIntyre et. al, 2009).

Table 1: Summary of Environmental Impacts of Agriculture

Category	Summary of Negative Impacts
Land Area	<ul style="list-style-type: none"> • Agricultural production and related activities occupy 40-50% of land on Earth • Over half² of the land in the U.S. is dedicated to agriculture
Water Usage	<ul style="list-style-type: none"> • Agriculture accounts for 70-85% of freshwater use globally • 15-35% of global water usage is not sustainable • Water tables around the world are dropping
Water Pollution	<ul style="list-style-type: none"> • The livestock sector, including manure as well as chemical inputs for animal feed, contribute to nearly one-third of fresh water contamination from nitrogen and phosphorous
Deforestation³	<ul style="list-style-type: none"> • From 1990-2000, 3.1M hectares of forest was cleared • From 2000-2010, 1.9M hectares were cleared • Over the last 25 years, the world has lost forests equal in size to India • Deforestation releases more CO₂ than do cars, trucks, trains, and buses worldwide
GHG Emissions	<ul style="list-style-type: none"> • Agriculture accounts for 10-12% of anthropogenic GHG emissions, or up to 25-30% if related activities are included • Livestock is a particularly significant contributor. According to some methodologies, it alone accounts for 18% of GHGs, including 9% of CO₂, 35% of methane, and 65% of nitrous oxide emissions⁴
Chemical Usage	<ul style="list-style-type: none"> • Large-scale monoculture systems characterized by significant water, fossil fuel, pesticide, and artificial fertilizer use often increase crop yields; however, studies show that after time yields decline as soil and water resources are strained beyond sustainable limits. • Significant water and air pollution can result from chemical usage and industrial scale agriculture • Soil health has degraded as a result of chemical fertilizers, making harvests more vulnerable to shocks such as extreme weather events

Adapted from Reynolds & Nierenberg, 2012, which in turn references: Change, 2007; Steinfeld et. al, 2006; Santilli et. al, 2005. Additional information included from: USDA ERS, 2016; Rosegrant et. al, 2001; Paarlberg & Paarlberg, 2013; IFPRI, 2016.

² 1.2B of the U.S's 2.3B acres

³ Forests are often cleared to make space for livestock to graze, or to produce food for livestock or humans (Steinfeld et. al, 2006)

⁴ The methodologies used to derive GHG contributions by certain activities are somewhat controversial (e.g., see Eshel et. al, 2014.). It is clear, however, that agribusiness, and livestock in particular, are significant contributors.

Table 2: Summary of Social Impacts of Agriculture

Category	Summary of Negative Impacts
Obesity	<ul style="list-style-type: none"> • Over 2 billion overweight or obese adults globally • 300 million obese adults globally, who are then predisposed to conditions like diabetes and cardiovascular disease
Poverty	<ul style="list-style-type: none"> • Incomes are declining for most farmers • As supply chains are increasingly monopolized, farmers have less control over production • Much of the world's food is produced by smallholder farmers who make up a majority of the world's poor/hungry (75% of poor people in developing countries derive their livelihoods, however insufficient, from agriculture)
Gender inequality	<ul style="list-style-type: none"> • Yields from female farmers are 20-30% lower than for males because of access to land, inputs, and financing • 60% of U.S. farm workers are undocumented, meaning they lack basic rights and access to resources
Labor Issues	<ul style="list-style-type: none"> • 75% are foreign born, and pathways to citizenship are extremely burdensome • There are 27 million victims of human trafficking globally, many⁵ of whom are forced to work in agriculture and related activities

Sources: Giovannucci et. al, 2012; Reynolds & Nierenberg, 2012; Kelly et. al, 2008; IFPRI, 2016; National Farm Worker Ministry, 2016; State Department, 2013

In addition to negative impacts, there are a number of social and environmental benefits of agribusiness. The current system produces large quantities of food at increasingly affordable prices: Americans spend less on food as a percentage of disposable income than ever before (USDA ERS, 2015). Further, the industry creates economic value by providing jobs. In fact, the global agribusiness industry provides livelihood for 2.6 billion people globally (Alston & Pardey, 2014). Beyond these obvious contributions, it is important to note that certain types of agricultural practices can improve ecosystems by protecting biodiversity, natural pollinators, and watersheds, sequestering carbon, providing micro climate regulation, and developing soil health (Giovannucci et. al, 2012).

Demand Drivers and Supply Constraints

Most of the demand on the agribusiness industry comes from consumers, who in turn are driven by their income and preferences (McCormack, 2015). Demand drivers for the industry therefore include population growth, domestic and global demographic shift, and changing consumer preferences. Similarly, the agribusiness industry's ability to meet

⁵ it is not determinable how many, precisely, though various human rights organizations have documented cases of slave labor in the agribusiness industry globally

demand is also constrained by a number of factors, such as climate change and allocation, availability, and quality of natural resources. This section examines each of the demand drivers and supply constraints that put pressure on the agribusiness system.

Demand Driver #1: Population Growth

Finding ways to provide affordable, nutritional food to the growing population without negative environmental consequences is a critical challenge facing the global agribusiness system. The United Nations (UN) calculates that the world population as of July 2015 reached 7.3 billion and predicts⁶ that global population will increase by 83 million people in 2016 alone, and will reach 9.7 billion people by 2050 (UN, 2015). Though fertility rates are declining and population growth is expected to slow compared to the past 35 years (UN, 2015), the Food and Agriculture Organization (FAO) estimates that to feed the world in 2050 agricultural production will need to increase by 70% globally, and nearly 100% in developing countries where malnourishment, malnutrition, and poverty are most prevalent, and where the population will increase most (FAO, 2009; UN, 2015). If the agribusiness industry does not find ways to produce more⁷ food, using fewer resources, without negative environmental consequences, the supply-demand gap will continue to widen. The growing population also creates a business opportunity for agribusiness corporations, investors, and entrepreneurs.

Demand Driver #2: Demographic Shift and Urbanization

As the population grows to 9.7 billion between now and 2050, many of the world's poorest, hungriest people will remain in rural areas. The FAO estimates that "rural areas will still be home to the majority of the poor and hungry for quite some time" (FAO, 2009). Rural populations will face challenges as cities expand and subsequently decrease availability of arable land for farming (Cohen, 2002), as well as force the poorest people into ecologically fragile areas (FAO, 2009).

However, the majority of people will move to urban areas and see their incomes rise. The FAO predicts that by 2050 over 70% of people will live in urban areas (FAO, 2009). Demand for agribusiness products in the developing world is already increasing, and will continue to do so as the economies in countries such as China and India grow and incomes increase. More income and urbanization will cause lifestyles, and therefore diets, to change. Specifically, demand for milk and meat-based proteins are expected to increase (Rosegrant et. al, 2001). Increased demand for beef is already materializing in China (McCormack, 2015). Additionally, this demographic shift will cause demand for vegetables, fruits, and fish to rise (FAO, 2009). The increase in demand for meat proteins will be especially pronounced in the developing world (see Figure 4, below).

⁶ This prediction refers to the medium prediction variant; neither the low nor high project, the median is assessed as the most likely.

⁷ Some argue that we currently produce enough food to feed the predicted 2050 population, but that, due to waste along the value chain, food does not reach consumers. Reducing food waste is therefore critically important, and an opportunity for incumbent and emerging agribusiness firms. See (Parfitt et. al, 2010) for a review of food waste literature.

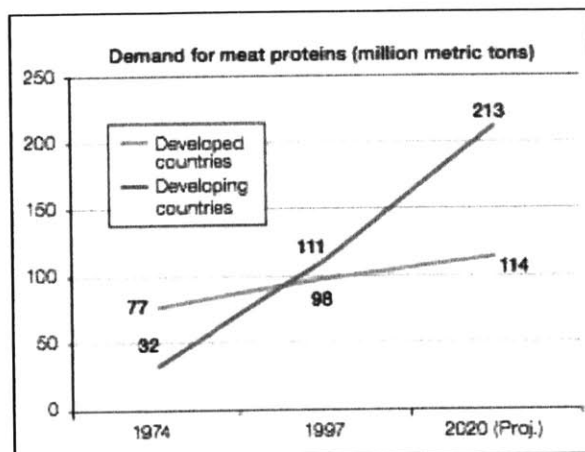


Figure 4: Expected Demand for Animal Protein [Giovannucci et. al, 2012]]

Though the emerging middle class in the developing world will create opportunities for profitable innovations in agribusiness, the increased and changing demand from developing countries will also put pressure on existing supply chains and natural resources as agribusiness firms expand into these new markets. Raising livestock, especially cows, is highly resource intensive (e.g., land, water, energy) (Steinfeld et. al, 2006; Eshel, et. al, 2014). Figure 5, below, shows that the environmental demands for beef outweigh those of dairy, poultry, eggs, and pork combined. As demand for animal protein increases, production of animal food (i.e., grain) products will need to increase. This in turn will require more resources, and, under current production systems, will exacerbate the environmental impacts described in Table 1, above.

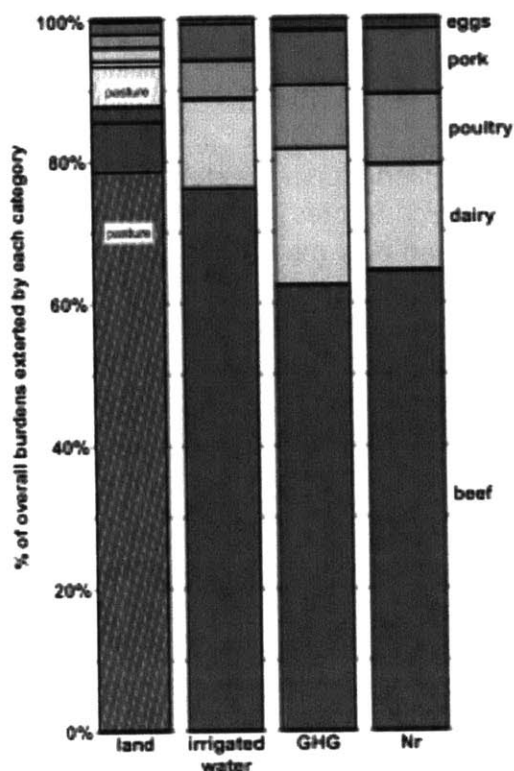


Figure 5: Environmental Burdens of Livestock (Eshel, et. al, 2014)

Changing demand dynamics in developed countries also put pressures on agribusiness firms. For example, agribusiness corporations in the U.S. are struggling to meet the demands of millennials⁸, baby boomers⁹, and Hispanics. Millennials represent the biggest sector of the population (25%) (Mintel, 2015), so their buying decisions, which are very different from other demographics, are important for agribusiness companies. A 2015 Mintel survey found that millennials distrust big food companies, want more transparency about where their food comes from (and need the messaging about pedigree to be authentic), prefer less processed food, and want more healthy food (Mintel, 2015). The baby boomers, in contrast, care much less about transparency and authentic messaging. Baby boomers are getting older and hitting retirement, meaning they have fixed incomes. Simultaneously, they are increasingly concerned about their health, and interested in using food as medicine. Baby boomers are therefore likely to prefer affordable, healthy options. Further, the industry is seeing increased spending by the Hispanic population, the largest minority group in the U.S., who are more likely than other groups of the population to purchase fresh and frozen food (S&P Capital IQ, 2015). A 2015 Nielsen survey also revealed that Hispanic shoppers spend 14% more than the rest of the market on consumer packed goods (CPG) such as frozen dinners and cereal (S&P Capital IQ, 2015). Agribusiness corporations may have to develop new strategies to cater to these distinct segments.

As the global population becomes urbanized and diets in developing countries start to look like those in developed countries, agribusiness firms will need to adapt their value chains, products, and marketing strategies. If practices do not become more efficient, there may be significant environmental impacts. Meeting the changing demand patterns from an increasingly urban population without negative environmental consequences therefore creates a significant challenge for the agribusiness industry.

Demand Driver #3: Changing Consumer Preferences

Shifting consumer preferences and changing purchasing behaviors are putting pressure on existing agribusiness firms and their value chains. There are two main trends that characterize the shift in consumer preferences: sustainability and health and wellness. New buying behaviors such as e-commerce and increased snacking are also emerging.

Sustainability

Consumers are increasingly looking to align their food purchases with their values about environmental stewardship. For example, organic and “local/better” sourcing are increasingly popular (Euromonitor International, 2015). This shift is evident not only in survey data, but also in purchasing decisions. For example, there has been a huge increase in organic food sales. Growth in the organic industry has been increasing consistently for the last 15 years, and 2014 saw 11% growth, totaling almost \$40B, which is just under 5% of the total food market (FiBL & IFOAM, n.d.). It should be noted that some surveys have found that the main reason consumers are purchasing organic products is the perception of health benefits; however, consumers also believe that organic products are free of

⁸ No agreed upon definition exists, but usually people born in from the 1980s to 2000 are safely referred to as millennials

⁹ Commonly defined as people born between 1946 and 1964

pesticides¹⁰ (Mintel, 2015) and other analysts believe environmental concern is also a key factor (Harfmann, 2015). Results from the 2015 Food and Health Survey indicate that 64% of Americans surveyed consider environmental sustainability aspects of food production, and 20% report thinking “about the topic a lot” (International Food Information Council Foundation, 2015). The survey also found that there are many interpretations of environmental sustainability, so perhaps consumers are not basing purchasing decisions as heavily on sustainability because of the lack of consistent terminology¹¹ across labels.

Consumers are also concerned about the ethics of the supply chains that process and deliver their foods. Consumer desire for ethical supply chains is driving growth in the U.S. specialty foods¹² segment. For example, a 2015 survey of adult shoppers in the U.S. found that 48% of shoppers care about the “values and philosophy” of the store where they shop, and 35% care about the “heritage” of the food they buy (Specialty Food Association, n.d.). Consumers also increasingly want to know that animals in the food system are treated ethically (Giovannucci et. al, 2012).

There is increasing evidence that sustainability plays a role in purchasing decisions (e.g., (Hainmueller et. al, 2015)). Understanding this change in consumer preferences is a challenge, and therefore an opportunity, for agribusiness companies. If companies can educate their customers- through authentic communication and not flashy marketing- about their specific approach to sustainability, they may be able to establish credibility (Mintel, 2015) and capitalize on the opportunity.

Health and Wellness

Consumers today are increasingly health-conscious and apt to use food as part of a holistic approach to health. According to the 2015 Food and Health survey, 60% of adult Americans say that “healthfulness” is a key driver in food and beverage purchasing decisions (International Food Information Council Foundation, 2015). One clear indication of this change is that consumers are moving away from packaged foods (Kowitt, 2015) and towards “real food”, or foods without “artificial flavors, preservatives, added sugars, and refined grains” (Moskow et. al, 2015)¹³. Additionally, the Specialty Food Association found that 47% of adults surveyed in 2015 chose specialty foods because they want to eat “more natural and healthy foods [and avoid] artificial ingredients and preservatives” (Specialty Food Association, n.d.).

Consumers are changing their approaches to weight loss and diet in response to increasing concerns about the growing obesity rate in the U.S. A 2015 Mintel report found that consumers are taking longer-term approaches to weight management, meaning they are purchasing fewer diet products, and looking for options with fewer, whole ingredients that are part of a balanced diet high in protein and nutrients (Mintel, 2015). Some consumers are increasingly buying low-calorie and/or high protein options, for example by

¹⁰ Current organic standards restrict certified organic products to non-synthetic pesticides, but natural pesticides may be used.

¹¹ Industry reports have also begun to mention consumer confusion due to lack of standardized terminology with functional foods. See [this FoodDive article](#) for a good overview.

¹² Specialty foods, according to (Specialty Food Association, n.d.), are “foods or beverages of the highest grade, style, and/or quality in their respective categories”. This includes characteristics such as “uniqueness, origin, processing method, design, limited supply” or distribution channel.

¹³ Additionally, according to a 2015 Mintel survey, the biggest reason for purchasing organic products is the perception of health benefits (Mintel, 2015).

purchasing portion controlled quantities (e.g., 100-calorie packs of cookies or crackers)¹⁴ (S&P Capital IQ, 2015). Agribusiness firms need to take note of consumer preferences for healthy products and holistic diet solutions.

Behavior changes

Consumers are not only looking for different characteristics in their food, but are also interacting differently with their food. For example, e-commerce is growing significantly. Though it has thus far been slow to disrupt the food industry (less than 1% of current food sales are happening through e-commerce according to (Cooper, 2015)), e-commerce is predicted to increase, especially for millennials who are already very likely to buy food online (Intel, 2015).

In addition to buying different, consumers are changing when, how much, and how often they eat. Whether trying to be healthier, save money, or just because food- especially energy-dense snack food- is more ubiquitous than ever, snacking especially is becoming more popular. Global snack sales grew 9% in value in 2015, according to Euromonitor (S&P Capital IQ, 2015). A 2014 FoodThink report found that 81% of Americans snack at least once per day, and 37% of millennials plan to snack more in the future (Sullivan, Higdon, Sink, 2014).

Agribusiness firms will need to develop strategies that enable them to cater to these changing buying and eating behaviors. Though this challenge is especially relevant for manufacturers with branded products, upstream processors and even producers are also impacted as consumers demand different types of products and more information about supply chains.

Supply Constraint #1: Climate Change

As the effects of climate change manifest, agribusiness operations will be among the most impacted, further constraining supply and putting pressure on corporations throughout the value chain. Agribusiness fundamentally relies on natural resources such as healthy soil, fresh water, and suitable atmospheric conditions. Climate change is, and will continue to, impact all of these resources, making our food supply incredibly vulnerable to the effects of climate change (Reynolds & Nierenberg, 2012). Producers in particular are vulnerable to climate change. Approximately 85% of the estimated 570 million farms globally (FAO, 2014) are family farms, and the vast majority of farmers globally are own less than two hectares of land (Lowder, 2014). These smallholder farmers have minimal risk bearing capacity, and are especially susceptible to climate change.

According to the International Food Policy Research Institute (IFPRI), “climate related uncertainties – manifesting as drought, floods, temperature fluctuation, and crop disease – pose what could become the greatest challenge to agricultural production and food security” (IFPRI, 2009). For example, climate change will impact global weather patterns, and weather conditions have a significant impact on agricultural commodities¹⁵ (McCormack, 2015).

¹⁴ Labeling of 100-calorie packs, or generally of portion control as a diet solution, is not currently regulated.

¹⁵ Examples include good weather increasing yields, or heavy rainfall increasing demand for fertilizers and pesticides (McCormack, 2015)

The agribusiness industry is not only extremely vulnerable to the impacts of climate change, but also contributes significantly to climate change. Agricultural activity contributes massively to climate change as land is cleared and carbon dioxide is released, fossil fuels are burned to make fertilizers and run machinery, and increasing amounts of livestock produce significant amounts of GHGs (see Table 1). Alone, the agricultural sector is responsible for 10-12% of global anthropogenic GHG emissions, and this estimate goes up to 20-35% when accounting for related activities (i.e., fertilizer production, food transport and refrigeration, consumer practices, and waste management) (Paarlberg & Paarlberg, 2013). As climate change regulations emerge (e.g., on deforestation and GHG emissions), specific practices within the agribusiness sector are likely to be impacted, which will further constrain supply.

Climate-resilient agribusiness is necessary to ensure adequate food supply and mitigate, as well as adapt to, potentially catastrophic environmental and social consequences.

Supply Constraint #2: Natural Resource Challenges

Agribusiness producers need available, high quality natural resources. Agribusiness already uses significant natural resources, and unfortunately the industry is increasingly depleting key natural resources that are fundamental for sustainable production of food, including land, water, and biodiversity (OECD, 2011). For example, 20,000–50,000 km of what would be productive land is lost each year as soil is degraded (Giovannucci et. al, 2012). The FAO special report titled “How to Feed the World in 2050” cites the Millennium Ecosystem Assessment that finds “15 out of 24 ecosystem services examined are already being degraded or used unsustainably. These include capture fisheries and water supply. In addition, actions to intensify other ecosystem services, such as the ecosystem service ‘food production’, often cause the degradation of others. Soil nutrient depletion, erosion, desertification, depletion of freshwater reserves, loss of tropical forest and biodiversity are clear indicators” (FAO, 2009). The report goes on to explain that resources must be both maintained and rehabilitated if we are to continue to feed the growing population.

In terms of land, there is not much room for growth, as increasing the amount of available arable land will have negative consequences because cutting down forests reduces biodiversity, negatively impacts both water and soil, and produces large amounts of GHGs. In terms of water, agribusiness already uses most of the world’s fresh water (Giovannucci et. al, 2012), and in many areas, producers are extracting water faster than the natural replenishment rate (Grimond, 2010). Water is extremely important to agriculture. For example, a cup of coffee uses 140 liters and a glass of beer requires 70 liters (Hoekstra & Mekonnen, 2012). The agribusiness industry must find a way to sustainably manage, and restore, natural resources or it will not be able to meet growing demand.

Supply Constraint #3: Biofuels

Recently agribusiness firms have experienced demand from a new sector: biofuels. The ethanol and biodiesel markets are increasing as corn and sugar manufacturers are increasingly able to produce fuel additives and substitutes (McCormack, 2015). From 2000 to 2008, biofuel production more than tripled, and in 2007-08, 110 million tons of coarse grains were used to produce ethanol (FAO, 2009). The use of biofuels is controversial from

an environmental sustainability standpoint and due to concerns about their impact on food prices and food shortages, especially in emerging markets (for example, see Scharlemann & Lawrence, 2008; Godfray et. al, 2010; Rosegrant, 2008; and FAO, 2009).

Despite these concerns, the demand for biofuels will continue to influence¹⁶ the agribusiness industry. In the U.S., the “federal government has announced plans to reach a target of 36.0 billion gallons of biofuel (ethanol and biodiesel) for transportation uses by 2022, with a Renewable Fuel Standard (RFS) to be set each year by the Environmental Protection Agency” (McCormack, 2015). If demand for biofuels increases, more land will be allocated to corn and sugar production, which will further limit available land for food production and ultimately constrain supply of foodstuffs. To avoid negative environmental consequences and increased risk of undernutrition, the agribusiness industry must therefore find ways to reduce competition between food and fuel.

Agribusiness Under Pressure

The demand drivers and supply constraints described above are putting pressure on agribusiness firms, who are already struggling to meet market expectations. For example, packaged food companies lost \$4 billion in market share in 2014 alone, and since 2009 the top twenty-five packaged food firms have lost \$18 billion in market share (Moskow et. al, 2015; Moskow et. al, 2016). Higher input costs impact mid-stream processors and manufacturers alike, as it is challenging and slow to pass along costs to retailers and consumers (S&P Capital IQ, 2015). Processors and manufacturers are forced instead to cut costs to maintain margins. One result of increased pressure to cut costs is consolidation. As firms strive to be more efficient, they look for synergies that enable them to eliminate redundant infrastructure and operations.

Agribusiness firms are also feeling pressure directly from consumers as activists and consumers increasingly demand more sustainable and socially responsible products and companies. Consumers are demanding simplicity. However, the specifics of implementing these changes for incumbent and emerging firms are far from simple. For example, consumers are increasingly “anti Big Food” (Euromonitor International, 2015), yet large-scale operations are what have enabled agribusiness firms to deliver consistency, safety, and low-cost products. An oft-cited Credit Suisse report suggests that consumer preference for “real food” is the primary driver of decline in market share for big food corporations (Moskow et. al, 2015). The report goes on to explain that the challenge for corporations is not that consumers want something different, but rather that what they want is almost directly in contradiction with the approach that has brought these firms so much success in the past. The report sums up this predicament well:

“The conundrum for the big food companies is that all of their scale in manufacturing, R&D, and marketing is geared toward using cheap ingredients to optimize taste and convenience and the lowest possible cost to the consumer. For example, Kraft literally invented pasteurized processed cheese for the purpose of extending shelf life and limiting the need for refrigeration. As a result, the idea of “Kraft Organic cheese” almost sounds like a contradiction in terms to consumers. Consumers are more willing

¹⁶ Note that “influence” in this case does not necessarily mean a positive influence. For example, if land is transitioned to biofuel-producing crops but demand for biofuels, and gasoline in general, does not adequately increase, there will be a surplus of supply and firms will face negative consequences.

to try niche “homespun” brands when seeking “natural” and “organic” solutions as opposed to the big corporate brands.” (Moskow et. al, 2015)

Agribusiness corporations are facing a risk of disruption that is present with any established industry, but is especially present in this one. The traditional dynamics of disruption are already playing out as big firms are losing market share, the cost of innovation is decreasing, and adoption rate is increasing, ultimately enabling ideas to rapidly become startups and then become industry disruptors (Christensen, 1997). Agribusiness giant Unilever has already felt this exact pressure from startup Hampton Creek with their “Just Mayo” substitute for egg-based mayonnaise (Sanwal, 2016). The increasing potential for disruption is also evidenced by the number of investors who explicitly state that changing the current food system is part of their mission or investment thesis, such as New Crop Capital (“Funding the next generation of food industry disruptors”) and FreshSource Capital (“Our mission is to invest in companies that are rebuilding local, regional food systems”).

Agribusiness firms are increasingly at risk. As Monsanto’s Chief Technology Officer, Robert Fraley, said in a recent interview, “You don’t only need to worry about being disruptive, but about your disruption being disrupted” (Burwood-Taylor, 2016). The 2015 Fortune special report eloquently summarizes in saying, “as in every other legacy industry, Disruption (with a capital “D”) is here. Big Food is under attack from Startup Granola” (Kowitt, 2015).

Emerging Role of Sustainability-Oriented Innovation (SOI)

The changing industry dynamics described above are not only putting pressure on the agribusiness industry, but also creating market opportunities for innovations that are financially viable and address the above challenges. These innovations, or more specifically, Sustainability-Oriented Innovations (SOIs), show a promise for helping agribusiness firms to close the supply-demand gap and continue to meet, or exceed, changing consumer expectations. Emerging examples in agribusiness include: biotechnology research is being applied to create genomic solutions like plant-based meat alternatives and bio-fertilizers that can replace synthetics; B2C marketplaces are popping up to ensure fair prices and enable producers to cut out middlemen; and ecology research is advancing to develop agro-ecological approaches that increase yields and improve biodiversity (Giovannucci et. al, 2012).

In 2015 alone, private investment activity in the agribusiness industry¹⁷ nearly doubled. Compared with \$2.36 billion in 2014, the agribusiness industry attracted \$4.6 billion from 672 unique investors across \$499 ventures (Burwood-Taylor et. al, 2016). This frequently cited AgFunder report goes on to argue that while this may seem like a lot, it is still a relatively small influx of capital compared to other sectors. For example, the report cites that investment activity in agribusiness represents less than 3.5% of total investment in venture backed companies, while health care, which is responsible for a similar amount

¹⁷ The AgFunder definition includes e-commerce, though without including ecommerce deals the sector still saw over \$2.9B of investment, up from \$1.9B in 2014. . In terms of geography, companies in the U.S. received 58% of total agribusiness investment dollars, while Israel, India, and China also saw significant activity.

of global GDP¹⁸, received 12% of total venture funding (Burwood-Taylor et. al, 2016). There is therefore significant room for additional capital, and additional disruption. In addition to funding, the industry is seeing an increasing number of venture-enabling operations, such as crowd-funding platforms and accelerators. According to popular information and innovation platform Food+Tech Connect, six new crowd-funding platforms and 15 startup accelerators focused on food launched in 2014 alone (Meijers, 2015).

Public Sector Innovators

One set of stakeholders that readers might find notably absent from this analysis is the public sector. Globally, the public sector, including NGOs and local governmental organizations, has undeniably played a significant role in catalyzing innovation and directing capital to create more equitable and sustainable food system. During the Green Revolution¹⁹, the public sector enabled development and adoption of agriculture technologies by supporting local and national research and complementing private sector efforts with investments in supporting infrastructure, such as roads, power, and extension services (Evenson et. al, 1979). The impacts of public sector investments are positive and far-reaching: literature indicates that public sector investments in agriculture have long-term effects as other countries adopt technologies and practices over time, and because they provide a maintenance effect (e.g., to prevent yield decreases after technological gains) (Alston et. al, 2009). Despite this fact, growth in public sector investments in agriculture is declining (USDA ERS, 2012). Simultaneously, private sector investments are increasing (Giovannucci et. al, 2012). The agribusiness industry is in a moment where innovation and investment by private sector players are necessary to address the demand drivers and overcome the supply constraints described above. My focus in this thesis is therefore on the role of private sector solutions to complement the necessary public sector investments. Though the public sector plays an integral role in accelerating agribusiness SOIs, primary research on this sector is not included in this thesis. Future work should elaborate on the complementary nature of the two sectors (e.g., building on King et. al, 2012), as well as investigate the role of the public sector in accelerating agribusiness SOIs.

The Private Sector Innovation Ecosystem

Fueled by an influx of capital, and motivated by demand drivers and supply constraints, key players within the private sector of the agribusiness industry are attempting to accelerate SOIs. *Corporations* are threatened by disruption and are currently losing market share. To respond to the above challenges, they are currently employing M&A and R&D strategies, as well as implementing changes to internal processes (e.g., marketing, CSR, cost cutting). Though corporations will undoubtedly play an important role in accelerating SOIs (Giovannucci et. al, 2012), external innovation is also necessary. *Corporate Venture Capital (CVC)*, a strategic external investment function of a corporation, is therefore emerging at the intersection of corporations and risk capital investors to help access, de-risk, and accelerate SOIs. Traditional *investors*, too, play a key role in the innovation ecosystem by providing capital necessary to scale SOIs. Investors in this case include: support

¹⁸ According to the report, health care is 12% and agriculture is 10%.

¹⁹ A period around 1960-70 when agricultural productivity increased, mainly in developing countries, as a result of adoption of technologies such as seeds, fertilizers, and pesticides. Though there is some dispute about the environmental and social impacts of the green revolution, it is clear that the public sector played a key role in enabling the advancements.

mechanisms such as prizes, accelerators, and incubators; early-stage investors such as angel investors and venture capitalists; growth stage investors such as private equity firms; and other investors including impact investors, family offices, and real-asset investors. These investors see an opportunity for financial returns and/or positive impact, and are deploying increasing amounts of capital to accelerate technologies that address the above supply/demand challenges. Finally, *entrepreneurs* play a necessary role by developing and managing SOIs from idea to impact. Entrepreneurs have an opportunity to create a better food system through innovation. As the need for SOIs in agribusiness increases, and an increasing amount of private sector capital is mobilized to the sector, each of these stakeholders will play a critical role in the innovation ecosystem.

Research Questions

Corporations, including their CVC function, investors, and entrepreneurs are trying to accelerate desperately needed SOIs in various ways, but it is not clear if the current approaches will be sufficient to ensure we can adequately²⁰ feed the growing, changing population without negative environmental and social impacts. This thesis therefore asks the following questions:

1. Are **existing private sector approaches** to accelerating SOIs sufficient?
2. If not, where are the **gaps** and what **solutions** show promise in closing them?

This thesis is part of a broader line of research on SOI currently being pursued by the Sustainability Initiative at MIT Sloan. Understanding effective strategies to accelerate SOIs will provide actionable insights for academics, corporations, investors, and entrepreneurs.

²⁰ Quantity is not enough, and nutrition must be part of the solution. Much of the developing world still faces malnutrition while obesity and other diseases of excess are increasingly prevalent in developed countries.

Methodology

The goal of my thesis is to analyze current approaches to accelerate SOIs in the agribusiness industry and, where they are not sufficient to address emerging supply constraints and demand drivers, propose potential solutions. I draw on data collected from both primary and secondary sources. Primary sources include semi-structured interviews and forced ranking questions. Secondary sources include public documents such as press releases and blog posts, company websites, industry reports, and academic literature. This section details the processes I used to collect data from primary sources.

Identifying Interviewees

I first reviewed current literature, including academic work and industry publications, as well as publically available information and company and investor websites. Then, I conducted a series of semi-structured interviews with corporations, investors, and entrepreneurs. I used a purposive sampling approach (Trost 1984) to identify interviewees. First, I identified relevant categories (i.e., independent variables) of agribusiness actors, and then I iteratively refined these categories based on an evolving understanding of the research questions, access to interviewees, and logical and empirical gaps (Trost, 1984). The interview sample was also constrained by participant availability and willingness, as well as overall access. Interviewees in the corporation category include corporate venture capitalists, corporate sustainability professionals, and embedded sustainability roles (e.g., within R&D or health and safety) in agribusiness companies. Investor interviewees include family offices, private equity (PE), venture capital (VC), accelerators, crowd-funding platforms, real-asset investors, and patient capital (e.g., impact investors; alternative financing). I also interviewed entrepreneurs, investment bankers, non-profits, and strategic advisors.

Ultimately, the 50 interviews I conducted represent a broad sample across the 11 independent variables (see below). All categories within the property space represent players in the agribusiness industry with decision-making responsibilities relevant to accelerating SOIs. Though not shown below, I also selected my interviewees to ensure the property space included actors involved across the agribusiness value chain (i.e., production, processing, and manufacturing). Interviewee names and firms are not included as a matter of privacy.

Corporations			Investors							Entreps./ Other
CVC (Priv.)	CVC (Public)	Corporations	Family Offices	Patient Cap.	PE	VC	Accels.	Crowd .	Real-assets	
2	7	5	3	6	1	9	3	1	3	10

Figure 6: Summary of 50 Interviewees by Category

This selection methodology, while not allowing statistical inference, does address the challenge of ensuring a sufficient number of participants across a range of relevant independent variables, while affording the opportunistic approach of leveraging existing contacts as interviewees. It allowed me to develop a set of empirically grounded

propositions that can be tested through further research. In addition to information gained from interviews, I used publically available information on specific companies and investment events to provide insight into investment decisions in cases where direct interviews were not possible. These companies are not included in the figure above.

Semi-Structured Interviews

Interviews were conducted over the phone or in person, and notes and quotes were transcribed in real-time. Before each interview, I conducted research on the individual and the firm, where applicable, using publically available information. Appendix I contains the base template of semi-structured interview questions that were tailored for each interview. After each interview, a research memo was written to summarize key findings, including known information, gaps in the current information, and emergent theories (see Appendix II for a sample). Insights from each interview, as captured in research memos, were used to inform subsequent interviews and further explore emergent approaches, challenges, and best practices.

Ranking Questions

Following the interview, I gave all investor interviewees three forced ranking questions to analyze their preference for different investment criteria. Corporate venture capitalists (CVCs) were specifically asked to answer the third question related specifically to corporate investing strategy, while other investors were asked to answer only if they felt they had insights into corporate investing strategies. A total of six CVCs²¹ and eight non-CVCs responded to the forced ranking questions. The response options for these questions were determined from review of literature and public sources on investment decisions. Upon receiving the responses, I compiled them in an excel spreadsheet. The forced ranking questions are included in Appendix III.

Data Analysis

Throughout the data gathering process, I iteratively compiled, refined, and synthesized both primary and secondary data. My first pass through the data was intended to uncover themes across different stakeholders. More specifically, I reviewed the research memos and considered the results of the forced ranking responses to distill key insights. Insights fell into three categories: (1) existing approaches to accelerating SOIs; (2) limitations and associated challenges to these approaches; and (3) practices that leading firms are deploying to overcome these limitations. I then grouped the identified practices by stakeholder category and ranked them according to the amount of supporting evidence in the qualitative data and secondary sources. I excluded insights without significant support across multiple interviewees or sources, or noted them as areas for further research. Next, I did another pass through the data to distill general insights that did not pertain to specific stakeholder categories, but that had strong supporting evidence across interviewees. Finally, I linked all supporting primary and secondary to related insights, as appropriate.

Though not derived from a systematic review of successes and failures, the set of proposed best practices represent a post-hoc analysis of what the subjects interviewed for this thesis perceive to be effective and ineffective. Of course, even many leading

²¹ Seven CVCs responded to the third forced ranking question, because responses from one CVC-turned-VC are included

stakeholders are adopting practices based on what they observe among their peers, rather than what they themselves have found to be legitimate. In the future research section of this thesis, I elaborate on additional efforts needed to verify and validate these practices.

Analysis of Current Approaches to Accelerating SOIs

Corporations, investors, and entrepreneurs recognize the opportunity for innovations that deliver financial returns while creating environmental and social benefits. These key players are taking various approaches to accelerate SOIs. This section provides an overview of the activities of these key players, and highlights limitations that render current strategies insufficient to address supply constraints and meet the changing and growing demands on the food system.

Corporations

Process Changes: Marketing, Public Relations, and Cost-Cutting

Many agribusiness corporations are responding to industry pressures by changing aspects of internal processes such as updating marketing efforts, launching Corporate Social Responsibility (CSR) initiatives, and implementing cost cutting initiatives.

Marketing is hugely important to food brands, as much of the firm's value lies within the intangible brand value (Moskow et. al, 2015). However, as explained above, the industry is changing rapidly and existing firms are struggling to maintain brand equity. Advertising is moving to social media platforms like Twitter and Instagram, rather than TV, to attract the next generation of consumers. However, existing firms do not have an established presence on social media and are not familiar with this type of marketing. In contrast, emerging brands, often led by young, tech-savvy entrepreneurs, are able to take advantage of these new marketing channels. Therefore, corporations who once benefitted from the scale of their marketing dollars are no longer able to use this as competitive advantage, and as a result are cutting their advertising spend (Moskow et. al, 2015). Further, consumers are in general increasingly skeptical of the advertising efforts of existing firms. As a result, consumers may not like, or believe, their marketing efforts, irrespective of the platform on which they are delivered. For example, including "natural" on product labels to suggest the product is health or sustainable, or adding scenes of farms and farmers on packaging²² is no longer effective: consumers are starting to see through this as no more than a marketing tactic.

Corporations are also increasingly updating their Corporate Social Responsibility (CSR) strategies, such as annual reports, to include external commitments around sustainability and transparency. Table 3, below, shows a number of recent commitments by agribusiness corporations that have received a lot of media attention. These commitments help corporations to hold themselves accountable and make incremental changes towards meeting consumer demands; however, it is not clear if these external commitments will be sufficient, or take place fast enough, to help firms regain market share and raise revenues. More importantly, the upstream impacts of these commitments are not yet clear. When consumer-facing brands commit to change their sourcing strategies, it puts pressure on their suppliers, who may have to restructure their operations or increase their costs. Ultimately, these commitments could exacerbate problems such as malnutrition and poverty in developing countries where many of the raw commodities are produced.

²² For example, see http://www.nytimes.com/2007/01/03/dining/03crun.html?_r=0

Table 3: Example Corporate Social Responsibility (CSR) Commitments

Corporation	Commitment
Tyson Foods	Remove antibiotics from chicken feed
Nestle	Source cage-free eggs for U.S. products by 2020
Campbell, Kellog, Mars, General Mills, ConAgra	Voluntarily label products containing Genetically Modified Organisms (GMOs)
The Hershey Company	100% sustainably sourced cocoa by 2020

Another response by corporations is cost cutting. For example, Coca-Cola committed to cut \$3 billion per year through 2019 in response to losses from decreased soda consumption (Conley, 2014). Cost cutting may be effective in the short term; however, over the long term this may be insufficient as corporations *spend* money to meet emerging supply and demand challenges. For example, according to a Credit Suisse analysis, firms will need to “buy higher quality, more expensive ingredients and acquire the small, fast-growing organic brands with much lower profit margins [which poses] a significant threat to gross margin and [Return on Invested Capital (ROIC)] over time” (Moskow et. al, 2015).

All of the responses described above are likely necessary in the near-term to help existing agribusiness corporations respond to industry pressures. However, these strategies may not be sufficient. For example, marketing efforts need to be more authentic to reach increasingly skeptical consumers. Further, goals and commitments within annual reports are becoming the ante to play, but without associated holistic updates to sourcing and procurement strategies, these commitments could exacerbate supply constraints. Finally, cost cutting can only go so far, and if more consolidation happens in pursuit of synergies, consumers are even less likely to trust the then-even-bigger companies.

Research and Development (R&D)

Another common approach that corporations are using to address changing demand dynamics and supply constraints is to leverage internal research and development departments. For example, many companies are now attempting to change the ingredients in existing products (see Table 4, below).

Table 4: Examples of Ingredient Changes by Agribusiness Corporations

Corporation	Ingredient Changes
Kraft	Remove synthetic ingredients from mac and cheese
General Mills	Lower sugar content of Yoplait yogurt; remove artificial colors and flavors
The Hershey Company	Removing polyglycerol polyricinoleate and vanillin from chocolate bars

Sources: Kowitz, 2015; General Mills, 2015; Scipioni, 2015

However, changing product composition is not trivial. There are three main challenges that agribusiness corporations will face with this strategy. First, changing ingredients while preserving flavor and texture is difficult and can take a long time. For example, vanillin, a synthetic flavoring, has a consistent flavor profile, but the flavor of vanilla

changes depending on how or where it was grown (Kowitt, 2015). The timelines needed to make these changes are much longer than the pace at which consumers are demanding new offerings, and therefore this might not be enough to combat the decline in market performance by food companies. Second, R&D can be expensive. If the supply chain for a product has to change, it can be not only costly, but also face resistance or even introduce new issues (e.g., safety concerns). According to Harvard Business Review, “R&D has a tendency to be slow, rigid, and expensive (Lerner, 2013).” Finally, companies are risk averse and may not make big enough changes. One reason may be that public corporations have an obligation to deliver quarterly returns to shareholders, which limits the amount of budget available for experimentation (Sanwal, 2016). Companies are also risk averse because they do not want to be too responsive to ever-changing consumer trends. For example, trends such as gluten-free and low fat may not be in demand by the time a corporation can develop products in those categories. Companies may resist developing and introducing new products because of risk aversion due to high expenses and fear that consumers will not try them (Moskow et. al, 2015).

Overall it is clear that the R&D approach to accelerating SOIs is necessary but insufficient because it is too slow, too expensive, and not aligned with normal company operating principles. As Rabobank, the world’s largest agricultural bank, says, “the major American [food and beverage] companies- once characterized by strong innovation and competitive brand marketing- are struggling to meet the challenges of the twenty-first century consumer landscape” (Fereday & Rannekleiv, 2015).

Mergers and Acquisitions (M&A)

Another common and growing response for corporations is merging with, or acquiring, companies. According to a 2015 MergerMarket report, from 2010 to 2015 there were over 200 M&A deals in the U.S. reported at over \$50 million, adding up to \$235 billion (MergerMarket, 2015; Neely & Porter, 2015). Further, the value of M&As in the food sector increased by 57.8% in 2015, up to \$120.8 billion²³. A 2016 Credit Suisse report confirms that, “food companies are looking to buy out the small organic and natural foods entrepreneurs who have taken market share away from the traditional big brands” (Moskow et. al, 2016) (see Figure 8 below for an overview of common M&A strategies). Figure 7, below, shows a number of recent examples of agribusiness M&As.

²³ It should be noted that the huge mergers of Kraft and Heinz and ABInBev and SABMiller drove a lot of the size.

Acquirer	Target	Year	Addressing consumer shift
ConAgra	Blake's All Natural Foods	2015	Natural and organic frozen meals
Bacardi	Angel's Envy	2015	Growing interest in bourbon and independent distillers
Hershey	Krave	2015	Greater demand for protein snacks in C-stores
Mondelez	Enjoy Life	2015	Desire for 'better-for-you' snacks with cleaner labels
AB InBev	Blue Point Brewing Company	2014	Craft brewer
General Mills	Annie's Homegrown	2014	Growing consumer interest in organic/natural food
AB InBev	10 Barrel Brewing	2014	Switch from 'domestic premium' to 'craft' beer
Campbell Soup	Bolthouse Farms	2013	Fresh food and smoothies
WhiteWave	Earthbound Farm	2013	Packaged salads
Campbell Soup	Plum Organics	2013	Organic baby food in pouches
Post Holdings	Premier Nutrition	2013	Active nutrition and supplements
Starbucks	Teavana	2012	Rising consumer interest in tea
Starbucks	La Boulange	2012	Artisanal bakery to expand food options
Hershey	Brookside Foods	2011	Healthy indulgent chocolate
Coca-Cola	Honest Tea	2011	Bottled organic tea
E&J Gallo	Barefoot Wines	2005	Consumer shift to more premium wines
Source: Rabobank, 2015			

Figure 7: Overview of Recent M&A Strategies for Food and Beverage Companies (Fereday & Ranneklev, 2015)

There are a number of reasons why agribusiness corporations are attracted to M&As. For example, M&As help create top-line growth for firms. M&A is also faster than internal innovation because rather than compete with tons of smaller, more agile brands that can respond to trends more quickly, corporations get the benefit of these brands as soon as they buy them. Corporations also then get access to new consumers (e.g., millennials) and new market segments (e.g., organic products; fresh produce). Buying new brands may not be a problem for agribusinesses: according to Bloomberg, many food manufacturers can afford to take on debt because of their currently low financial leverage (Banjo & Lachapelle, 2016).

Common M&A strategies for food manufacturers

Rationale	Description
Product or category adjacency	Company acquires a business that sells a product, service, or brand related to, but not identical to, one of its own business categories.
Geographic adjacency	Expansion into a new location rather than a new sector or category. May be US companies wanting to expand into emerging markets or international players wishing to move into the US.
Consolidation	Takes advantage of synergies and economies of scale, usually between two companies with similar businesses. Also increases clout with large food retailers.
Innovation acquisition	Large companies purchase smaller enterprises with proven innovation in order to realize immediate benefits.
Accessing capabilities	Company acquires a target that either leverages or builds on its own capabilities system. It may also sell a unit that does not benefit from these capabilities.

Figure 8: Strategic Drivers of M&A for Food and Beverage Companies (Neely & Porter, 2015)

Overall, there is an advantage for corporations to acquire entrepreneurial ventures because they are more agile than incumbent firms, and can therefore develop new products that meet the changing demands and therefore disrupt existing products. However there are three main challenges that make M&A insufficient. First, acquisitions only have a small impact on the total revenue of a corporation. If this strategy does not have an impact on the bottom line, it cannot be a long-term strategy to maintain market dominance. Further, it may not even be effective over time if the corporations do not invest in the ventures, or, as one CVC interviewee said, “there’s also a tendency to destroy the acquired companies. Because they are such a small chunk of total revenue for the corporation, they don’t get the attention that it deserves.”

Second, acquisitions are really expensive and can be risky. Corporations have to acquire well-established brands that they know will address important market segments, but these brands cost more. Mid-market companies that are promising targets for acquisition often do not need the capital, or fear losing brand value by associating with “Big Food”. So, corporations who want to acquire them have to compete with Private Equity (PE) firms, which can be expensive.

Finally, the changing demand dynamics within the agribusiness industry are causing a number of integration challenges for corporations and the companies they acquire. For example, the corporation has to ensure the acquired company retains its independence to assure consumers that it still delivers the same value proposition. The Coca-Cola Founders Program recognizes this challenge, stating on their blog²⁴ that the companies they help to

²⁴ <http://coca-colafounders.com/blog/how-we-fast-track-the-discovery-process-inside-coca-cola/>

incubate “remain an external entity separate from Coke. That means that as they hone their offering, they can begin offering it to other companies as well.” A recent Rabobank report suggests additional risks, such as “losing authenticity,” “undermining the brand’s position,” and “conflicts among acquired brands and/or loss of focus,” where the buyer’s marketing power is diluted across too many brands, or acquired brands begin to compete with each other and with established brands (Fereday & Ranneklev, 2015). Many interviewees confirmed this challenge, for example:

“Our concern with M&A is that we want to keep the brand [integrity] of [the acquired] company” –Multinational Agribusiness Corporation

“M&A [in the food industry] tends to go better when the small companies are left alone. Companies can’t be overbearing and destroy brand value. So, integration and how they manage [the M&A] is increasingly important” – Agribusiness Investment Banker

“Big companies are saying let’s just buy the company, be there and give it access to our resources, but don’t change [product] formulation or the strategy behind their brand. This is risk-driven, as they don’t want to lose customers who are customers because of what the brand stands for” - Agribusiness Investment Banker

“The key for corporations after an M&A is to keep the brand recognition of the venture so they can retain the value of the acquired brand, and the way to do this is to keep the brand independent.” –Food Industry Expert

In addition to integration challenges, corporations have to consider whether the target company will be a value-add to their operations and a cultural fit. For example, many new ventures are high growth, but low margin, which is the opposite of the current model for manufacturers. Before acquiring such a company, the manufacturer needs to consider whether they will be able to maintain the benefits associated with the acquisition. This may require a high level of attention, and the corporation may not be willing or able to provide it.

“Previously the corporations could look for synergies [i.e., eliminate redundancies], but now they don’t do that, which is appealing for the acquired companies, but the other side of that is that the acquired companies don’t get the same level of attention” – Former CVC at food manufacturer

Though M&As may be appropriate in some cases, they may not be the most effective approach for corporations given their minimal overall impact, high cost, and emerging integration challenges. It is increasingly clear that an M&A approach is not sufficient to address emerging industry pressures.

Corporate Venture Capital (CVC)

Corporate Venture Capital (CVC) is emerging as a way for existing agribusiness corporations to accelerate SOIs and gain a competitive advantage. However, CVC is relatively new to agribusiness and consequently corporations face a number of challenges in fully realizing the potential of CVC, such as: (1) finding the appropriate balance between

financial and strategic objectives; (2) implementing a CVC structure that enables them to pursue their objectives; and (3) establishing and maintaining credibility both internally with the parent corporation, as well as externally with other investors and entrepreneurs. In this section, I discuss the recent increase of CVC in agribusiness and each of these main challenges.

Corporate Venture Capital On the Rise

CVC is a dedicated venture investment function that is tied to a corporation. Corporations in all industries are increasingly considering the strategic value of CVC. Corporations often create CVCs to outsource their R&D efforts or gain access to deals that they may eventually want to acquire. Increasingly, CVCs are being used to help corporations be more innovative, possibly because they struggle to do so internally, and because they fear disruption by new ventures (Sanwal, 2016). 2014, which at the time was the strongest year for corporate venturing since 2000, saw CVCs invest a total of \$5.4 billion in the U.S. across 775 deals, which is equivalent to 11.0% of all venture investments (NVCA, 2015). 2015 continued to show growth in CVC activity: CVCs participated in \$28.4B of funding across 1301 deals, an improvement over CVC participation in the \$16.7 billion invested across 1245 deals in 2014 (CBInsights, 2016) (see Figure 9). Part of this increase in funding can be attributed to the entrance of new CVCs: since 2014 alone, 127 new CVCs have formed (CBInsights, 2015). However, though CVC is growing, CVCs still only represent 12% of total active VCs in 2015 (CBInsights, 2016).

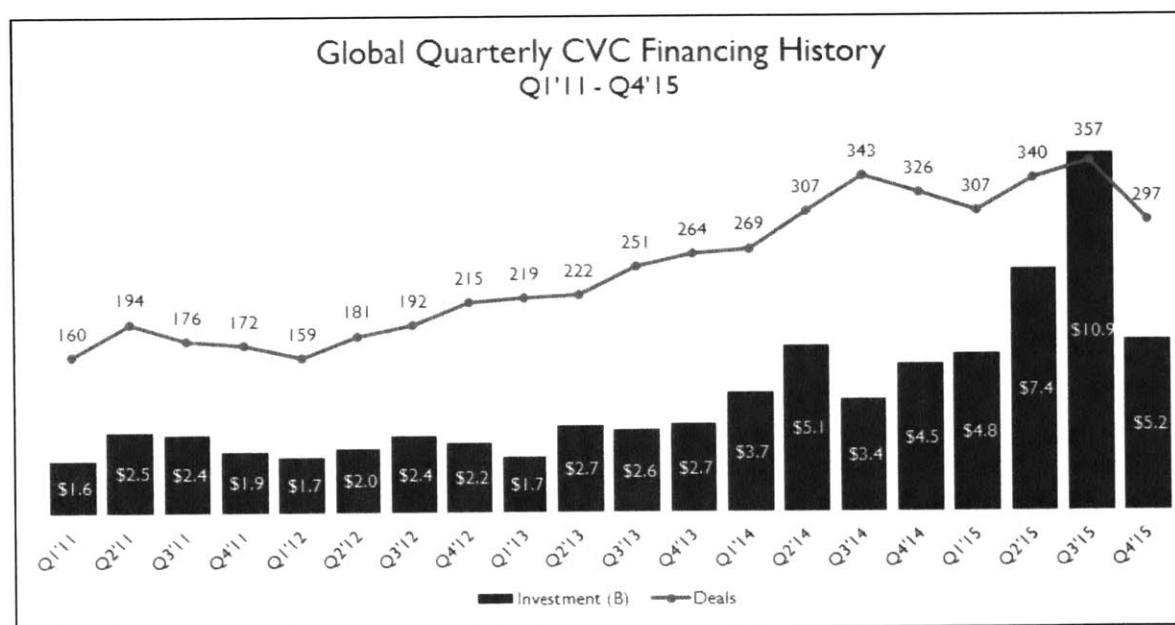


Figure 9: Quarterly CVC Investment and Deal Volume (CBInsights, 2016)

In agribusiness specifically, CVC is a relatively new phenomenon. All but one of the CVCs interviewed for this thesis mentioned that they are “still figuring it out,” “there is lots of uncertainty,” or “we have to wait and see how this goes.” As further evidence, many of the CVCs that have been around for a few years have not made any investments yet. As one agribusiness investment banker said, “my sense is that [CVCs are] still new to the game and

are learning how to do it. They haven't really figured out what the best approach is." The results of the forced ranking questions are consistent with the notion that agribusiness CVCs are still deciding on the most appropriate strategy and investment priorities (see Figure 10). For example, investing in a venture that is a customer of their parent corporation is both the lowest and highest priority across this set of CVCs. Further, five out of seven CVCs rank creating a new market offering as the highest priority, yet these five CVCs express a lot of diversity across their lower priority choices. The lack of a validated approach creates a number of challenges for CVCs, and for corporations considering a CVC function.

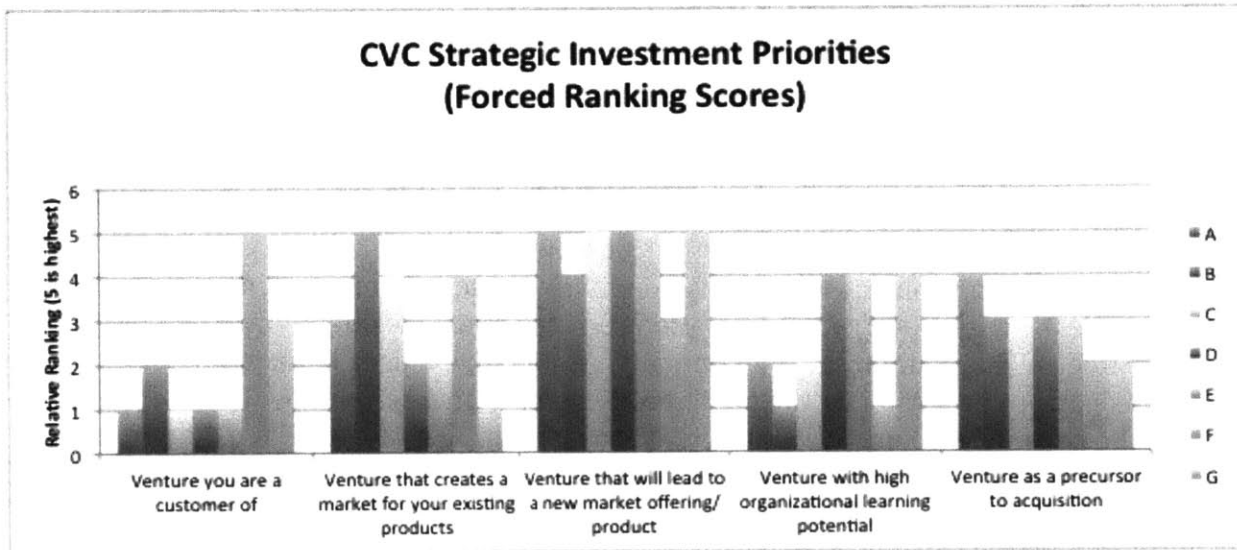


Figure 10: Forced Ranking Results: CVC Strategic Investment Priorities²⁵

However, despite the lack of agreement on priorities across existing CVCs, prominent corporations across the value chain have CVC functions and new CVC arms are increasingly being announced (see Table 5 below). This increase in CVCs may be because, as one former agribusiness executive said, "internal innovation for large cap companies in this industry has largely been a failure."

²⁵ CVCs express diversity across venture investment objectives (Figure 11) and determinants for venture investment (Figure 12). See Appendix IV for graphs of these data.

Table 5: Example Agribusiness CVCs and Deals

Investment Area	CVC	Deal	Terms
Production	Monsanto Growth Ventures	<i>Blue River Technologies</i> - use computer vision, machine learning, and robotics to determine plant health and input requirements	\$17M Series B
Processing	Syngenta Ventures	<i>Agrivida</i> - produce enzymes to make feeding livestock more efficient and economical	\$15M Series C
Manufacturing	General Mills 301 Inc.	<i>Beyond Meat</i> - produce plant-based meat substitutes	Not Disclosed

Source: CrunchBase and review of company websites

CVC Strategies: A Balance of Financial and Strategic Objectives

CVC objectives in agribusiness are consistent with those documented in other industries (Chesbrough, 2002). CVCs are often referred to as “strategic” investors, as they provide strategic value to their parent company. As one investment banker said, “All investments have to be strategic- the goal here is really to invest in innovation for the benefit of the parent company.” CVC activities may be purely strategic. For example, CVCs can provide visibility into market dynamics to more quickly evaluate and respond to trends (Lerner, 2013). CVCs also benefit their parent companies by providing a way to leverage other funding sources (e.g., VCs). Having an explicit venture function gives the corporation a seat at the table with other investors who can provide capital and help de-risk ventures (Lerner, 2013).

CVCs are also looking for financial returns for their parent company, just like other venture investors seek to deliver returns to their Limited Partners (LPs). Figure 11, below, shows that Team, Product/Technology, and Market are among the top determinants of venture investments for both CVC and other venture investors. However, for the parent company of a CVC, strategic returns are the driving factor because even though the financial returns from CVC deals look good on a percent ROI basis, the actual dollar amounts earned are insignificant compared to the core operations of the parent company. CVCs and their parent companies must therefore consider strategic returns in addition to direct financial returns from equity investments.

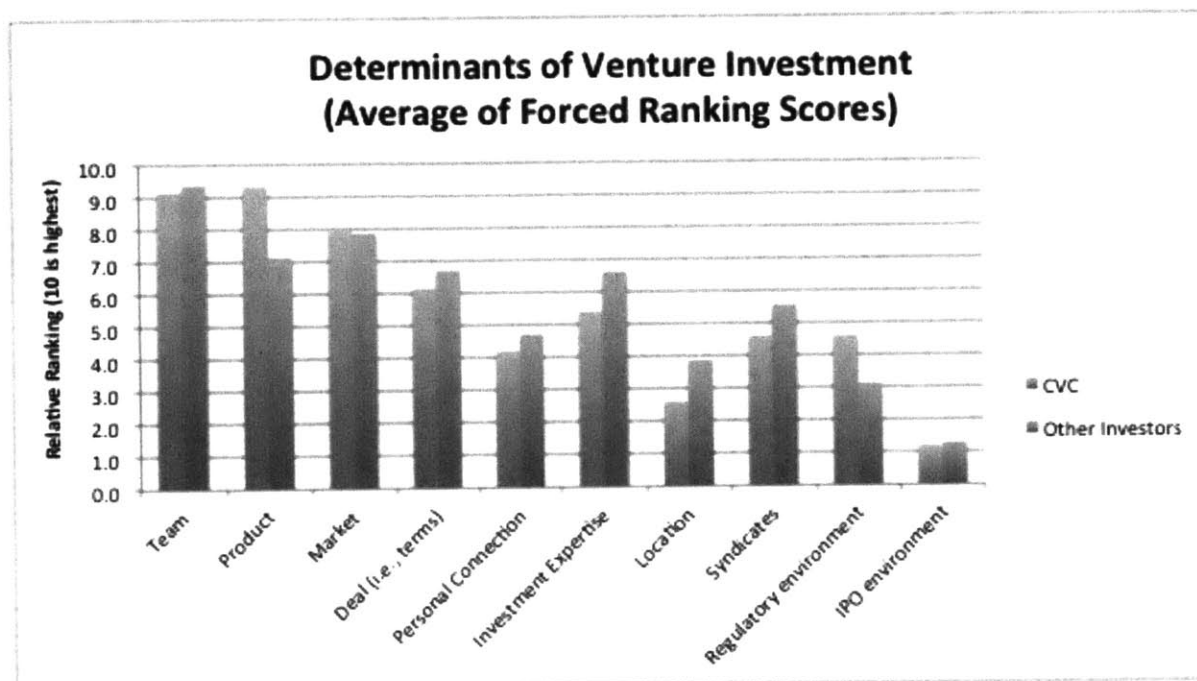


Figure 11: Forced Ranking Results: Determinants of Venture Investment

For CVCs, strategic returns might include non-financial, or indirect financial, benefits such as creating a new market for existing products, increasing sales of existing products, or gaining access to an emerging technology that may become a competitor for existing products (Lerner, 2013). This is again consistent with my findings from the forced ranking questions (see Figure 12). CVC respondents ranked “learning and exploration” as the most important investment objective, while other investors felt it was least important. Strategic investments are critical, as profits from corporate venturing activities are usually insignificant to the parent company’s bottom line (Lerner, 2013). CVCs are also able to take a longer-term perspective on their investments. For example, non-CVC investors rank “five to ten year gains” and “gains within five years” as the most important objectives for venture investment. CVCs, however, rank financial gains “over ten or more years” as the second most important criteria for investment, after only the strategic benefits of “learning and exploration.”

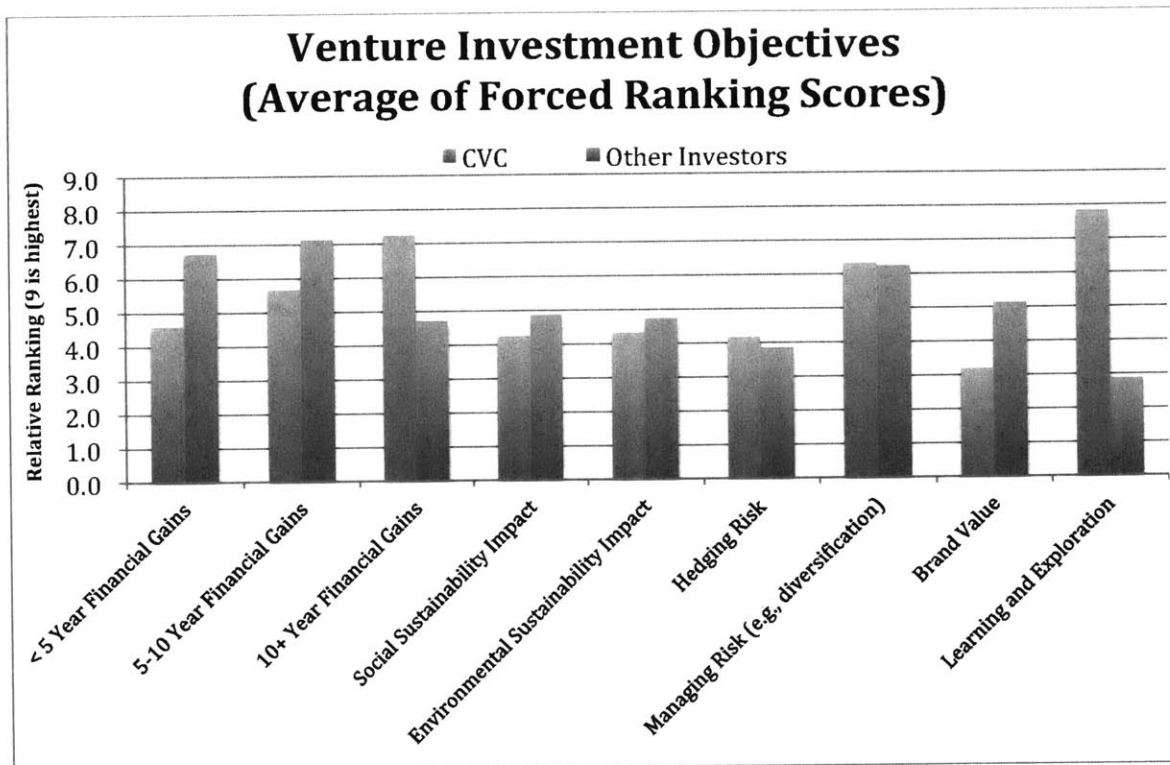


Figure 12: Forced Ranking Results: Venture Investment Objectives

Figure 13, below, presents a framework for understanding the strategic *and* financial objectives of CVCs, as well as the extent to which the CVC's investments are tied to the operational capabilities of the parent company (Chesbrough, 2002).

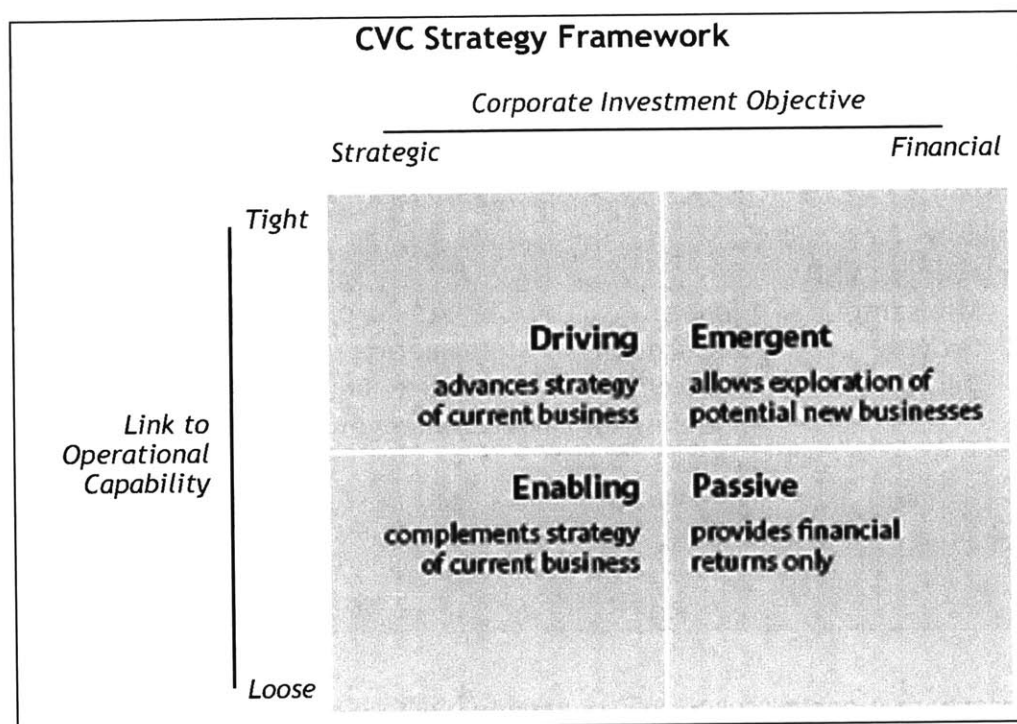


Figure 13: Framework for Understanding CVC Strategies (Chesbrough, 2002)

Each corporation determines where their CVC arm falls within this framework. As is consistent with the literature (e.g., Chesbrough, 2002), this designation often varies per deal, rather than per CVC. For example, many upstream Agribusiness CVCs only invest in ventures that are tightly coupled to their operational capabilities, but vary the degree to which they are looking for strategic vs. financial returns (i.e., investments may be Driving or Emergent). The overlap between strategic and financial returns is nuanced. For example, the most effective CVCs understand that strategically motivated investments can lead to greater financial returns, as there is a correlation between CVC activity and better internal R&D (Dushnitsky, 2011). Further, strategic investments can turn into financial returns when technologies mature, or ventures create new markets for existing products (Dushnitsky, 2011). Similarly, the degree to which CVC investments are coupled to operational capabilities can vary on a per investment basis. Table 6, below, provides specific examples of Driving, Emergent, and Enabling investments by Agribusiness CVCs²⁶.

²⁶ Literature indicates that *Passive* investments are undesirable, and in fact may be a misuse of shareholder funds for public corporations (Chesbrough, 2002). This is accepted by CVCs, and therefore *Passive* investments are excluded.

Table 6: Examples of Agribusiness CVC Investment Objectives

Investment Objective	CVC	Venture	Explanation
Enabling	Coca-Cola's Venturing and Emerging Brands (VEB)	Zico- premium coconut water	Allows Coca-Cola to enter new market segments focused on health
Emergent	Monsanto Growth Ventures	<i>Climate Corporation</i> - weather modeling for farmers	Climate Corp. provides information that Monsanto can use to help their customers in new ways
Driving	DuPont	<i>NexSteppe</i> - biofuel feedstocks (e.g., sorghum)	These new feedstocks (i.e., seeds) allowed DuPont to gain advantage in biofuels industry

Source: company websites

Literature indicates that parent corporations need to have a clear definition of the CVC strategy, and that the strategy must be aligned with the overall goals of the corporation and of the ventures within the CVC portfolio (Lerner, 2013; Lerner, 2013). Despite the need to be flexible on a per investment basis in terms of strategic/financial objectives and tight/loose coupling, CVCs must not be too responsive to external pressures, or change strategies too frequently (Bradford, 2014). Determining the balance between strategic and financial objectives, as well as between tightly and loosely coupled investments, is a challenge for agribusiness corporations and their CVC arms.

CVC Structures

Corporations need to find the right structure and implementation of the CVC function that will help them achieve their objectives. There are a number of aspects of CVC structure, including but not limited to: types of investments made; relationship between the CVC and the parent corporation; CVC personnel; and approval processes. Table 7, below, shows different aspects of CVC structure and their possible permutations for Agribusiness CVCs.

Table 7: Key Aspects of CVC Structure

Investment Types	Stage Preference	Relationship to Parent Corp.	Approval Process	CVC Personnel
<ul style="list-style-type: none"> • Indirect/ advisory • Direct Equity • Commercial partnership (e.g. licensing) 	<ul style="list-style-type: none"> • Agnostic/All • Early • Growth 	<ul style="list-style-type: none"> • Business Unit • Subsidiary • Functional Role 	<ul style="list-style-type: none"> • Specific BU buy-in for each deal • Committee • Initial approval of CVC strategy 	<ul style="list-style-type: none"> • Traditional VC expertise • Expertise w/in parent corporation

The types of investments a CVC seeks to make are different from that of other venture investors. VCs invest with third party money from their limited partners (LPs); however, most CVCs invest off the balance sheet of the parent company (76% do this, according to (CBInsights, 2015)), which often requires forming an independent fund or subsidiary of the parent company, or at least a functionally distinct branch. This means that while many venture investors have multiple LPs, CVCs only have a single LP. Some CVCs have an amount of funding allocated, while others invest when the opportunity arises (CBInsights, 2015).

CVCs can make direct (i.e., capital in exchange for equity) or indirect (i.e., invest into a fund that makes direct investments) investments into ventures. CVCs may also get involved with a fund in an advisory capacity, for example as a domain expert or industry-specific advisor. Generally, the economic terms that CVCs offer are the same or similar to that of VC investments, including liquidation preferences and additional control mechanisms (as in, CVCs are not asking for preferential treatment with respect to potential acquisition) (CBInsights, 2015). However, in addition to investments²⁷, CVCs often seek to form relationships with startups such as technology licensing agreements or joint development efforts.

“We want to co-develop technologies [with startups], then adapt it for specific applications that are of value to us. For example, we might use their process, so the structure of the relationship might be a license” –CVC Investor

There are many implications of the type of relationship between the CVC and the parent company, such as the autonomy of the CVC, and compensation and incentives of the CVC personnel (Dushnitsky, 2011). There are also implications for the CVC with respect to how the innovation ecosystem- other investors and entrepreneurs- perceive them (see Role and Perception of CVCs in the Innovation Ecosystem, below).

The relationship between a CVC and its parent company can also have huge implications for the diligence and approval process (i.e., the final decision as to whether the CVC can make an investment). CVCs have a different approval process than other types of investors. Most investors raise a fund from their LPs, and then have autonomy in deciding how to deploy that capital to particular ventures. Though the fund managers may stay in constant communication with their LPs, which some investors note as a significant time commitment, they do not have to get LP approval for particular investments. CVC partners, conversely, often need approval from within their parent company. For example, the CVC might need to get buy in from a senior leadership committee or specific business unit lead before starting diligence on a potential investment (CBInsights, 2015). The structure of the CVC, and its relationship to the parent company, influence the approval process. For example, CVCs face bottlenecks in making investments because of this need for approval from their parent company. Delaying the approval time and can make investing with a CVC, or getting an investment from a CVC, unattractive (CBInsights, 2015; Lerner, 2013). As one CVC explained, having to go back and forth between the CVC and business units can “constrain the scope [of the investments we can make], or slow the process down.” Other

²⁷ Some CVCs actually prefer non-equity investments over equity investments, depending on their structure and objectives

CVCs echoed this, explaining that the business units often “don't understand the value CVC can have,” or lack a “clear idea of what they are or aren't looking for.”

Corporations also face challenges in staffing their CVC arms. CVCs inherently need to be more risk-tolerant than their parent companies, but they need to be sure they are able to take measured, appropriate risks. Some CVCs hire their fund managers from the corporation, so they may not be knowledgeable with respect to investing. Further, CVCs may not provide sufficient incentives to hire and retain high quality personnel with investment expertise. Finally, CVCs may not offer compensation equivalent to investment industry standards, so they have both trouble hiring and keeping talented, experienced investors (Dushnitsky, 2011; Lerner, 2013; Rice et. al, 2001; Bradford, 2014). Agribusiness CVCs range in their structures, and no clear best paradigm has emerged.

Role and Perception of CVCs in the Innovation Ecosystem

The strategy and structure of a CVC also influences the CVCs access to deal flow. Literature indicates that CVCs need to engage in intentional and orchestrated interactions between with startups (Husted & Vintergaard, 2004), but CVCs may not know how, or where, to do this. Agribusiness CVCs are attending conferences and participating as mentors in prizes and for accelerators to gain access to promising deals. Many CVCs also seek to co-invest with VCs, as VCs often have more experience finding high quality deals than CVCs (Dushnitsky & Lenox, 2006). Syndicates and other types of co-investing platforms are therefore increasingly important, especially for CVCs.

Other venture investors are increasingly recognizing the value of CVCs as co-investors. One VC investor explained that CVCs can be “invaluable partners, especially that now [they are] paying more attention than they used to [because they realize that] their power in the value chain makes them valuable.” However, though there is increasing CVC activity and recognition about the value of CVC investors in agribusiness, many investors and entrepreneurs still have a negative perception about their motivations and expertise. For example, CVCs must overcome the perception that their parent company may be interested in acquiring a venture thereby limiting the potential exit options for the portfolio company. Further complicating this is the fact that startups- especially those with engineering backgrounds who may not have as much business expertise- may not have the experience to navigate deal sheets and term agreements with investors that may put them at risk (Bradford, 2014). Finally, some startups fear that strategic alignment with a particularly company, via their CVC, may deter other potential customers or investors, or may put pressure on the venture to narrow its focus to meet the needs of the corporation, rather than the broader market needs (Crichton, 2014).

CVCs, especially those without experience in investing, may also fail to align their own incentives with the interests of their ventures. For example, one investor explained that CVCs initially become excited about engaging with innovators, but believe the best way to do that is to get exclusivity. However, this is not effective because:

“...then [the CVC] realizes that no one will give those terms. So they get the worst guy, and then they realize they need to be better collaborators and co-investors because if you lock in [exclusivity], you only get to play with the worst player...the best guys understand they don't need board seat, don't need veto power, don't need exclusivity. If they can just get more info than their competitors and lower their cost of investment,

that's a model that wins. But this needs more courage and confidence. Sometimes they have to have a few write-offs and failures to get it" – VC Investor

Though investors of all types, including CVCs, confirmed that there are particular challenges for CVCs, other investors noted that involving a CVC might be attractive *because* of their potential to provide an exit option through acquisition. As one VC explained, "our portfolio companies need to achieve scale. IPOs are rare, so for us, acquisition can be a great exit option. This is definitely part of our theory of change." In addition to the strategic benefits discussed above, CVCs can also be advantageous for SOI ventures because of their longer time horizon (see Figure 12).

One VC investor explained that, "the benefits of getting a CVC involved far outweigh the risks. Even though risks [like limited exits or tarnished brand value] are real, big companies can add way more benefit by investing." The following quote illustrates some of the subtleties of this issue:

"If a CVC fund has a requirement or mandate to move towards a control position, they will make that explicit. For example, they might say, "20% stake with the right to buy another 30% at some agreed upon valuation over next three years." This might be unattractive to some entrepreneurs. [The CVC] strategy might also manifest more subtly: invest early, gain the right to participate but without a mandate, and over time acquire a 30-40% stake. Then [the parent company] should be able to buy [the startup because it] can outbid others. [The CVC doesn't have] a contractual right, but it is still cheaper to [the parent company] than others because you have the high stake at a lower cost. It's not clear if this strategy is unattractive to entrepreneurs and other investors. If the strategic advice from the corporate is of value, then this might still be a win for the entrepreneur." – Agribusiness Expert

CVCs in agribusiness are generally aware of the challenges of CVCs in other industries as documented in the literature and as seen in industry and the media. Challenges for CVCs in agribusiness are similar, and current CVCs are trying in various ways to overcome them; however, it's not yet clear if- or which- of the current approaches will be successful.

Summary

Innovation is necessary to help Agribusiness corporations respond to demand drivers and supply constraints. Corporations are currently trying to change processes and use both R&D and M&A to become more innovative and sustainable. However, many of these previously effective strategies are proving insufficient given the current challenges and pressures on the industry. Agribusiness corporations are also increasingly turning to Corporate Venture Capital (CVC) to gain access to, and knowledge of, emerging SOIs. Though there are many benefits to CVC, and agribusiness corporations are increasingly pursuing this strategy, there are also significant risks and limitations that need to be addressed. For example, corporations struggle to define a strategy for their CVC, operationalize the CVC using a structure that enables their strategy, and establish credibility within the innovation ecosystem. Overall, the existing corporate innovation strategies fall short in their ability to create long-term solutions to supply/demand challenges. Table 8, below, provides a summary of the current approaches and their associated limitations.

Table 8: Overview of Corporation's Approaches and Associated Limitations

Approach	Examples	Limitations
Marketing	<ul style="list-style-type: none"> • Packaging with idealistic pictures of farms 	<ul style="list-style-type: none"> • Authenticity • Emerging regulation
CSR Commitments	<ul style="list-style-type: none"> • “We will source only cage-free eggs by 2018” 	<ul style="list-style-type: none"> • Timeline • Uncertain supply chain impacts
Cost Cutting	<ul style="list-style-type: none"> • Cut \$X/year for 3 years 	<ul style="list-style-type: none"> • Not a long term solution
R&D	<ul style="list-style-type: none"> • Remove artificial colors and flavors from specific product lines 	<ul style="list-style-type: none"> • Slow • Expensive
M&A	<ul style="list-style-type: none"> • ABInBev and SABMiller • Hormel and Applegate 	<ul style="list-style-type: none"> • Minimal impact on total revenue • Expensive • Integration challenges
Corporate Venture Capital	<ul style="list-style-type: none"> • Monsanto Growth Ventures • General Mills 301 Inc. 	<ul style="list-style-type: none"> • Determine financial vs. strategic objectives • Implement strategy-driven structure • Establish/maintain credibility

Investors

Influx of Capital

Investors of all types have been increasingly making bets in the Agribusiness industry (see Figure 14 below for an overview of investor types). According to the 2015 AgFunder annual report, venture investments in agribusiness totaled \$4.6 billion in 2015, up from \$2.26 billion in 2014 (Burwood-Taylor et. al, 2016). These investors deployed capital across a number of subsectors (see Figure 15, below), with food e-commerce²⁸, irrigation and water, drones and robotics, and bioenergy leading by percentage of total investment. Despite the increasing flow of capital, this industry is not yet highly competitive across all stages and subsectors. Most of the investment funds dedicated to agriculture are still small, and most deals outside of ecommerce are \$50 million or less (Burwood-Taylor et. al, 2016). Further, seed stage investments see the highest number of deals (49%), but compared to other sectors, the seed stage in agribusiness is still “relatively undercapitalized” (Burwood-Taylor et. al, 2016). Many investors claim that this space, which is largely dominated by Venture Capital (VC), is relatively more competitive, perhaps because of the commonly held notion that “VCs have more access to deal-flow.”

²⁸ The report does *not* include restaurant delivery, as it “has less of a disruptive effect on the agriculture value chain” (Burwood-Taylor et. al, 2016).

Characteristics Investor Type	Example	Stage	Financing Resource	Breadth of Interest w/in Agribusiness	LP Structure	Timeline	
Venture Investors	Incubators and Accelerators	AccelFoods	Seed	Equity	Narrow	Sponsor(s) Multiple LPs	<5yr
	Angels	Hyde Park Angels	Seed	Equity or Debt	Varies	n/a	<5yr
	Impact	Impact Engine	Varies (usually seed, startup)	Equity	Varies	Multiple LPs w/ independence	Varies
	Crowd-Funding Platform	AgFunder	Idea / Seed	Equity or No- strings attached	Broad	Multiple LPs w/ independence	<5yr
	Family Office	Armonia LLC	Varies	Equity	Narrow	n/a	5-10 years
	Venture Capital	Cultivian Sandbox	Seed Startup Growth	Equity	Varies	Institutional	<5yr
	Corporate Venture Capital (CVC)	Dow Ventures	Seed Startup Growth	Equity or Strategic partnership	Varies	Parent company	Other/ varies
	Private Equity	Paine & Partners	Growth Mezz.	Equity or Debt	Broad	institutional	<5yr
	Real-Asset	SLM Partners	n/a	Equity	Narrow	institutional	5-10 years
Grant	Slow Money	Idea/ Seed	No-strings attached	Narrow	n/a	Varies	

Figure 14: Investor Types and Characteristics

Early stage investors in general face challenges, as many investors agreed that thus far there is a lack of sophisticated investors who can provide future funding to the companies they invest in, which makes early stage investments particularly risky.

“Not many firms investing in growth stage. [Manufacturers] do, and there are some funds focused on this, but there’s a real hole here on the agriculture side. It’s because there’s a lack of historical success, so investors don’t have confidence” – PE Partner

Other investors are hesitant about agribusiness ventures because they believe that the consolidated nature of the industry limits the number of potential exit pathways. This fear is reinforced by the fact that there have been very few Initial Public Offerings (IPOs), so most startups end up failing, or a few get acquired.

Total Funding, Number of Deals, and Percent of Total Dollars by Subsector

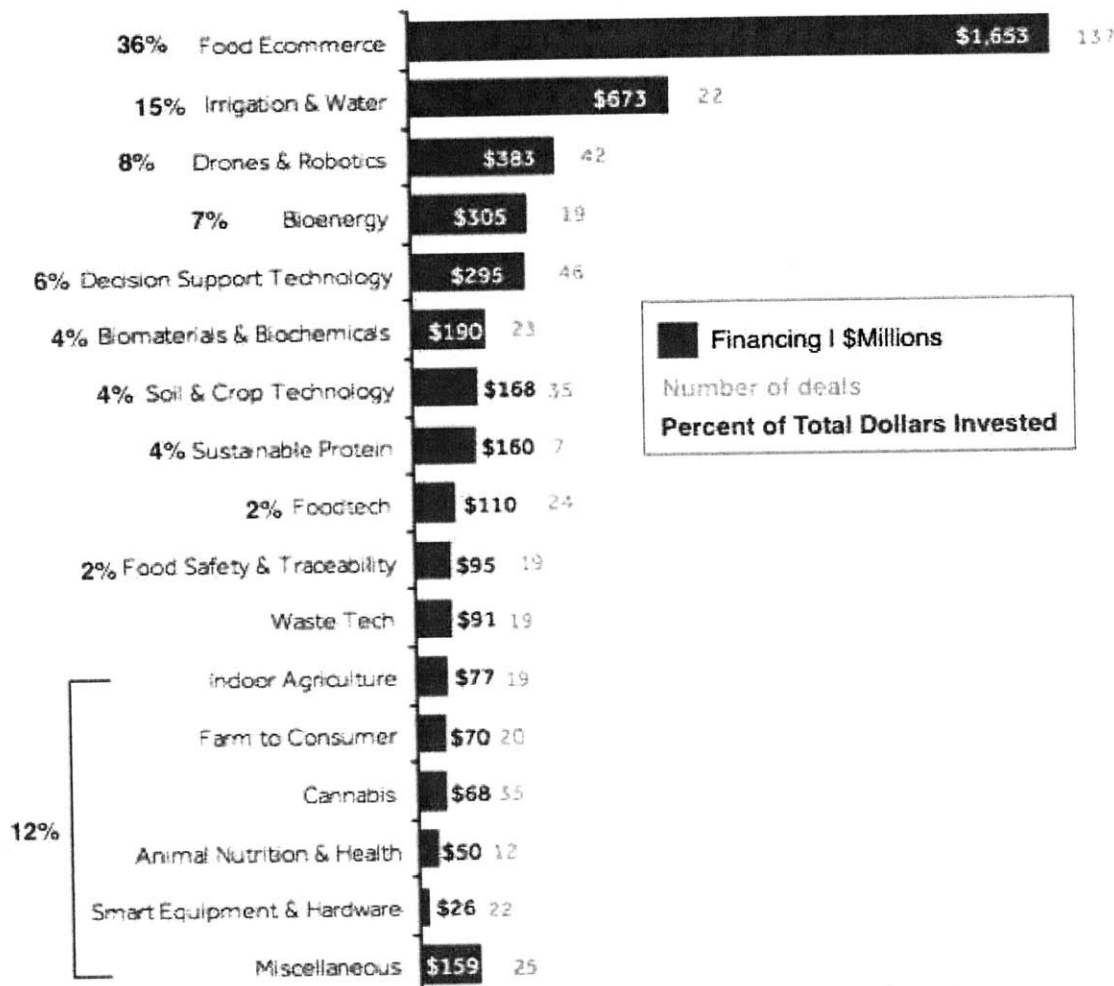


Image adapted from 2015 AgFunder AgTech Investing Report (Burwood-Taylor, et. al, 2015)

Figure 15: Summary of Investment Activity

Investors also feel that the space is risky because of the relative lack of data such as historical deal flow and resources to help get up to speed on relevant stakeholders and regulatory risks. As one fund manager stated, “investors want a clear track record from previous funds, but we don't have that yet. A reinforcing cycle will happen over time, but just hasn't yet.” This lack of historical information is preventing some investors from raising capital, as potential LPs are hesitant to get involved.

“The data [in this industry] are just not getting covered by the investment community...Most investors are not comfortable investing when they don't know the market well, or don't understand the risk” – Investor/Entrepreneur

Many investors, especially those who are new to agribusiness, lack confidence in upstream agribusiness investments. Investors fear that upstream investments require a significant amount of time, and similarly, that investments in this area may take longer

because of slower market adoption due to more conservative users, higher regulatory barriers, and the inherently slow pace of the natural systems on which farming depends. Table 9, below, illustrates a number of other barriers and challenges that agribusiness investors face.

Table 9: Additional Challenges for Agribusiness Investors

Barrier	Evidence
Limited domain expertise, and existing experts are partial to status quo system	<i>"The domain knowledge is around the current system, and there's already a low-level of expertise in the industry to guide investors. So finding expertise to guide investments into disruptive ventures is hard"</i> – Entrepreneur
Upstream (i.e., closer to production) subsectors require additional expertise that investors often lack	<i>"The challenges of upstream supply chain and production are real and hard- investors need to be sure someone at least knows what they don't know"</i> –CVC
Risk aversion compounds, as early stage investors cannot invest without high likelihood of follow-on funding in late stages.	<i>"There's lots of risk aversion in the seed stage. Everyone wants signs of traction. Want to know product market fit, customers, etc. ...Investors are not comfortable to go on just a cool technology. In tech, you have lots of seed stage funds that specialize in a specific market (e.g., marketing apps or social media) the investors know the space, but [upstream agribusiness] is a bit more B2B, cyclical, etc. And Ag is still a bit unsexy"</i> – Agriculture crowd-funding platform founder
Mismatch between (short) venture investment timelines and (longer) required timelines for agribusiness cycles	<i>"[Tech-focused investors, often out of Silicon Valley] are struggling in this space. I'm not sure they fundamentally understand agriculture or the sales cycles and behavioral aspects of farmers. A lot of these data-driven AgTech ventures may be good products, but are basically sent into the market with high expectations [for quick and huge returns]...but the reality is really slow. We'll see how it works out. My sense is there will be a lot of pivots and down-valuations."</i> –VC Investor

One investor who has spent significant time and resources on understanding the industry summarized by saying:

“Lots of investors want to just apply software to [agribusiness]. But if they don't do the digging to understand the technologies, including their current state and existing capabilities and match that with the user needs and market opportunity (e.g., farmers needing consistent data feeds, even when it's cloudy), you end up with rote applications when it doesn't work for the use case. It's the same if you don't understand the margins- maybe [food products and ecommerce] can make lots of money, but I'm not sure how”

Sustainability-Oriented Subsectors

Due to different risk factors and characteristics, there are a number of important trends emerging across specific investment subsectors. Investments in some subsectors align extremely well with sustainability challenges and opportunities, and with venture investors' bias toward technological innovation²⁹. For example, the precision agriculture subsector is gaining speed, and drones and robotics in particular have huge potential (Burwood-Taylor et. al, 2016). Precision agriculture uses hardware and software technologies to develop a more granular understanding of agricultural dynamics, enabling producers to increase yields and simultaneously reduce the required amount of inputs. Doing so reduces the use of natural resources and some forms of pollution, such as off-gassing of N₂O and flow of excess fertilizer into waterways. This space is especially attractive to VCs because, as one investor explained, ventures in this space, “are really tech-based, so human capital is the only limiting factor [meaning there are] low barriers to entry. This space is crowded and there are tons of investors and businesses entering.” VCs may be particularly attracted to this space because the technologies (e.g., software, robotics, big data) are familiar but have not yet been applied broadly in agribusiness.

Biologicals, or bio-based inputs that are intended to replace synthetic inputs, are also an increasingly popular area for investors. Biological technologies have the potential to make production more efficient, but do not face the same regulatory or consumer-acceptance challenges as synthetic solutions (e.g., chemical-based fertilizers and pesticides). This area is expected to see more deal-flow in the future, even though investment as a percent of total industry dollars shrank in 2015 (Burwood-Taylor et. al, 2016).

Similarly, the alternative protein subsector, which is primarily focused on cultured and plant-based meat alternatives intended to disrupt the livestock industry, received significant funding and will likely continue to do well (Burwood-Taylor et. al, 2016). This subsector in particular has received positive press around environmental and social sustainability benefits, including animal welfare.

²⁹ Ventures focused on new food products (e.g., vegetable-based chips; protein bars; goat-based dairy) are also increasingly entering the market in response to the demand for healthy and sustainable options. However, food products are not included in the AgFunder report, and compiling comprehensive data on investments in this space was out of scope for my thesis. Review of the gray literature provides a preliminary indication that there are two likely pathways for these ventures: (1) entry into a local market, then scale-up via relationship with a cross-regional retailer (e.g., Whole Foods); and (2) receive funding and support from a corporation looking to eventually acquire the brand (e.g., Coca-Cola's Venturing and Emerging Brands unit). These two pathways may not be mutually exclusive.

Each subsector has unique characteristics and is therefore more or less attractive to certain investors. For example, both alternative protein and biologicals have seen investments from bigger funds and more patient capital, as well as domain-specific funds. Alternative protein has also been of interest for VCs. Figure 16, below, provides an overview of characteristics that may be relevant to venture investors in each agribusiness subsector. Additional information about historical deal flow and exits, as well as enhanced domain knowledge, especially for upstream subsectors, will help investors to de-risk potential SOI investments.

Characteristics / Subsector	Example	Regulatory Barriers	Time to Market	Perceived Environ. Impact	Perceived Social Impact	Risk Factors	Technological Maturity	Technological Complexity	Capital Intensity	Most Interested Investors
Bio-engineering (synthetic)	Agrividia	High	Slow	Negative*	Negative*	Consumer acceptance	Mature	High	High	CVC
Biologicals	AgBiome	Low	Medium	Positive	Positive	User Acceptance, Efficacy	Immature	High	High	CVC, VC
Precision Ag (HW and Software)	Blue River Tech.	Drones- High Others- Low	Medium	Positive	Neutral	User Acceptance	Immature	High	High	VC, CVC
Alternative Protein	Beyond Meat	Depends	Slow	Positive	Positive	Consumer acceptance, Scale	Immature	High	High	VC, CVC
Farmland	Prather Ranch	Low	Slow	Positive	Positive	Execution	Mature	Low	High	Family Offices, PE, Institutional
Urban Ag	AeroFarms	Low	Fast	Positive	Positive	Execution, Technology	Mature	Low	High	VCs**
Local Food	Red' s Best	Low	Fast	Positive	Positive	Scale, Safety	Mature	Low	Low	Philanthropic, Impact
Food E-Commerce	Hello Fresh	Low	Fast	Neutral	Positive	Technology	Mature	Low	Low	VC
Healthier Food/Ingredients	Good Culture	High	Slow	Neutral	Positive	Brand value, Longevity	Mature	Low	High	CVC***, VC

*This is highly controversial **Investors interested in B2B solutions only ***High potential for M&A activity

Figure 16: Investment Characteristics by Subsector

Sustainability Considerations

The growing amount of capital deployed to sustainability-oriented areas such as precision agriculture, biologicals, and alternative protein indicates that investors realize the potential of, and need for, SOIs. Many investors believe that sustainability is fundamentally aligned with all profitable food and agricultural investments, due to the demand and supply dynamics of the global system. For example:

“Our goal as a VC is aligned with sustainability, as we want to find solutions to help increase food supply” –Agriculture-focused VC

“We are investing in technologies that save farmers money by helping to optimize water usage and be more efficient. This immediately moves into the area of sustainability” - CVC Investor

“My focus is to explore or apply IT to food and ag [and I] believe that as a by-product there will be societal benefits including more food, healthier food, increased access, and fewer [synthetic] inputs)” –Agriculture-focused VC

“Within agriculture, all deals have a sustainability aspect because of resource intensity...we don't look at sustainability metrics specifically, but sustainability benefits might align with growth opportunities such as using fewer chemicals, which is what people want, so there's a business case here” – CVC Investor

Investors of all types use their investment theses to communicate their sustainability orientation and the impact potential of their ventures. Impact investors alone additionally use explicit sustainability impact metrics, usually on a per-investment basis.

“We do diligence for both financial and impact in parallel. For impact, we agree with portfolio companies up front on certain things. Maybe we're looking at outputs and not outcomes, but outcomes and outputs have to be linked by some kind of research. Ideally want to be able to prove [outcomes], but it's not always possible. Everything is specific to each company. By the end [of the diligence process], we know enough about the metrics and details that we just write it down and agree.” –Impact Investor

Other investors vary in terms of how explicit their investment theses are with respect to sustainability. For example, one VC firm is focused entirely on “solving a core social and/or environmental challenge from modern agriculture production or food systems.” Another investor’s website states that they are interested in “methods of food production that regenerate soil and other natural systems.” Other investors have more general focus areas, such as “improving yields”, “feeding the growing population”, or “helping farmers to be more efficient and use fewer resources”. One agribusiness finance expert summarized accurately in saying, “some funds out there are more focused on sustainability within their investment thesis, but most don't have it as key issue explicitly.” Investors may be hesitant to focus too explicitly on sustainability for fear of scaring away potential Limited Partners (LPs). LPs are inherently looking for financial returns, and as there is still a strongly held misconception that environmental and social impact must necessarily be at the expense of financial returns, an explicit sustainability focus may be unattractive.

It might also be the case that investors are not more explicit about measuring their sustainability impacts because of challenges surrounding metrics. Though none of the investors interviewed have explicit sustainability metrics, many are in progress of developing them or at least claim they want to develop them. Investors instead have specific techniques they use to assess sustainability in the absence of metrics. For example, one firm is writing an annual report that includes anecdotal evidence of the positive environmental or social impacts of the ventures in their portfolio. Another investor asks that startups clearly state what impact they will make, and how they will measure it. Many investors assess sustainability impacts by considering only startups that have a clear mission, and assessing whether the leadership is “authentic” and “dedicated”, as well as the extent to which the mission and vision, if implemented, will have an impact. Investors cite many reasons for the lack of specific sustainability metrics. The most common reasons include: cost and time required to develop metrics; lack of scalability and applicability of metrics across portfolio companies; fear of scaring away investors; and not wanting to burden the startup.

“Everything we look at has to have some potential environmental or social impact in the food system. When metrics exist, like for [one of our portfolio companies in the

alternative protein space where there are] lots of metrics out there around health and environmental cost [of current livestock production], it gives us confidence that this company is addressing one of these key challenges...this helps us understand the potential of the business for impact. But all of this done out of convenience in hindsight...we have a conversation with portfolio companies [but don't want] them to log into a big tool and waste a lot time...[We] ask the portfolio company what they can measure [as far as] social and environmental impact. Impact investors give them all kinds of frameworks and tools, but that's a lot of work and often feels like making a square peg fit a round hole." –VC Investor

"In the impact [investing] space, there's too much talk and not enough action. It's frustrating. We're trying to build the right tools...and collaborations to be able to eliminate risk. But we have to [make sure we don't] scare away investors, and be easy to implement and not scare away or add too much work to portfolio companies" – VC Investor

Many investors are interested in the environmental and social sustainability benefits of the ventures they invest in, but financial returns are still a primary motivation for all investors. Family offices, for example, prioritize financial returns and consider themselves investors rather than philanthropists; however they often prioritize sustainability impact higher than financial returns when making an investment decision. One family office explained that they "always have to ask when we're going to get money back and how. But I'm not sure we care about the answer, though. But, the sooner we get returns, the more we can re-invest and the more we can make an impact." Similarly, though there is still much debate within the impact investing industry and no standard metrics have been agreed upon, most impact investment firms seek to "actively measure" the social and environmental impact of their portfolio companies, in addition to measuring financial returns.

For all other investors, though sustainability may be an important consideration, it often manifests as a compliance- or risk-based consideration. Investors do not want to deploy capital into investments that may have environmental or social risks such as regulation around protected species, labor rights, or waste management. Investors are also wary of areas that have potential to attract negative publicity from activists, such as around animal welfare concerns. Sustainability positioning may also be dictated by risk factors, for example:

"Right now with GMO's there's big debate about sustainability. But we don't invest in them because it's prohibitively expensive. So we are aligned with sustainability concerns, but our risk is regulatory and cost. If the regulatory risks fell off, who knows how we'd respond" – Ag-focused VC investor

Overall, for all investors, financial returns are paramount. Sustainability may be a tiebreaker or value-add characteristic, but it is not a driver of investment decisions (see Table 10 for examples).

"Our objective is return on investment- foremost there has to be an opportunity for high return. It just so happens that agribusiness has a sustainability focus- but it's not on the top of our diligence list" – Ag-focused VC investor

“We’ve never made an investment purely driven by sustainability, but it clearly becomes a strong consideration for anything we do. The key for us is managing resources responsibly” – CVC Investor

“Sustainability can be a tie breaker, but it is not driving our investment decisions” – Strategic Investor

“Sustainability is not a driver of why we invest. We invest in increasing yields, while at the same time having benefits to sustainability and agricultural practices in general...but we would use sustainability as a distinguisher, though this hasn't happened yet” – Strategic advisor to agricultural investors

Table 10: Sustainability Considerations in Example Investment Decisions

Situation	Example
Sustainability as a deal-breaker	<ul style="list-style-type: none"> • PE firm considering an investment in an input company • Had some concerns about cost effectiveness of investment • During diligence, found out that venture was dumping by-products into the ocean <p>→ Did not invest (“we really wanted to steer clear”)</p>
Sustainability as a tie-breaker	<ul style="list-style-type: none"> • Angel investor considering a compelling venture that gives a percent of profits to a non-profit that fights human trafficking • Other companies in investor’s portfolio source from areas with high instances of human trafficking <p>→ Invest (“I put more money in than I normally would have”)</p>
Sustainability as a value-add consideration	<ul style="list-style-type: none"> • Investor considering two tableware deals, where one had to be disposed of, and the other did not • Investor realized there was public relations and marketing value to the deal with a sustainability component <p>→ Invest in SOI (“sustainability didn’t make a difference in the decision, but it was something you could say about one business, but not the other”)</p>
Sustainability as a risk factor	<ul style="list-style-type: none"> • Corporation considering acquiring a food product base on heritage grains sourced from developing country • Concerns raised about tradeoffs between driving up local incomes vs. taking food source away from local communities • Corporation worried about public relations implications (i.e., activist publicity campaign against them)

	→ Did not invest (“in the past, they might not have analyzed supply chains and brand risk, but now it can be a deal breaker”)
Sustainability creates new markets	<ul style="list-style-type: none"> • Investor considering software to increase market efficiencies for specialty and organic crops • Huge market growth in this segment → Invest

Summary

Investors are deploying increasing amounts of capital into agribusiness ventures. Certain subsectors, such as precision agriculture, biologicals, and alternative protein, are emerging as especially promising areas for SOIs. Investors, however, face a number of challenges in de-risking their investments. Because venture investing in agribusiness is relatively new, and because the industry is highly consolidated, investors fear their ventures will not receive follow on funding and/or have limited pathways to a successful exit. Investors also feel they lack the necessary domain expertise and historical industry data to sufficiently de-risk investments, and to persuade potential investors in their funds. Further, agribusiness, especially in upstream subsectors, is based on natural systems and deeply embedded paradigms that require time and expertise to alter. Investors, especially those who are coming from the IT space, often lack expertise in these areas. Additionally, investors are unsure of how to, or if they should, measure environmental and social impact of their investment portfolio. This fear derives from the (perceived and actual) amount of resources required to implement meaningful, yet practical, metrics. Investors may also fear that too much of a sustainability orientation may signal to their own investors that they are not serious about financial returns. Due to these challenges, it is clear that additional ways to de-risk SOI investments are necessary to ensure investor’s approaches are sufficient to achieve desired financial, environmental, and social impact.

Entrepreneurs

SOI Ventures

Just as investment activity is increasing in Agribusiness, so too is entrepreneurship. Entrepreneurs play a crucial role in accelerating SOIs by starting and scaling companies. Entrepreneurs are particularly relevant for SOIs in agribusiness, as environmental and social issues are often among the primary factors motivating entrepreneurs in this sector to start a business. Investors have noticed the increasing sustainability-orientation of entrepreneurs. As one director of an entrepreneurship showcase said, “100% of the [startups we accept] have a piece of sustainability in their story.” The sustainability focus of entrepreneurs is also evidenced by the subsectors of venture activity that are increasingly attracting investments (see Figure 15, above).

Ventures in agribusiness are often technologies or processes that already have traction in other industries but are novel in agribusiness. Many agribusiness entrepreneurs therefore have deep technical expertise. For example, many of the synthetic and natural biology solutions have roots in healthcare. Similarly, ventures in precision agriculture are often new applications of software or hardware IT innovations (e.g., big data, robotics).

These technical entrepreneurs need business and domain-specific expertise to help them grow their startups. For instance, an agribusiness SOI venture may need legal council, strategic advisors, domain expertise, or access to manufacturing or logistics resources. Investors may not be a good source of this expertise, and further, seeking out domain expertise from investors may be detrimental. For example, entrepreneur Matthew Crisp of Benson Hill Biosystems, which raised a \$7.3 million Series A round, explained in a recent AgFunder post that investors that lack experience in agribusiness are wary of making investments, so entrepreneurs run the risk of wasting time chasing unwilling prospects (Crisp, 2016). Instead, to better understand potential applications for their technologies, many entrepreneurs are attending conferences and tradeshow, or doing pilots with user groups in particular geographies. There are also an increasing number of structured events, such as hack-a-thons, where entrepreneurs and industry experts (e.g., agronomists, nutritionists, farmers) can interact. However, entrepreneurs are notoriously short on time and money, so they must be efficient in selecting how they allocate their limited resources. One entrepreneur noted that “the landscape for entrepreneurs is fragmented... and then the investor landscape is also fragmented,” making it hard to figure out where to get help.

Finding Aligned Investors

Entrepreneurs need to find sources of funding that enabled them to develop their ideas and grow their business. There are many types of capital that entrepreneurs can consider, such as equity investments, debt financing, and grants. Within each category, an entrepreneur must navigate the many types of investors and their different characteristics. Agribusiness as an ecosystem for startups is still relatively new and uncompetitive for investors; however, as one investor and entrepreneur noted, “there’s a general consensus that there are more opportunities than capital.” Entrepreneurs must therefore differentiate and de-risk themselves, and their venture, to investors. Solutions entrepreneurs use to find and attract investors, as well as de-risk their ventures, include incubators, accelerators, prize competitions, and showcase events. These platforms are gaining traction and the number of options for entrepreneurs is increasing. For example, six crowd-funding platforms focused on food launched in 2014 (Meijers, 2015).

Given the focus on sustainability, many entrepreneurs seek to raise capital that is both appropriate and affordable (i.e., does not cost too much time, or equity, to acquire). They are looking for investments that are aligned with the goals and mission of their business. Alignment between entrepreneurs and their investors usually manifests around the company’s mission and the investment firm’s investment thesis. Accelerators and strategic advisors also increasingly teach entrepreneurs that they need to understand investor timeframes, and ask specifically about when potential investors expect to realize financial returns. One VC-turned-strategic advisor said, “the biggest and most common questions I get from entrepreneurs are: ‘who’s investing in what?’ and ‘who would be a good fit for my venture?’” But the answers are not always simple. For example, VCs exhibit different investment behavior depending on what stage of the fund they are in. Early on, they have more patience and can make investments with slightly longer timeframes; however, later on in the fund lifecycle, they have increased time pressure to deliver returns to their investors.

Inexperienced entrepreneurs need to understand these nuances, and ask potential investors questions to understand if it will be a mutually beneficial fit. However, SOI

agribusiness entrepreneurs lack comprehensive resources on possible funding options and their associated implications, as well as educational resources about how to best engage with potential investors to understand their motivations (i.e., what questions to ask). One experienced entrepreneur said he has learned to create a mental characterization of potential investors, where each type of investor (e.g., angel investor) can fall along a spectrum within their category in terms of how much value they will add to the venture and how much experience they have. The entrepreneur then tries to move forward with investors that have capital, and will help him, “augment my capabilities and address limitations.”

Another source of potential discord between SOI entrepreneurs and venture investors is the need for scale. VCs, for example, need all investments to achieve significant scale to satisfy their financial model. This criterion means that venture capital may not be appropriate in all cases. One VC gave an example of a profitable business in the almond industry that had clear environmental sustainability benefits, but was uninteresting because “all our ventures need scale.” In contrast, others believe that scale does not always equate with success. One entrepreneur went further, suggesting that investors who propagate the theory that scale is necessary for all startups can actually harm SOI ventures. For example, food products especially may benefit from staying small longer, as they can establish a loyal and passionate customer base that will not only help with sales, but also make their venture attractive to retailers and venture investors.

Finally, some ventures may not be well suited to a venture investment model. Entrepreneurs in this case need to seek alternative financing options, such as borrowing money from friends and family, institutional debt (e.g., loans), grants from foundations, public sector funding, incubation within an academic institution, or bootstrapping with revenue from sales. Program Related Investments in particular, which allow foundations to make loans and equity investments in addition to philanthropic contributions, have in the past been perceived as risky but are increasingly being used as a viable way to help SOI ventures and simultaneously advance the mission of the foundation. For example, the Bill and Melinda Gates Foundation and RSF Social Finance, among many others, have PRIs related specifically to agriculture³⁰. Navigating all of the potential funding options is a challenge for entrepreneurs, yet the consequences of a mistake can be high. For example, an entrepreneur who seeks venture funding early on can become stuck in a vicious cycle where they have to continue raising money and diluting their equity to keep operations afloat.

Summary

Without entrepreneurs as effective champions, agribusiness SOIs will neither achieve meaningful environmental and social impact, nor deliver economic value. Entrepreneurs must be able to fund their ideas. To do so, they must first de-risk the investment by gaining not only technical, but also business and domain expertise. Given limited time and resources, this can be a challenge, and investors still see many ventures as too risky. Sustainability-oriented entrepreneurs must also find financing mechanisms that align with the mission and desired impact of their business. Important considerations include timeframe, balance of financial and impact metrics, and pathway to maturity. Pursuing

³⁰ More information is available on the foundation websites [here](#) and [here](#).

equity investments is still most common, though alternative-financing options may be more appropriate in some cases. Entrepreneurs need understanding of, and access to, alternative options. Despite the surge of entrepreneurship in agribusiness, finding and securing aligned capital for SOI ventures is still a challenge.

Emerging Stakeholder Best Practices

This section suggests a set of best practices, based on what leading corporations, investors, and entrepreneurs are currently doing to address the limitations and challenges identified above. The proposed best practices are grouped into four categories according to stakeholder. Best practices for Corporate Venture Capital (CVC) are discussed separately from those of Corporations, as often CVCs are independent entities and face unique challenges.

Corporation Best Practices

This section suggests three best practices that may help agribusiness corporations enhance the SOI ecosystem. The first practice is related to a corporation's own existing operations; however it should be noted that internal innovation was not a primary focus of this thesis. The primary data collected for this thesis contribute more to the role of agribusiness corporations within the larger agribusiness system (i.e., how they interact with customers, each other, and other innovators). Further, there exists a vast body of academic work and tools on product innovation, measuring the environmental impact of products, and using sustainability as a driver of innovation (e.g., (Beynus, 1997); (Utterback & Abernathy, 1975); (Nidumolu et. al, 2009); (Joshi, 1999)). Of course, there still remains significant room for improvement in the SOI strategies of agribusiness corporations. The latter two best practices suggested below are intended to help corporations with their external innovation strategies.

Embed Sustainability Requirements Early in the Design Process

Agribusiness corporations need to embed sustainability considerations early in the design and development process for internal innovations. Product design and development is a well-studied process, and many frameworks exist outlining the various stages and necessary iterations (e.g., (Eppinger & Ulrich, 1995)). Like in many industries, product innovation initiatives in agribusiness are often driven by brand managers or marketing professionals. In many cases, neither sustainability experts nor explicit sustainability criteria are brought in until the later stages of the process. By the time sustainability concerns are raised, incorporating any changes would be too costly or take too long. Further, without sustainability considerations as constraints for the innovation process, the proposed solution may actually be less sustainable than the product or process it replaces. As one agribusiness sustainability professional said, "product design and development is almost universally less efficient in terms of operational costs such as materials and energy." He went on to give an example of a labeling technology that, although visually appealing, required significant amounts of heat to apply. The marketing department was very excited about the innovation, and by the time the sustainability assessment team was involved, there was too much momentum for the product for the environmental impact (not to mention the associated energy cost) to be considered.

"Some products are green by design, others are green by intent. Sustainability, including marketing angle [for how we will communicate the sustainability aspect to consumers], has to be included up front. You can try to [add it] later, but it's harder" – Sustainability Professional

Corporations need to include sustainability considerations, including objectives and metrics, early on in the development process. Including these constraints as early as the idea conception phase can help to ensure that once the set of ideas is narrowed down throughout the product design and development process, options that meet the sustainability criteria are included. Early embedding can also help to build-up buy-in and momentum at each stage of the process, and from people within each level of the organization who are exposed to the idea. One sustainability professional at an agribusiness manufacturing company went further by suggesting that designers should be given a specific target for improvement in sustainability performance.

“If our goal is expand into a new space or capitalize on a [sustainability-driven] opportunity, we have to make sure at least one of the options that we consider in the final round [of the product innovation process] is the most sustainable option. It has to advance where we are in terms of resource use efficiency, recyclability, or some other metric. Then, when we test with consumers, this option is there, and doesn’t cost anything else to add. [That is how to] get it in front of the executives” –Sustainability Professional

Two other associated practices may help agribusiness corporations embed sustainability into product innovation processes. First, corporations need to allocate sufficient staff to the project, including sustainability expertise. Second, a shared visual representation of the project, timeline, and metrics (sustainability and otherwise) may help all stakeholders involved in the development process to maintain a common understanding of the current status, as well as hold each other accountable for deliverables, including performance and impact.

Add Value to the Innovation Ecosystem

Corporations need to become a contributing part of the innovation ecosystem by adding value to other players, such as entrepreneurs and investors. For example, corporations can collaborate with accelerators and other entrepreneurship showcase events. These collaborations can vary in terms of the amount of time and resources required from the corporation. In the minimal case, corporations can sponsor one-time events, giving them a low-effort way to get access to deals and improve their brand by associating with SOIs. Corporations can go a step further by participating as mentors in a prize or for ventures within an accelerator, in addition to providing capital. Mentorship will require more time, but will add more value to the ecosystem and give the corporation more insight into emerging trends and challenges. Finally, corporations can enter into a partnership with an accelerator or event. A partnership will cost more capital and require more time from personnel within the corporation, but it allows the corporation to more deeply help, and engage with, entrepreneurs who might become partners, customers, or acquisition targets. For example, one distribution corporation partners with an accelerator and advises entrepreneurs about how to quickly get their products into their own warehouses, and how to make their processes compatible with their own systems. The corporation also has a specific person dedicated to managing the relationship with the venture. This deep partnership between accelerator, corporation, and venture helped the venture to get fast-tracked into the corporation’s customer base upon graduation from the accelerator.

Corporations engaging with the external ecosystem can also be a platform to share innovation challenges that the corporation is struggling to overcome internally, thereby seeding SOI entrepreneurship. This strategy will return value to the corporation. Corporations could, for example, share insights about R&D or supply chain challenges that if addressed, would create new or cheaper sources of input materials for their existing products. One CVC investor said that their R&D department has “a laundry list of things they’d like,” but went on to lament the lack of overlap between their list and the areas where entrepreneurs are focusing. “Their list doesn’t really acknowledge what’s out there, so it can’t really drive deal-flow.” Corporations can address this problem by engaging with venture investors and entrepreneurs to help them understand important problems, and giving clear guidance about what solutions they would pay for.

Corporations can go further than just sharing challenges by talking to other investors about what are looking for in a potential acquisition target. One investor explained that he gets very specific information from corporates, such as which product categories their interested in, and what criteria they need to meet to be viable targets (e.g., revenue numbers; EBITDA threshold; gross margin.

“We’ve had strategic conversations with all of the [potential acquirers]. So when we talk to young companies, we have a pretty good idea of the pain points in the sector and subsectors...[then we use this as] one of the filters [when considering] early stage deals...Then it’s just can we get it to a place where it’s attractive to these companies. Of course, we want [the venture] to find its own voice in the market. The right consumers. The right positioning. [But we are then confident that if] they have good performance, they’ll find a buyer. Its not like we really guide them to an exit [as we’re] mostly thinking about the next round [but it helps to know how to] position this company for an exit” –VC Investor

Finally, corporations can help entrepreneurs directly. One former agribusiness executive-turned-investor explained that there are many aspects of agribusiness that are not intuitive to entrepreneurs, such as setting up contracts with vendors or understanding how farmers evaluate new technologies. Corporations, acting as advisors, can therefore help these entrepreneurs. Further, there is a demand for these ideas from entrepreneurs. According to the same investor, “the best young entrepreneurs seek out advice from anyone they can get to [because there are] lots of little things that sneak up and can become a huge deal.” Corporations can accelerate SOIs in the ecosystem by helping these entrepreneurs to de-risk their ventures early on, thereby increasing the number of high quality deals that can become potential acquisitions.

Use CVC to Fill a Gap Between R&D and M&A

Corporate Venture Capital (CVC) arms help their parent corporations to accelerate SOIs by filling a gap between M&A and R&D (See Figure 17, below). For example, Coca-Cola created a CVC business unit, Venturing and Emerging Brands (VEB) to identify and invest in emerging beverage products that cater to markets where they do not yet have a strong presence. The goal of VEB according to their website is to, “find and develop the next generation of brands with billion-dollar potential”(The Coca-Cola Company, 2016). VEB helps their portfolio companies, which must have at least \$10 million in revenue, by providing access to resources and capital to help them grow. VEB’s goal is to eventually

acquire these companies, thereby enabling Coca-Cola to enter a new market segment. VEB has successfully employed this strategy with brands like Honest Tea and Zico coconut water, enabling Coca-Cola to capture the demand for health and wellness products. This CVC approach is ultimately cheaper than M&A, as it allows the corporation to access the startup companies much earlier through initially making equity investments for a minority ownership position and reducing the eventual cost of acquisition. Additionally, this strategy is faster than R&D. Rather than pay for the development and testing of many new ideas, VEB can make investments in a number of potential ventures that are agile and able to respond to emerging demands, and eventually pursue the most promising ones.

To successfully deploy this strategy, corporations considering a CVC function need to understand the role of CVC in context of their overall innovation strategy. Specifically, CVC is complementary to, and even enhancing of, R&D, not a threat to it (Dushnitsky, 2011). For example, a CVC portfolio company may work with internal R&D teams to co-develop technologies that advance the objectives of both parties. This commonly occurs when a CVC invests in a technology that has not yet been applied to agribusiness. For example, many agribusiness corporations are especially interested in healthcare technologies because the processes used to create pharmaceuticals can also be used to develop novel, or improved, inputs for agribusiness producers (e.g., pesticides; seeds). The agribusiness company can then leverage its own resources, including R&D through licensing or co-development agreements, to further develop and eventually commercialize the technology or process within the agribusiness context. One CVC explained the value of this approach: “we can help the startup stay focused while we create new value for them and us. We make the pie bigger, and all share the new pie.”

Many CVC investors describe this as a sweet spot where the CVC can adapt an existing technology to a new industry where their parent company is dominant or has an advantage, while also creating a beneficial outcome for the startup (i.e., a new stream of income).

“It's the best situation when we can truly add value. If we're really going to chase after the same value bucket [as we're already looking at internally], I'd tell our business unit to just step up and buy the venture. And we don't want the startups to be too diluted or distracted by pursuing other applications. I really like this structure [of adapting technologies to a new market while the startup focuses on different market.] We end up having a fairly straightforward conversation with the leadership because it's a really good value-sharing proposition. Then if we can advance the technology, it feeds back to other applications for them and for us” –CVC Investor

Corporations should also consider CVC as a way to be more proactive than R&D affords, meaning that they can establish a presence within opportunity areas sooner (Alston & Pardey, 2014).

“[With CVC] you don't have to wait for winners; you can back a bunch of future winners. Then overall you might get financial returns, as well as relationships, or potentially acquisitions, that align directly with your strategy.” – Agribusiness M&A Expert

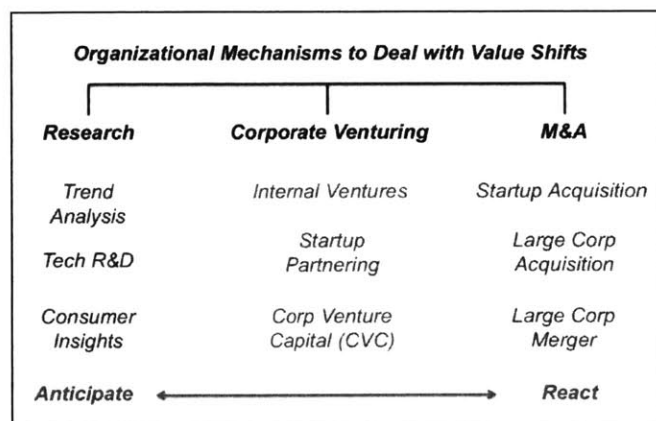


Figure 17: Comparing Corporate Venturing to R&D and M&A (dos Santos, 2016)

As illustrated above with Coca-Cola's VEB example, a CVC can also help corporations to get access to emerging technologies earlier than M&A, which saves money (Dushnitsky, 2011). Further, even if a CVC does not make an investment, gaining insight into market dynamics via the CVC arm gives the corporation enhanced ability to respond more quickly to changing demand dynamics (Lerner, 2013). For example, many agribusiness CVCs are interested in the applications of Big Data and robotics to agriculture. AgTech Venture Capitalists are particularly focused on these areas given their expertise in IT, so forming a CVC function gives corporations a way to access innovations in these areas. One CVC explained that a huge reason for having the CVC function was to get a "view into the network of startups and technology landscape."

Corporations that use CVC to complement and augment the strengths of R&D and M&A will gain an advantage. As one investor summarized, "CVC arms are particularly effective at relieving pressures on existing firms to innovate, especially for innovations where they cannot do it in house, or when they cannot afford to wait longer." The following section proposes a set of best practices for implementing a successful CVC operation.

Corporate Venture Capital (CVC) Best Practices

There are a number of best practices that CVCs can employ to accelerate SOIs and help their parent corporation respond to emerging challenges. The first practices proposed below is intended to help companies who are considering a CVC function develop a strategy for, and implement, the CVC. The latter two subsections explain best practices that existing and new CVCs can employ to overcome objections about their motivations and gain access to high quality deal flow and co-investors. These practices can include *not providing capital*, instead pursuing other types of relationship with startups to drive innovation.

Determine CVC Objectives, and Let Objectives Dictate Structure

Corporations need to determine how they want their CVC to balance their portfolio across Driving, Emergent, and Enabling investments (see Figure 13). The objectives of the CVC, including the end goal for the deals, will determine the types of terms a CVC will offer and types of investments a CVC will consider. Objectives will also determine a CVC's focus area, and in which subsector(s) they will concentrate their activities and collaborations. The objectives of the CVC then determine the appropriate structure, and dictate how a firm can best operationalize the CVC function. There are three key aspects to consider: (1) CVC's

relationship to the external system; (2) CVC's relationship to parent company; and (3) CVC personnel. As discussed above (see Table 7), a CVC can make direct or indirect investments, or construct alternative relationships with entrepreneurs, such as licensing or co-development agreements. There is no agreement across CVCs in agribusiness about what types of objectives are most important, and current agribusiness CVCs vary in how they prioritize investment objectives, as discussed above (see Figure 10). CVCs need to be intentional and strategic about choosing a structure that will help them to achieve their primary objectives.

Driving Investments

For *Driving* investments, CVCs should try to use co-development and licensing agreements, and resort to direct equity investments only as a last resort. Direct equity investments can be unnecessarily expensive because the CVC can often achieve their objectives for less money by creating a different type of relationship. Because Driving investments are by definition highly related to the current core business of the CVC's parent company, non-dilutive capital is preferable. For early stage ventures this will likely take the form of a partnership; for later stage ventures that have an established brand and revenue streams, moving towards an acquisition may make sense.

"It really is the best case when a [startup] company has a platform technology that we want a piece or, want exclusive rights to, or want to bring to commercialization through funding and leveraging [our parent corporation]. We don't necessarily want to capitalize the whole company. Because many [agribusiness] ventures are coming from other industries, and we only want the agriculture piece" –CVC Investor

A CVC employing this strategy needs to have a tight coupling with the business units of their parent company. The CVC might then be structured as a functional unit within the corporation, and require approval from a specific business unit for all deals. Though the approval process may be slower in this case, this tightly coupled structure will ensure that the investment will be in alignment with the parent company's strategy. The personnel in this type of CVC should have significant expertise on the current business of the parent company, as well as investment expertise.

Emergent Investments

Other CVCs are focused on Emergent investments that will create new business opportunities, and need to consider a different CVC structure. Here, it is important for the CVC to have a certain degree of autonomy in decision-making, as the parent company may see these investments as too risky. The CVC should structure the approval process to entail a small, high-level management committee, rather than requiring approval from a business unit. Further, staffing of the CVC should include experienced VCs, as they will have external credibility and be better able to manage risk and opportunity. CVCs must compensate their personnel like other venture investors to ensure the CVC incentives are aligned with their portfolio companies.

Enabling Investments

Finally, for CVCs making primarily Enabling investments, they need to consider later stage ventures and look to invest in ventures that they can eventually acquire. These new ventures will help the parent corporation to access to new market segments. The CVC may

make equity investments or pursue different types of relationships like co-marketing or co-development agreements. Though venture capabilities in this case are not tightly coupled with operational capabilities of the parent company, the CVC still needs to have an understanding of current internal innovation and development strategies to identify complementary opportunities. Therefore, the approval process should include BU buy-in. Buy-in in this case does not have to be mandatory, because existing BUs may be too focused on their current areas of operations to consider new strategies that a venture may unlock. CVC personnel need to consider longer timelines, and support their portfolio companies by providing access to the resources of the parent company such as customers, infrastructure, and marketing. Personnel therefore need both investment expertise and an understanding of the parent corporation's near- and long-term strategies.

Manage External and Internal Reputation

CVCs need to develop and maintain a strong reputation externally among co-investors and entrepreneurs, as well as internally with their parent corporation. Externally, CVCs have to overcome the negative perceptions of other stakeholders. For example, entrepreneurs and other investors may fear that CVC involvement in a deal will potentially limit exit pathways for the venture. In other words, they fear the parent corporation will just want to acquire the venture.

"We have actually turned down money for a portfolio company from a CVC because we didn't want to deal with a potential conflict if they wanted to acquire them" –VC

Investor

There may also be a fear that if a venture has a CVC investor, but then the parent corporation does *not* want to acquire the company once it reaches a certain scale, other potential acquirers will assume there must be an issue with the venture. Finally, other venture investors may feel that CVCs often lack expertise as investors, and may therefore be a risky co-investor.

To overcome this, CVCs need to build a good reputation by doing deals, attending conferences and pitch events, and adding value to other investors and entrepreneurs without asking for anything in return. Another way for a CVC to be an appealing co-investor is to invest directly in the venture, rather than participate as a strategic advisor. By showing up with cash, the CVC signals to the entrepreneur that they are serious about the venture, while offering an advisory position signals that, as one CVC-turned-VC investor said, "[you're not] willing to put skin in the game and might be seen as a distraction."

"If a CVC has unreasonable terms, we don't let them in [the syndicate]. If they're committing their own capital and have a downside if it doesn't work, it increases their commitment [and incentive to build commitment internally]. The more commitment they get in their [parent] organization, the more likely they are to allocate their resources to the venture. [We can tell how serious they are by the] seniority of the people, amount of resources they put into diligence, and the terms and hurdles they try to put into the terms. [CVCs are becoming] more aware they need to do this, so CVCs are getting more serious" - VC Investor

Taking a board seat can help to convince other investors that a CVC is not a risk:
To counter the fear that investment by a CVC will limit exit potential, we might take a board seat. This helps us maintain separation. We're also very careful about how

information is shared—we let [the startup] go directly to [the parent company] not through us as the CVC. We also have to show past behavior, and build up a positive reputation among investors. –CVC Investor

However, CVCs may actually want to take an observer seat on the board. Then, in cases where there may be a conflict of interest with the parent company, the CVC can excuse his or herself from the conversation.

CVCs also need to hire qualified personnel to establish and maintain their reputation. For example, CVCs looking to co-invest with other venture investors need to hire experienced investors with a strong reputation and experience in the industry. Many investors make decisions about which other investors they will co-invest with based on how well they know, and get along with, them. This is true for CVC investors as well. One VC explained that he would be very likely to invest with a recently formed CVC because he “knew the guy, and he had a solid reputation.” CVCs can use the fact that they have a single LP to attract this type of talent:

“[A normal VC model] includes: raising funds, investing over the investment period and the follow-on investment period, harvesting, and exiting. You might have 10-30 LPs. In this structure, you have to do marketing, and communication about updates and performance to LPs all the time. It is very time consuming. It can take up to 30-50% of VC time to communicate with existing investors, or market new fund. So VCs may be interested in being an external manager for CVC fund. Benefits would include: fewer investors; less time spent managing LPs; not having to have the same conversation 30 times a day. This would be attractive to VCs, and good for the CVC.”– Agribusiness Investment Banker

CVCs, because they are not financial investors, also need to balance investment expertise with knowledge of the parent company, to ensure they are fully realizing potential strategic benefits. This may mean having a balanced team, including some investment expertise and some expertise from within the parent company.

The CVC’s reputation within the parent company is also important in realizing the potential for strategic returns. CVCs face challenges internally because they have to take on more risk than large corporations are accustomed to, and because they are not part of core operations and may not be seen as value-add. For CVCs that have to get approval from specific people or business units within their parent corporation, building trust is especially important. CVCs can overcome this challenge by developing strong relationships with the business units, noting that the “relationship with business units internally is as important as the ones we have externally.” One CVC explained that she seeks to align with people in the parent corporation by developing a mutual goal. She does this by finding “an internal champion to help move the case forward.”

By building up their internal and external reputation, CVCs can establish credibility so that the unique aspects of being a CVC are seen as value-add, rather than as risks or deterrents.

Communicate Unique Value Proposition to Entrepreneurs and Co-Investors

In addition to managing reputational risk externally and internally, CVC investors need to build credibility by leveraging the unique traits that make them valuable to co-investors and entrepreneurs. This is especially important in agribusiness because CVCs are relatively

new within the innovation ecosystem, yet can add significant value that other players might not be aware of. Further, CVC shows potential to accelerate SOI ventures because it can address the challenges associated with other funding sources in agribusiness. For example, VCs often expect a short timeline to returns, but technologies that depend on natural systems often require more time to reach maturity (Bunge & Brat, 2015). CVCs do not have to provide returns to LPs, and can therefore “wait longer, unlike VCs who want a quick exit” (see Figure 12). Entrepreneurs and other investors may not be aware of all the advantages of CVCs.

To attract high quality ventures, CVCs have to make themselves entrepreneur-friendly. Specifically, CVCs have to transact with entrepreneurs in ways that are meaningful to them. One CVC summarized the CVC value proposition to entrepreneurs as being threefold: (1) Partnerships, including access to customers, infrastructure, and large data sets; (2) Equity to grow their business; and (3) and an eventual source of liquidity. In addition to resources, CVCs may offer domain expertise to entrepreneurs. VC investors may be too narrow in terms of their focus on certain subsectors (i.e., precision agriculture) or regions (e.g., Silicon Valley) (Lerner, 2013). Crowd funding is even more specialized, as only the most easily understood or “glamorous” ventures get attention (Lerner, 2013). Therefore, CVC, with its broader industry perspective can be a better fit for entrepreneurs.

Entrepreneurs may not be familiar with these advantages, so CVCs need to find ways to interact with entrepreneurs, as well as communicate this information to the industry in general. Speaking at conferences, sharing information about past deals (e.g., via their website), and showing off entrepreneur testimonials from previously successful deals may help.

CVCs also have to clearly articulate their value proposition to other investors who may not have experience co-investing with CVCs. For example, as noted above, with their connection to an existing corporation, CVCs can provide infrastructure, domain expertise, and access to customers or suppliers. Further, having a single LP and clear objective, as mentioned above, can mean that the CVC can move faster. The CVC does not have to spend time fundraising, or managing the expectations of multiple LPs. This means that the CVC can filter out deals that are not of interest, and depending on their structure, get approval quickly for deals they do want to invest in. Having a large agribusiness corporation as an LP should also signal to other investors that the CVC would be able to participate in future funding rounds, as well as eventually be a potential acquirer. CVCs need to be sure they communicate their value to investors by their actions as well as by building their networks and relationships. Many investors explained that “who you know” is crucial, as “it’s all about relationships.”

Investor Best Practices

This section provides best practices that investors use to de-risk their investments and find, as well as measure the impact of, SOI ventures that realize social and/or environmental impact without compromising financial returns. Though best practices unique to CVCs are discussed above, there are a number of investor best practices that apply to CVC investors as well.

Develop Theory of Change To Evaluate Positive Impact Potential

In the same way that investors define a minimum viable return (e.g., IRR) for financial value, a minimum impact framework can help investors think about environmental and/or social sustainability impact. The concept of minimum impact as applied here goes beyond risk assessment (i.e., screening for, and avoiding, investments in companies that have a high probability of risk, or significant associated downside as illustrated by the examples in Table 10). Instead, environmental and/or social impact should be viewed as a positive outcome associated with a venture (e.g., carbon sequestration; job creation). Minimum impact, analogous to minimum viable financial return, then becomes the lowest acceptable amount of this positive outcome that investors commit to achieve.

A minimum impact framework is an integral part of a Theory of Change approach to measuring sustainability impact. A Theory of Change approach has four main components: (1) define area or aspect of impact; (2) understand relevant environmental and/or social issues, and define a minimum floor for impact; (3) evaluate portfolio companies against this floor; (4) evaluate portfolio companies in context of their potential interaction with other portfolio companies, and their collective impact.

Many investors are already implementing the first step, as discussed above, by using their investment thesis to define their sustainability orientation. Investors are currently using publically available data, including but not limited to academic research, to understand pertinent sustainability issues in their area of interest. There remains room for improvement on the second and third steps, as very few investors are able to articulate the minimum impact they hope a particular portfolio company will achieve. Investors often talk qualitatively about environmental and social improvements (e.g., less water; fewer chemicals; increased access to local food; and healthier animals), but fail to go deeper on this topic with entrepreneurs. One VC investor explained that he is hesitant to talk to portfolio companies about impact metrics because “no startup is making an impact *yet*, and it’s not clear how to you measure their potential impact given this uncertainty.” That said, using the current state of research in a particular subsector can help investors to define a sustainability floor and to ground conversations with portfolio companies around specific targets, analogous to conversations about financial metrics.

In the alternative protein subsector, for example, many investors and entrepreneurs use data about the calorie and protein conversion rates across various types of protein production systems to understand where environmental gains can be realized. Investors can take this one step further by using these data to specifically define their sustainability floor. For example, an investor could set an “at least as good as chicken” parameter for the natural resources usage profile of all their alternative protein investments (e.g., water and land requirements). This specificity would help them to understand and begin to quantify their impact, as well as provide actionable guidance for potential portfolio companies.

Many leading investors are beginning to take the fourth step in developing a Theory of Change approach by investing in portfolio companies that help existing portfolio companies advance. For example, one VC investor explained how over half of their portfolio companies complement at least one other portfolio company. For example, they first invested in a fast-casual restaurant chain that focuses on nutritious meal such as salads, and environmentally friendly ingredients such as organic vegetables. Then, once they realized that supply of organic produce would be a bottleneck for the restaurant chain, they invested in a second venture that uses an innovative business model to deliver greenhouse-

grown produce to urban and suburban areas. Though the second (i.e., enabling) investment needed to pass diligence as an independent investment, the fact that it complemented the existing portfolio company made it compelling in context of the firm's theory of change.

The theory of change can also work retrospectively, though this is arguably less effective. One VC investor who is trying to implement a theory of change approach explained that though they want to have an a priori "conversation with entrepreneurs to figure out what to measure and where they synergies are" they are unfortunately currently only able to evaluate synergies across their investments "out of convenience in hind-sight." However, this approach still allows them to think about and measure impact in a way that neither scares away potential investors.

The theory of change approach is efficient as it allows investors to evaluate whether a venture is "in the right range," without requiring the resources needed to develop comprehensive metrics for all potential portfolio companies. Efficiency in this context is important to investors and their portfolio companies, as they do not have the resources to develop impact metrics, and yet believe it is important to ensure that their ventures align with the sustainability aspects of their investment thesis. By taking a holistic view of an investment firm's activities, the theory of change approach can also help sustainability-oriented investors to articulate the social and/or environmental impact they, by deploying capital, have on the agribusiness system. This is important for investors to not only evaluate ventures, but also raise funds despite the sustainability "stigma" that exists.

Using a theory of change approach can help investors to articulate the impact they want to make using language that does not imply tradeoffs with financial performance. Defining a minimum positive environmental or social impact, in addition to goals for financial performance, can help investors create "simple rules" that appropriately constrain and guide their investment decisions (Sull, 2015). For example, one VC investor looks only at "ventures with a net-positive environmental impact," a family office constrains their portfolio to investments that support regenerative agriculture (e.g., grass-fed beef), and a VC firm focused on alternative protein and animal welfare only considers plant-based and cultured-meat investments. These firms can more efficiently make investment decisions that are consistent with their theory of change by comparing potential ventures to their rules. A theory of change approach may also have benefits external to the investment firm. One family office investor explained how a theory of change approach enabled her to not only talk about sustainability with financially oriented investors, but also "partner with these more traditional investors and get them to be more values aligned."

Differentiate

Investors must differentiate themselves by making their value proposition clear to potential co-investors and entrepreneurs of potential portfolio companies. Differentiation is important because investors want to collaborate with other investors who can add value beyond just capital. Further, investors have to differentiate themselves to entrepreneurs who may be considering multiple potential investors.

Investors of all types can add value to co-investors or ventures. For example, investors may have technical expertise in certain areas that they can leverage in the diligence process to help de-risk a potential venture. VC investors with experience in the IT sector- an increasingly common phenomenon- can add value to precision agriculture ventures with technical hardware and software aspects. Because of their relationship to their parent

company, CVCs can offer strategic benefits that financial investors cannot. As described above, CVCs can provide access to infrastructure and potential customers, as well as technological expertise from their internal business units. Finally, Angel investors and High Net Worth Individuals (HNWIs) may have expertise in specific areas where they earned their wealth. For example, one Angel investor explained that the typical Angel is either bored and wants to “get back in the action” in the area where he made his money, or wants to get back at the VCs that he worked with as an entrepreneur “to show them that he can play at their game, too.” These individuals are often successful entrepreneurs in specific areas, and so can add expertise to new ventures as investors.

Successful investors must also be careful to build up their own reputation and track record in the investment community. Many investors explained that they find ways to interact with startups and other investors and add value to them without asking for anything in return. For example, an investor may provide advice or mentorship to an entrepreneur, or introduce an investor to a potential deal.

“The investment environment is a sellers market. Entrepreneurs can get money anywhere these days. Increasingly, they are looking for value-add investors. I sit on boards and act as mentor. I am real resource. I form lots of relationships. I am valuable because I understand how [the industry] works. This is absolutely a differentiator for our firm...we have no issues with deal flow. [And, because I] mentor a lot of entrepreneurs that I’m not investing in, when it comes time for a raise, we’re already comfortable with each other. We don’t need to hire anyone to do the deal, we just trust each other” –VC, Former Agribusiness Executive

Another key aspect of reputation and track record is a demonstrated ability to provide follow-on funding. Investors want to know that their portfolio companies have a pathway to future capital and eventually a profitable exit. One experienced VC-turned-CVC explained that when he evaluates potential co-investors, he asks, “are they going to participate in the bridge round or will we have to force them? We prepare for the crisis and enjoy it when it doesn’t happen.” As the investment landscape becomes more competitive and entrepreneurs increasingly have more options for capital, only investors who have a positive reputation and demonstrated past successes will continue to thrive.

Develop Domain Expertise

Investors need to establish themselves as attractive partners. As noted in a recent CBInsights webinar on venture investing, “finding the deals is not the hard part anymore. The hard part is becoming the investor that the best entrepreneurs [and investors] want to work with” (Sanwal, 2016). Investors can add value to co-investors and attract and add value to potential portfolio companies by becoming an expert in a specific domain.

“If I don’t know the [other investor], I just wouldn’t get into diligence at all. I’d just say no....But for example I have a friend with experience in the alcoholic beverage space. If he came to me with a deal in that space, I’d take a hard look. He’s a great friend, but I’d look because of his domain expertise” –CVC-turned-VC Investor

One way to do this is to specialize in a particular type of investment or subsector. For example, some investors are narrowing their area of focus within a subsector, such as local food, fisheries, or grass-fed beef. Specialization can help investors to gain access to deal

flow, as entrepreneurs in that sector will find their expertise and network particularly attractive. Then, as the investor expands their portfolio in that area, they gain more expertise that in turn makes them more attractive to future entrepreneurs. However, investors must be careful not to limit their ability to diversify their investment portfolio, either by becoming overly reliant on a particular market, customer, or technology, or by restricting their access to deal flow.

CVC investors, in particular, can leverage the domain expertise they have by nature of being connected to an existing agribusiness firm. One CVC mentioned that they are leveraging the industry connections of their parent company. For example, they have a strong relationship with equipment manufacturers who could be attractive partners to help a venture get access to users or go to market. The same CVC investor gave another example of demonstrated value-add potential:

“We weren’t sure about [a new application of a technology], so we used our network to do a pilot with farmers and measure their sign up rates. We ended up with 200% [retention (i.e., they signed up, and told their friends to sign up)]. This makes financial investors excited. And we held a workshop to determine what farmers want on a larger scale, and [began exploring how we could] integrate with our capabilities to deliver this value. It was a win-win for everyone.” –CVC Investor

Investors of all types can gain domain expertise by investing in internal proprietary research functions to “differentiate and inform ourselves by becoming experts.” One PE firm expressed that their “research-driven approach is unique – it gives us a sourcing advantage.” One VC explained that information alone is not sufficient and “there’s no summary report or silver bullet.” Further, the agribusiness industry is fragmented and behaviors and timeframes differ across geographies and crops. Investors therefore need to “travel, build relationships and find the quality reports, which do exist.”

Proprietary research also helps to de-risk investments by helping investors find less competitive opportunities that may exist further upstream in the value chain. Innovations focused on production need more domain knowledge to de-risk, because they take longer, require more capital, may incur regulatory hurdles, and involve natural systems and not-well-known users.

“With agriculture it’s more conservative and there’s slower market adoption. To get traction [upstream], you have to spend most of your time understanding market adoption. What do farmers want to buy, and at what price. Also, commodity prices impact things- farmers are more or less likely to invest depending on market prices for corn and beans. People don’t understand this.” –Leading Agriculture VC

Despite these challenges, investors who have had success in these areas claim that it is easier to find better margins and “simple wins” where simple technologies can make a huge difference within upstream subsectors. To realize these investments it is critical to spend time understanding the users, which takes time and, as one investor put it, “boots on the ground, as there’s no TechCrunch you can just read.”

Investors are also de-risking upstream investments by leveraging the domain knowledge of industry experts. For example, investors can co-invest with farmers or put farmers on the board of their portfolio company. Investors can join or start forums with farmers, or get involved with industry groups on specific topics related to their area of focus. By building a network of industry experts like farmers, investors have the ability to

introduce their portfolio companies to potential customers, which in turn helps the venture to scale and improves their credibility as investors.

Create Funding Pipelines

Entrepreneurship in agribusiness is exploding, and many investors agree there are more deals than available capital. The data also indicate that the sector may be undercapitalized, with only \$4.6 billion in venture investments for a sector with annual revenues of \$2.5 trillion (McCormack, 2015). Investors, therefore, have to not only differentiate to attract the best deals, and develop domain expertise to help de-risk those deals, but also ensure that the ventures they invest in have a high probability of attracting subsequent funding. If their ventures cannot attract capital in future stages, investors will either lose money because the venture will fail, or have to put more of their own money into the venture, therefore increasing risk. De-risking later stages is critical to accelerating SOIs.

“There’s a general consensus within [agribusiness that] there are more opportunities than capital. But, if there aren’t downstream investors that are sophisticated enough to look at [a deal], investors will pass at the early stage” –Agribusiness Investor

Many investors in agribusiness are particularly concerned about finding funding for their ventures to help them get to the “scale-up/commercialization” phase (see Figure 18, below). The reason for this is at least three-fold. First, there are an increasing number of VCs focused on agribusiness, so there is a lot of capital flowing into early-stage deals. However, VCs often don’t have the patience or resources (i.e., fund size) to invest in their ventures through the growth stage. Second, there are very few potential exit pathways for agribusiness ventures. The main exit pathway is acquisition by an existing corporation or Private Equity (PE) firm (i.e., there have been very few IPOs), but the agribusiness industry is highly consolidated so there are only a few possible acquirers for a given subsector. Further, investors fear that though “PE and M&A may come in later...getting ventures that far is hard.” For SOI ventures especially, these more traditional later-stage capital providers may not have a sustainability-orientation, so investors fear the mission or vision of the venture may become compromised in pursuit of financial returns.

“We struggle with how to get from \$10M [in available capital for a venture] to the \$50M that’s necessary. This has generally been allocated to traditional PE folks [that do not share our impact-orientation], so the challenge we have ahead is going beyond training and supporting [our ventures] to get to \$10M.” –Family Office Investor

Finally, though there are an increasing number of venture investors in agribusiness, there are still not very many overall and the industry is fragmented. Investors want to do deals with other investors that they know and trust, but finding these investors, and ensuring there are enough of them, and enough capital, to ensure a venture will have sufficient support remains a concern.

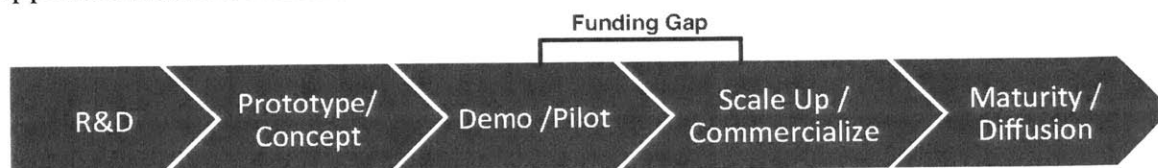


Figure 18: Agribusiness SOI Funding Gap

Investors should therefore create funding pipelines that attract new types of capital and have sufficient resources and appreciation for sustainability considerations to adequately support SOI ventures. Realizing such pipelines will take collaboration between investors of all types, and across many investment stages. Table 11, below, shows the contributions (financial support (\$) or strategic advise and mentorship (i) of each investor that are necessary at each stage to create a funding pipeline.

Table 11: Investor Contributions within Funding Pipeline

Stage \ Investor	Public Sector & Foundation	Accelerator	HNWIs/Angels	VCs	CVCs	Family Office	PEs
R&D	\$ i				i		
Prototype/ Concept		\$	\$	i	\$ i		
Demo/Pilot		\$	\$	\$	\$ i	\$	
Scale Up/ Commercialize				\$	\$ i	\$ i	\$ i
Maturity/ Diffusion					\$		\$ i

Funding pipelines have a high degree of collaboration between different types of investors. For example, they need an accelerator that has a fund of its own that is supported by active, value-add LPs (e.g., HNWIs or Angels with experience in the industry). The ideal LPs will be willing to co-invest with the accelerator in the seed stage so that each investor can leverage the capital of the others. Further, pipelines depend on the early involvement of CVCs who have the capacity to provide funding at later stages.

“In order to have aligned investors and management moving through stages, you don’t want to be the one writing the check in each round. You want [to find investors who will] step forward as a group and help grow these companies and help make sure they’re properly capitalized and managed” –VC Investor

To attract traditional later stage capital (shown as PE in the table above, though other types of capital such as holding companies should be considered), and the much-needed knowledge and experience these investors have, sustainability-oriented investors need to be patient, as well as cautious in how they talk about impact. Partnerships between investors with complementary skill sets will be important. For example, impact-oriented family offices can provide a sustainability lens to financial investors who simultaneously provide financial and investment expertise. Similarly, corporations can use their brand to provide credibility to accelerators and help the attract the best ventures, while their CVCs gain access to emerging ventures that could become potential investment targets. The process of getting traditional later stage investors to think about sustainability will take time; however, agribusiness PE firms are already showing promise, for example by using an Environmental, Social, Governance (ESG) framework to evaluate investments. Increasing collaboration between sustainability-oriented investors and traditional investors will also help.

[We have to] partner with [investors who have a] traditional later stage skill set and get them to be more values aligned” -Family Office Investor

To create robust funding pipelines, investors need to be sure they are looking ahead to subsequent stages, and helping to build the necessary investment capacity. This may mean providing more of their own capital; however, in the best case, investors will be able to look ahead and help build capacity along the pipeline.

“We have reserves because, like any fund, you have to be prepared to put more capital on the table. You have to be ready to participate in future rounds. You might have to be the white knight in a flat future round...because the sales cycle took longer than expected...or [the venture] just needed more runway than expected” -VC Investor

“When we look eight months ahead at a company that will need another round, we look for which investor is mission aligned, has money, and is a good fit for this sector. [They we] try to start talking to them. So we’re always looking ahead to the next round. Not just from a valuation perspective, but also who will be attracted to the venture and how do we position the company [to get that funding]. What data or proof points will make [the venture] attractive to the next stage of investor....[And then we look at] the particular investors. Where are they in their funding cycles? Are they in a governance phase? Did they exhaust their main deployment [and only have] reserves left? Or are they actively investing?” -VC Investor

Funding pipelines create value for the entire innovation ecosystem. For example, they will benefit investors by de-risking their early stage investments and reducing the cost of nurturing a venture to maturity. They will also benefit SOI entrepreneurs who will be the recipients of such funding, and can spend less time raising capital and more time developing their ideas and growing their companies. And finally, these pipelines will benefit existing agribusiness corporations who can gain strategic benefits by accessing new ventures through their CVCs and potentially increase opportunities for M&A activity.

Lead or Tag-Along in a Syndicate

An increasingly common strategy for managing risk is co-investing or syndicating with other investors. A syndicate, in this case, is a group of investors that come together to co-invest on a single investment or set of investments. A syndicate allows investors to combine their resources, including capital, networks, and diligence process, thereby decreasing risk. Individual investors have to decide what role they want to play within the syndicate, and what types of investors they want to collaborate with. Investors should make these decisions according to the type and area of investment, as well as the skill sets of the other investors.

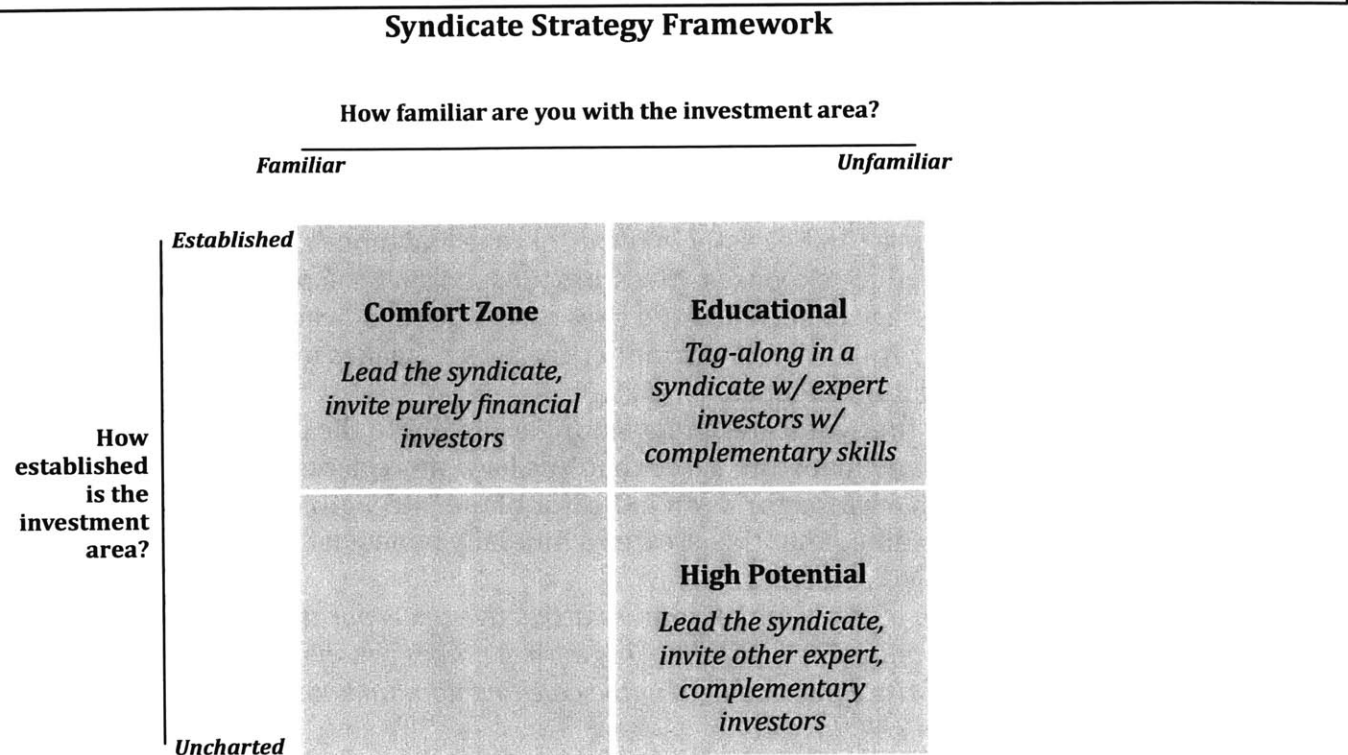


Figure 19: Proposed Syndicate Strategy Framework

Figure 19 (above) presents a proposed framework for investors considering syndication. Investors can decide to lead a syndicate, or participate (i.e. follow) within a syndicate that someone else is leading. Similarly, investors can syndicate with other investors who fall on a spectrum from purely financial (i.e., only contribute capital) to providing relevant complementary skills and expertise (e.g., distribution expertise), in addition to capital. Investors, in deciding whether to lead and with whom to syndicate, should consider how familiar they are with the subsector, as well as how established that subsector is overall. Each of the three viable³¹ syndicate strategies is discussed below in turn. In all of the cases, it is important for investors to be trustworthy: leaders need to build trust to gain followers, and followers need to be trustworthy to be invited to syndicate. Investors therefore must cultivate a strong reputation within the industry to make themselves attractive to potential co-investors.

“[Investors] start to build a reputation in the industry. If you do unethical things, are young and unproven, or don't have intentions that will benefit others, you're going to get called out and excluded. This is happening already with some VCs and CVCs” –VC Investor

³¹ Areas that are familiar but uncharted are likely not viable, either because no entrepreneurs exist, or because of technological, regulatory, or societal conditions. Similarly, participating in a syndicate as a financial investor along with other purely financial investors likely does not make sense in agribusiness, as domain knowledge and expertise are necessary to help de-risk ventures and assist entrepreneurs.

Unfamiliar but Established: Follow Other Expert Investors

Investors who do not want to lead a syndicate may still want to join a syndicate to gain access to ventures in areas outside their expertise. This strategy provides a number of advantages. For example, by not leading, an investor can decide how much of their own resources they want to put in to specific deals or the syndicate overall. For deals where they can add value, they can choose to weigh in; for deals outside their expertise, they can choose to invest (or not) because they trust the rest of the syndicate.

In addition, as a syndicate member, one can share, or even outsource, diligence responsibilities. Diligence can be costly in terms of time and money, so pooling resources across investors may reduce expenses. Investors must be sure the party performing the diligence has the necessary experience and expertise. One syndicate member investor explained that specialization is an important criteria, as it “makes investors stronger, and they can do more solid due diligence.”

Further, by joining the syndicate, an investor gets access to the deal flow of the other syndicate members. Many investors agree that VCs have more access to deal-flow. CVCs often use VC interest in a subsector as an indicator of the “strength of potential deals” in that area. One CVC explained that this creates a mutually beneficial reinforcing loop that benefits both CVC and VC investors.

“More VC interest in a sector makes it more attractive to corporate partners who want to be strategic, not financial, investors. This in turn makes the space more attractive to VCs who want exit strategies and help with scale and domain knowledge, so VC interest increases” – CVC Investor

Overall, this strategy allows investors to see, and even be a part of, investments in new or different areas. For example, CVCs are participating in syndicates in areas outside of the operational expertise of their parent company (e.g., biotech companies investing in precision agriculture ventures). Investors pursuing this strategy need to be sure the syndicate leader is both trustworthy and experienced in the subsector or technology, as they are depending on their expertise and decisions. One investor who has experience leading as well as tagging along in a syndicate explained that though the decision to lead or follow depends on the investment, it is also equally important, if not more so, to consider the other investors qualifications.

“You have to be very selective on who you partner with. People matter, and relationships matter. Especially if I’m tagging along, I have to trust them to have done the diligence and really understand the business” –VC Investor

Familiar and Established: Lead Other Purely Financial Investors

Many investors would rather lead the syndicate to retain control of the investment process and pick their co-investors. For investors leading a syndicate within their area of expertise, it may be advantageous to include purely financial investors in the syndicate. This form of co-investing enables firms to leverage the balance sheets of other firms, unlocking more total capital for the venture without requiring more capital from any one investor. CVC and VC investors with strong reputations and deep expertise often use this strategy, as they can attract other types of capital because of their reputation and track record within the industry.

However, even when considering purely financial co-investors, syndicate leaders need to be cautious of whom they collaborate with. First, other investors must be actively

interested in financial returns (i.e., rather than just gaining strategic benefits). This helps the leader because if a venture passes through all the investment theses of the syndicate, and all the syndicate members are interested in returns, it is more likely that the venture will be successful. Syndicate leaders can also look at the deal history, and associated returns, of previous investments to distinguish between successful, financially oriented investors and those with less experience. Finally, capacity is another particularly important consideration. Capacity is particularly important with non-institutional investors, such as angel investors, smaller VC firms, or CVCs, as these investors may not be as familiar with, as one investor put it, “VC best practices.” A key aspect of capacity is the ability to participate in future funding rounds to ensure the venture has the best chance of getting to an exit and making money for the syndicate.

“What have they done before? We ask because we’re concerned about follow on funding. Are they going to participate in the bridge, or will we have to force them? We try to prepare for the crisis and enjoy it when it doesn’t happen” – CVC Investor

This type of syndicate is especially important for accelerating agribusiness SOIs. Due to the massive size of the agribusiness industry, it is challenging for any one fund to have enough capital to make meaningful change alone. Investors acknowledge that changing a multi-trillion dollar industry is nearly impossible with syndication, as even large VC funds are only around \$100 million.

Uncharted and Unfamiliar: Lead Other Expert Investors

Early-stage ventures in uncharted subsectors or with unproven technologies are highly uncertain and therefore risky to investors. In this case, investors should consider leading a syndicate and bringing on other co-investors who can add expertise, in addition to capital, to help de-risk and reduce uncertainty. Leading this type of syndicate helps an investor to retain control, as well as build their reputation if the syndicate is successful. CVC investors may particularly want to lead the syndicate, as they may eventually want to help their parent company acquire the venture.

Syndication helps to disperse financial risk across investors. As described above, if a venture fits multiple investment theses, it has a higher probability of success. Further, syndicate members can share diligence responsibilities. In this way, a venture that passes through the more robust diligence filter will have a higher likelihood of success.

Collaboration is more attractive for investors in early stage ventures because the value of sharing risk and pooling capital are high, and investments are largely still pre-competitive. As one CVC noted, “for early stage ventures, we want to share risk. And there’s less capital overall to allocate to high-risk opportunities [in agribusiness] compared to other industries, so want to share risk.” Another CVC explained that “it gets competitive [when startups get to the] M&A stage, but early on we, like everyone, are looking for a minority stake, so it’s not competitive.”

These types of syndicates are also attractive because they provide benefits to entrepreneurs that other venture investors alone cannot achieve. Entrepreneurs often rely on their investors as a way to tap into specific domain expertise. Investors that bring specific expertise (e.g., in processing, logistics, or agronomy) to the syndicate help to decrease risk for all investors. A syndicate with many value-add members will also have a broader network to source deals, as well as to pull in more resources to contribute to the startup.

By providing additional value to entrepreneurs, and by casting a wider net for prospective ventures by leveraging the pipelines of all investors, a syndicate may also help each investor-member to increase access to potential future opportunities. A wider net, and broader network, also creates more opportunities for follow-on funding. As one investor said, it “gives you a connection to, and understanding of, buyers and next stage investors.” As venture investing in agribusiness continues to grow and more investors establish domain expertise, leading investors should form, and lead, syndicates with other complementary investors to explore new areas with potential for significant disruption—and therefore high returns and large impacts.

“We always lead, but we want to see complementary skills in our syndicates. [We bring domain expertise, so] we want to see financial investors looking for returns, and we want to see [that they are investors with] technological expertise” –CVC Investor

Entrepreneur Best Practices

Tailor Pitch to Sustainability Orientation of Audience

Entrepreneurs have to be clear about their mission and desired social and/or environmental impact, and tailor this message to fit the sustainability orientation of potential investors. Entrepreneurs also have to have the business acumen to be able to realize their vision.

Entrepreneurs may be motivated by “making a difference” or “changing the world”, but they need to further define what type of impact they want to have, and how they plan to achieve it. This may not come in the form of a written business plan, or specific impact metrics (see above for a review of the challenges associated with developing effective impact metrics for startups). Rather, investors indicate that a compelling case for sustainability manifests in the quality and authenticity of the entrepreneur’s vision.

“[Because of our investment thesis, the management of a portfolio company has to be mission-driven and sustainability-oriented...so we ask them about what change they want to make, and then we have to evaluate the authenticity of their mission-driven claims” –Agribusiness-focused VC Investor

Investors agree that the sustainability orientation of the leadership is extremely important in assessing the potential impact of the venture. Investors also agree that, “there’s no concrete way to assess this.” One investor explained that assessing impact is really a qualitative and subjective activity:

“It’s really about the people. Do we know them. Do we trust them...We look at sustainability as, ‘is this company true to themselves’...and it matters less how they define it relative to others” –Agribusiness Investor

It is critical, therefore, that SOI entrepreneurs develop a compelling, and consistent, vision for their social and/or environmental impact.

In addition to a vision for impact, entrepreneurs need a compelling go-to-market strategy and roadmap that outlines how they will build and gain traction on a minimum viable product. Even mission-focused investors are concerned about financial returns. Before deploying capital investors need to know that the ventures they invest in will deliver financial value. General business acumen may therefore be even more critical for SOI ventures as for non-SOI ventures, as the entrepreneurs have to balance their personal ambitions for environmental or social impact with the need to build a financially viable

business that attracts capital and customers. Sustainability-oriented food entrepreneurs often struggle to find this balance. For example, one VC investor explained that food entrepreneurs often overlook the importance of margins. He did not want to invest in these businesses, because once they scaled up to the size needed to make a real sustainability impact, they would no longer be financially viable.

“Entrepreneurs want to change the world but they’re not getting that you have to make money to be sustainable or have an impact. People are drawn to [agribusiness] because of societal benefit. Yes, this is a game changer and makes the space more interesting. But you have to have a monetization strategy” – VC Investor and serial entrepreneur

Investors continually emphasize the need for SOI ventures to clearly articulate both the business case and the desired impact, and further, to explain how they reinforce, rather than detract from, each other. As one investor said, entrepreneurs “have to make money to stick around [to be able] to make an impact.” Entrepreneurs must not only articulate both the business case and vision for impact, but also be careful not to scare away capital by focusing too much on impact. Investors, especially VCs, are focused on financial returns and may lose confidence in a for-profit venture that includes too much sustainability information in their pitch. Therefore, as one investor explained, “sometimes entrepreneurs have more success when they don’t use ‘sustainability’, but rather just pitch investors on economics. Maybe they add in sustainability as one piece, but don’t have it as a focus.”

Entrepreneurs must therefore create a pitch that resonates with potential investors by striking a balance between how they communicate the sustainability and financial objectives of their business. Many investors, perhaps due to their own challenges implementing metrics at the company level, agree that it is compelling when entrepreneurs can “connect impact to something you can measure [in dollars],” such as energy or water savings. However, entrepreneurs must be careful not to spread themselves too thin in their attempts to create and tailor pitches. One strategic advisor noted that courting too many investors with different methods could distract entrepreneurs.

Entrepreneurs that develop a vision and successfully tailor the sustainability and financial aspects of the vision according to the orientation of their audience will be most effective in securing aligned capital. As one food VC explained, “there’s a minimum ‘floor’ for impact. But we’re also very clear about achieving market-rate returns.” Entrepreneurs need to be sure they stay above this minimum impact floor, while convincing potential investors of the high ceiling for financial returns.

Find Aligned Capital

In addition to sustainability orientation, investors also differ on the timelines and terms they expect, as well as the value they can add. To find aligned investors, entrepreneurs need to not only be clear on their own goals and desired impact, but also understand what type(s) of capital will enable them to achieve their vision. For example, entrepreneurs must be aware of the differences in the goals of the investors. For example, a former CVC explained, “as a CVC we were often looking to get information that would inform how much [our parent company] should pay for the company [during an M&A down the road, but in contrast,] VCs are looking for near-term ROI.” Another investor explained that Angel investors and Family Offices often look to invest in subsectors where they have previous

experience or affiliation. For example, an Angel investor may be a c-suite executive at an agribusiness corporation. These investors may be able to add value because of their experience; or they may be tied to the status quo system in which they had success, and therefore their advice may be out of date or even detrimental.

Entrepreneurs need to be aware of investor motivations and initiate a dialog with potential investors about their expectations. Figure 20, below, shows various characteristics of venture investors that entrepreneurs need to consider. This table was derived from the interview data for this thesis, and should be expanded upon and validated by active agribusiness entrepreneurs and investors. In addition, entrepreneurs should collaborate with each other to share experiences about types of investors, as well as specific investors. Mentors, including advisors, investors, industry experts, and academics, can also help entrepreneurs understand both the agribusiness system and the motivations and characteristics of different investors.

Investor Type Characteristics	Example	Primary Value Proposition (for entrep)	Additional Value Proposition(s) (for entrep)	Stage	Financing Resource	Time Commitment Requirements for Entrepreneur	Breadth of Interest w/in Agribusiness	Application/ Selection Process	LP Structure	Timelines
Events	FoodBytes!	Recognition	Network Skill Development	Idea / Seed	n/a	1-time event	Depends	Application process	Sponsor(s)	N/A
	MIT F&A Innovation Prize	Idea Development	Recognition Funding Network building	Idea / Seed	No-strings attached	Part time commitment over ~6 months	Depends	restricted eligibility application process	Sponsor(s)	N/A
Incubators and Accelerators	AccelFoods	Network	Funding Skill Development Recognition Physical space	Seed	Equity	Part-time commitment to apply Full-time commitment during curriculum	Narrow	Application process	Sponsor(s) Multiple LPs	<5yr
	Grant Slow Money	Funding	Recognition	Idea/ Seed	No-strings attached	Part-time commitment to apply	Narrow	Application process	n/a	Depends
Angels and HNWs	Hyde Park Angels	Funding	Network	Seed	Equity or Debt	Pitch Part-time commitment to manage relationship	Depends	Pitch	n/a	<5yr
Crowd-Funding Platform	AgFunder	Funding	Recognition	Idea / Seed	Equity or No-strings attached	Part-time commitment to apply	Broad	Application process	Multiple LPs w/ independence	<5yr
Family Office	Armonia LLC	Funding	Network Domain Expertise	Depends	Equity	Pitch Part-time commitment to manage relationship	Narrow	Pitch	n/a	5-10 years
Venture Capital	Cultivian Sandbox	Funding	Network Reputation Domain Expertise	Seed Startup Growth	Equity	Pitch Part-time commitment to manage relationship	Depends	Pitch	Institutional	<5yr
Corporate Venture Capital	Monsanto Growth Ventures	Funding	Access to resources (infrastructure, channel, network) Potential Exit	Seed Startup Growth	Equity or Strategic partnership	Pitch Part-time commitment to manage relationship Significant working relationship	Depends	Pitch	Parent company	Other/depends
Private Equity	Paine & Partners	Funding	Operational Expertise Network	Growth Mezz.	Equity or Debt	Significant, depending on terms	Broad	Pitch	Institutional	<5yr

Figure 20: Entrepreneur-centric View of Investor Characteristics

Entrepreneurs must also consider the timelines of different investors. The traditional VC model has an investment period of 10-12 years and expects ventures to deliver financial returns in 3-5 years. Family Offices and CVCs, however, are more likely to consider a longer time horizon (e.g., 5-10 years).

“This unquestioned belief in the heuristic that success equals scale creates a mismatch between the [sustainability-oriented] mission of the entrepreneur and their potential investors- especially the ones who come from tech. Investors put pressure on going big and wide, but this might not be the best mechanism for the entrepreneur. Patient capital might be better. Especially in this industry where things move slow and you need time to build changes in consumer habits [or] supply chains.” – Sustainability-oriented entrepreneur

Deal terms are another important aspect that SOI entrepreneurs need to consider. Investors, especially VC investors who take equity in return for capital and may try to take a controlling position, may negotiate for performance criteria based on the belief that scale is an integral part of success. However, focusing on scale may or may not be the best option for an entrepreneur. For example, one entrepreneur suggests that using brand loyalty, or sales volume within a particular region, as a success metric may be more appropriate than scale in some cases. Entrepreneurs therefore need to manage their investor's involvement and influence, depending on how much the entrepreneur wants to have access to the investor's expertise (i.e., vs. just wanting their capital). For example, one entrepreneur wanted capital and technical expertise from an Angel investor, but wanted to make sure the investor did not "try to mess with me by pretending he knew what he was talking about in terms of running a company." This entrepreneur created a technical advisory board and offered the Angel investor a spot, thereby leveraging his expertise but ensuring his power was limited.

Entrepreneurs also need to consider alternative governance structures, or legal forms, to ensure they preserve the sustainability focus of their venture as it matures. Cooperatives, low-profit limited liability companies (L3Cs) and Benefit Corporations (BCorps) are appropriate for entrepreneurs who want to guarantee that the social and environmental metrics for their venture are just as important as financial performance. These legal forms are increasingly gaining traction as state legislatures recognize them (see Figure 21) and companies adopt them. Entrepreneurs should be cautious, though, as many venture investors, given their focus on near-term financial returns, are still skeptical of startups with these business models due to a fear that they will not be profitable. As more startups with these models are successful, investors may begin to accept them. Currently, impact investors and family offices are the most likely to invest in ventures with these governance structures, given the former's focus on sustainability and the latter's ability to be more patient. Angel investors may also be a good fit here, especially when the angel has expressed a particular interest in the subsector or intended outcome.

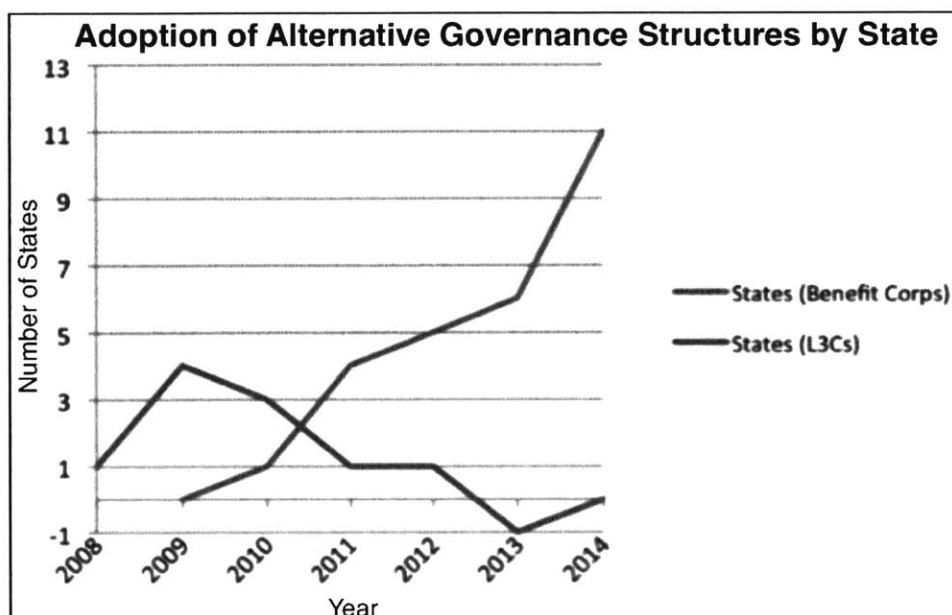


Figure 21: Adoption of L3C and Benefit Corp. by State (Cooney et. al, 2014)

Finally, though not included in the table above, SOI entrepreneurs should also consider alternative financing mechanisms beyond equity, such as debt financing, grants funding, bootstrapping using personal investments and/or sales revenue, and program related investments (PRIs) from foundations. These forms of capital may limit the speed at which a venture can grow, but may be more appropriate for SOI entrepreneurs in some cases, and help the entrepreneur to maintain control over their venture's future.

Find the Right Accelerator

The number of accelerators³² is increasing across industries in general (Mikey & Widjaja, 2015), as well as in agribusiness specifically. One report explains that at least 15 accelerators and incubators were founded for food products in 2015 (Meijers, 2015). Accelerators can help agribusiness SOI entrepreneurs by connecting them to an ecosystem of stakeholders and their resources, including but not limited to capital. However, there are a number of factors that entrepreneurs need to consider when selecting and applying to accelerators. Specifically, entrepreneurs need to look for accelerators that will help them (1) attain deep domain expertise and industry skills; (2) understand and leverage their sustainability-orientation; and (3) de-risk themselves and enter a funding pipeline.

Accelerators provide a number of services to entrepreneurs to help entrepreneurs develop their business and get funding, such as access to mentors, opportunities to build their network, peer learning, and office space (Cohen & Hochberg, 2014). Each accelerator is different, though, and not all accelerators provide the same services or have the same structure. Food-X for example, which brands itself as the world's leading food innovation

³² There is no agreed upon definition for accelerators. However, there are a number of common features, such as: having a *cohort*, or set number of startup companies that enter and leave over a fixed duration; taking equity and often investing in startups within their cohorts; providing access to development resources such as mentorship and networking opportunities; and culminating with a final event focused on creating funding opportunities where investors are invited to hear the pitches from the ventures (Heinemann, 2015).

accelerator, touts benefits such as “world class network” and “powerful alumni network” (Food-X.com). Other accelerators focus on helping entrepreneurs to build industry-specific skills. For example, AccelFoods helps packaged food startups to understand and overcome the challenges of getting to scale that are inherent to the industry, such as inventory management and distribution (Montgomery, 2015). The following benefits are featured on the AccelFoods website: “a hands-on operating team with sales, marketing, operations, financial and legal expertise; a highly-curated Mentor community composed of thought leaders from both the capital and food communities; a best-in-class group of Key Partners who provide discounts and/or added-value packages for their services; and a direct capital investment (Montgomery, 2015).” Entrepreneurs need to de-risk their ventures and gain access to capital, but not every accelerator will be a good fit. There are three main considerations for an SOI agribusiness entrepreneur choosing an accelerator.

First, entrepreneurs should look for accelerators that provide more than just a mentor network. Mentorship is extremely important and entrepreneurs should take advantage of the mentor networks provided by accelerators. However, unstructured or infrequent engagements with mentors may not be sufficient to help SOI agribusiness entrepreneurs. Some accelerators provide an even more structured process to help entrepreneurs de-risk their ventures. For example, one accelerator explained that in addition to the mentor network that most other accelerators provide,

“Our operational team is hands-on with the [companies in the cohort]. We provide finance, legal, investor relations, marketing, sales, operations, and manufacturing support in a structured way. We really take a 360 degree view of operations” –

Accelerator Founder

In addition to a comprehensive set of relevant services, entrepreneurs need to consider the skill sets and experiences of the accelerator’s operating team that will provide these services. Entrepreneurs need to ensure that this package will help them to identify and fill gaps in their skill set. One common gap for agribusiness entrepreneurs is lack of domain expertise. Finding the right accelerator can fill this gap. An entrepreneur should look for an accelerator that specializes (or at least has experience) in their subsector of the agribusiness industry, as they will know specific pitfalls and how to overcome them. For example, many entrepreneurs developing food products have to manage an inventory of goods, which requires a different set of business skills than other industries without physical goods (e.g., software). The right accelerator will understand this challenge and help their entrepreneurs learn how to manage their working capital. Accelerators may also provide domain expertise by connecting their entrepreneurs to their target market. For instance, a venture targeting farmers as customers should look for an accelerator that has connections to industry groups, has farmers as investors or mentors, and/or has strong ties to corporations with deep connections to farmers.

Second, entrepreneurs need to find accelerators that appreciate their sustainability-orientation and help them to structure their venture and attract types of capital that will help them to realize their vision. Accelerators that give entrepreneurs access to a curriculum that helps them to refine their mission and approach to sustainability will help them to more effectively tailor their pitch to both impact- and financially-oriented investors, as described above. One food accelerator founder specifically explained that they, and their associated network of advisors, helped one of their portfolio companies

from the alternative protein space to incorporate a sustainability aspect into their core strategy. Sustainability was therefore, according to the accelerator's founder, "a core part of the business, [something they] would never take out of their business model, because if they did, it would be unattractive to investors." Being clear about, and effectively communicating, the sustainability-oriented nature of the venture has helped the startup to attract follow-on investors who are also excited about sustainability.

Good accelerators will also help SOI entrepreneurs attract aligned capital. Some accelerators may offer advisory services, such as legal advice, that can help entrepreneurs understand what type of alignment they need to seek with potential investors based on their mission and sustainability orientation. Accelerators can also support SOI entrepreneurs by providing resources on alternative governance structures.

We help the entrepreneur to think about their strategy and what they're ultimately trying to achieve. [Becoming a] Benefit Corporation or L3C might be a good fit or it might not. If [sustainability is] not core to the strategy, if its just an afterthought, that's not good. We take a company-specific approach, [because it] really depends on ...their mission. Some funds look for this specifically." – Accelerator Founder

To understand if an accelerator will help them attract aligned capital, entrepreneurs need to consider the types of investors the accelerator has in their network. Entrepreneurs can look at whether other startups that have gone through the accelerator have raised different types of capital, or the kind of capital they want to attract. Further, entrepreneurs should consider the sustainability-orientation of the accelerator. Some accelerators, such as Fish 2.0, which is focused on sustainable seafood ventures, have sustainability baked into their DNA and therefore attract investors who also care about impact.

Finally, entrepreneurs should select an accelerator that will provide access to a funding pipeline. Many investors use accelerators as a source of deals; in fact, a recent working paper showed that startups that were accepted to the MassChallenge accelerator program received a statistically significant increase in the amount of funding they raised (Fehder, 2015). Investors can attend a single pitch event and see a number of refined business ideas that have been de-risked by nature of completing the accelerator curriculum. One investor described an accelerator as a "real world MBA" for startups, which helps him to "de-risk a potential investment a little bit, not a lot, but a little." Accelerators can also help investors connect with each other, or with strategic assets (e.g., established corporations). These connections help investors further mitigate risk and therefore invest earlier because they have found co-investors or established potential for follow-on funding. Entrepreneurs therefore need to consider both the value proposition of the accelerator, as well as its reputation and affiliated investors, and make sure that they will be able to leverage the brand of the accelerator and the skills it provides to both de-risk their venture, and find potential investors.

Entrepreneurs also need to make sure the accelerator has a vested interest in the long-term success of each cohort. Most accelerators provide some kind of financial support to their cohorts, but entrepreneurs should look for accelerators that have the capacity for long-term support. For example, some accelerators also have their own funds, and make investments in the ventures as they graduate from the accelerator program. This structure ensures that the accelerator has a vested interest in the success of the venture, and will be more likely to help them develop while they are in the accelerator, as well as attract follow-

on funding as they mature. Just as investors should create a funding pipeline (see above), so too should entrepreneurs be sure they find an accelerator that will help them enter a funding pipeline that has capacity to support them as they grow.

Accelerators in general, and especially within agribusiness, are a recent phenomenon, and only preliminary data exists about success rates (e.g., Fehder, 2015). It is increasingly clear, though, that there are many accelerators and that the space is crowded. Accelerators can offer a lot of value to entrepreneurs, but vary in the structures and services they provide. Entrepreneurs therefore need to find an accelerator that will build their skills and help them identify and address gaps, develop and maintain their vision for social or environmental impact, and gain access to a pipeline of funding that will help them be successful in the long run.

Conclusion, Limitations, and Future Research

Summary of Key Findings

The agribusiness industry is under pressure from demand drivers such as population growth and shifting consumer preferences, and simultaneously limited by supply constraints such as climate change, natural resource availability and quality, and a competing demand for biofuels. Sustainability-oriented innovations (SOIs) are necessary; however, current approaches by private sector players are insufficient. Corporations are inventing new products and acquiring companies that can help them target new market segments. However, consumers are losing trust in existing corporations, who in turn are losing market share as they struggle to change their operations and manage their reputations. Investors of all types are paying attention to the industry's challenges, and deploying capital in search of scalable, profitable solutions. However, attracting the best entrepreneurs, finding advantageous partnerships, and nurturing financially viable, sustainability-oriented ventures from idea to exit are still challenges for agribusiness investors. Entrepreneurs, too, struggle to find and attract necessary capital and expertise, despite the entrepreneur's desire to make both a profit and a positive impact. Corporate Venture Capital (CVC) is emerging as a solution to help corporations expand their innovation strategies and establish a role within the innovation ecosystem. CVCs have the potential to help entrepreneurs, investors, and their parent corporations; yet agribusiness firms have not yet figured out how to most effectively implement their CVC functions, nor have CVCs established credibility as strategic investors. To overcome these challenges, I propose a set of best practices for each of these private sector stakeholders. The proposed practices are summarized in Table 12, below.

Table 12: Summary of Proposed Best Practices

Stakeholder	Proposed Best Practices
Corporations	<ul style="list-style-type: none"> • Embed sustainability requirements early • Add value to the innovation ecosystem • Consider CVC to fill a gap between R&D and M&A
Corporate Venture Capital Investors	<ul style="list-style-type: none"> • Determine objectives and let them dictate structure • Manage external and internal reputation • Communicate and leverage unique value proposition
Investors	<ul style="list-style-type: none"> • Use Theory of Change approach to ensure positive impact • Differentiate • Develop domain expertise • Create funding pipelines • Lead or tag-along in a syndicate
Entrepreneurs	<ul style="list-style-type: none"> • Tailor pitch to sustainability orientation of audience • Find and secure aligned capital • Leverage the right accelerator

Limitations

My thesis should be considered an exploratory look at the emerging innovation ecosystem within agribusiness. Private sector venture investments, entrepreneurship, and especially CVC investments are a recent phenomenon within agribusiness. My findings and recommended best practices are therefore preliminary, and future investigation is necessary. Each of the best practices should be validated and verified in turn, for example through field experiments, pilots, or systematic studies, to identify which practices, or combinations of practices, can best accelerate agribusiness SOIs.

My research was also limited by the number of interviews I conducted, as well as the diversity of perspectives of my interviewees. Further, my insights are limited by the amount of time I was able to spend with each interviewee, given their own time constraints. I also was able to interview more venture capital and corporate venture capital investors than other types, so their perspectives may be overrepresented. My investor interviewees are mainly investors who specialize in agribusiness; however, there are many investors who include agriculture or food as one aspect of a broader portfolio- these perspectives are absent.

No universally accepted definition of agribusiness exists, so existing data sources may exclude or include different subsectors of the industry. For example, other commodities beyond food are produced using agricultural methods, (e.g., tobacco, cotton, those used in cosmetics), Similarly, other industries, such as the pharmaceutical industry, produce products that have significant implications for food and nutrition (e.g., antibiotics for animal nutrition). Understanding limitations, and applying best practices to accelerate SOIs, within these areas is increasingly important. A comprehensive study would consider the perspectives of entrepreneurs, investors, and corporations across all sectors and subsectors of the agribusiness industry.

Additionally, I did not include the public sector perspective in this thesis, though undoubtedly public sector actors have a critical role to play, as accelerating SOIs will take collaboration across the private and public sectors. In the U.S., the public sector, including organizations like the United States Department of Agriculture (USDA) and academic institutions, among many others, will continue to play a key role in accelerating sustainability-oriented innovations in agribusiness. For example, the USDA Farm Service Agency (FSA) provides affordable \$50k loans to producers. These microloans help existing and new producers gain access to capital for inputs, infrastructure and equipment, and to offset distribution and marketing costs (Niedzielski, n.d.). Universities contribute foundational research that can lead to new ventures, educate the future entrepreneurs, investors, and sustainability professionals, and provide an innovation ecosystem to incubate emerging ventures and attract capital and other resources. Non-profit organizations similarly have a role to play. For example, SlowMoney³³, a non-profit organization focused on local and organic food, has an associated crowd-funding platform that as of March 2016 had deployed \$48 million to 470 SOI ventures related to delivering sustainably-produced food within a 50 mile radius of production. Understanding the role of public sector innovators, including the challenges that stakeholders face, emerging best practices, and the interaction between public and private sector players, is necessary.

³³ <https://slowmoney.org/>

Finally, my thesis focused only on private sector investments within the U.S. The agribusiness system is a global one, and entrepreneurship and innovation in other countries warrants further investigation as geographical and cultural preferences, as well as context-specific regulations, may limit the applicability of my findings.

Future Work

I hope that my thesis can lay the groundwork for future research that helps private and public sector stakeholders accelerate SOIs. For example, the practices I suggest may be more effective within particular subsectors or for certain types of investors. Future efforts should therefore aggregate and analyze data on agribusiness deals by investor type and subsector. Such data could help expand on Figure 16 and Figure 20 to understand which types of investors are best suited to which innovations and subsectors. These data would also inform future work on the success rates of different syndication strategies by enabling researchers to see which types of investors have been more successful across different syndicate roles and subsectors. Finally, these efforts could be combined to create tools that help private and public sector players, such as: investors, in determining where to focus their efforts, how to effectively differentiate themselves, when to lead or tag along in syndicates, and who to collaborate with for particular deals; entrepreneurs, in narrowing down the options to find aligned capital based on their subsector; corporations, in seeding the ecosystem with challenges that can be addressed with innovation, and that they would be interested in funding through CVC; and policy makers, in looking to stimulate or provide enabling conditions to address gaps in the ecosystem.

A more mature understanding of agribusiness CVCs is also necessary. In particular, differences between CVC with private and public parent corporations should be explored to understand if CVCs with private parent companies have an advantage over CVCs with public parent companies. Though I only interviewed two investors with experience working for a CVC of a private corporation, my preliminary findings suggest CVCs of private corporations may have an advantage in accelerating SOI ventures. One CVC of a private company said, "Being private does allow us to be really patient capital, which might be more attractive to entrepreneurs." Another ex-CVC of a private company explained that being private gave them the ability to be "really thoughtful" about who they co-invest with. She explained that these considerations, "might limit who they collaborate with," but that overall, having patience to consider these factors would help the CVC, and their parent corporation, in the long term. Future work should focus on these aspects to uncover best practices for CVCs from private and public companies.

Future work is also necessary to explain the wide variance in investment priorities across CVCs (see Figure 10 and Appendix IV). Are certain CVC structures more successful? Should certain types of corporations use specific CVC structures? It may also be fruitful to compare agribusiness CVCs to CVCs in other industries. Some studies have looked at success rates of CVC-backed ventures (e.g., Gompers & Lerner, 2000; Chemmanur et al, 2014; Dushnitsky, 2013); yet no data exist on the performance of CVC-backed ventures in agribusiness. Future work should look at performance both in terms of financial success for the venture and investors, as well as strategic value to the CVC's parent corporation.

Finally, investigating the role of accelerators in the agribusiness innovation ecosystem is also necessary. In other industries some accelerators have established a brand and reputation that allows them to attract the best entrepreneurs and investors (e.g.,

Techstars). In agribusiness, however, no accelerators have yet established this level of recognition or reputability. Future work should therefore examine whether the reputation of an accelerator matters more than the specific domain expertise it can provide to entrepreneurs. Future work should also explore which types of business models accelerators and incubators should use to ensure they themselves are sustainable businesses.

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Appendices

Appendix I: Semi-structured Interview Questions Template

The questions below are intended to provide a sample of the types of questions I asked interviewees. As described above in the Methodology section, for each interviewee, I tailored the set of questions based on interviewee type (e.g., investor vs. corporation), background research, and stage of the research (i.e., my questions evolved throughout the process). Whenever possible, I asked interviewees to elaborate on their answers by giving a specific example or anecdote.

Investing

- How many investments do you make a year?
- What stage of investments do you focus on?
- How do you source deals?
- What is your value proposition to the SOI ventures you invest in? Why do they pick you over other options?
- What organizational dynamics can and have successfully enabled corporations to invest in SOIs?
- What other constraints or principles with respect to sustainability guide your investing strategy?

Collaboration

- What collaborations, tools, policies, and partnerships can and have successfully de-risked and potentially increased the economic viability of SOIs for corporate investors?
- Do you co-invest or syndicate? What makes an (un)attractive co-investor?

Sustainability

- Does your firm have a common definition for “sustainability”?
- What % of requests for investment claim to contribute to sustainability?
- Is important to evaluate the validity of the “sustainability” claims for an investment (i.e., will it really have an impact)? If so, how do you do it?
- Tools, definitions, and cultural perceptions of sustainability change all the time. Do you do anything to stay “current”?

Critical Incident Exploration

- Describe a specific company that you invested in that you’re really proud of
 - What is the story of this investment?
 - What was your rationale for investing?
 - What were the greatest risks in this investment?
 - Did certain regulations, public policies affect your investment decision at all?
 - Did sustainability considerations affect your investment decision at all? Did you verify the sustainability claims made by the company?
 - Was the team’s management sustainability-oriented?
- Describe a deal you did where you had hesitations about the social/environmental risks.
- Describe a company that you were really excited about initially, but decided after diligence not to invest

Appendix II: Sample Research Memo

What I think I know:

CVC approaches

- Wide range of strategies used by CVCs:
 - Direct investing like a VC
 - Potential to direct invest or form other types of relationships
 - Indirect investment as strategic partner/advisor
- Different degrees of embedding into the firm
- Different relationships to Business Units
 - E.g., have to get full buy-in; no requirement to get buy-in at all
- For all approaches, need alignment between ventures and firm
 - Could come in the form of a clear investment thesis or area
- CVC in food/ag is really just starting. Best strategy is still not clear

Health/Wellness as a driver

- Health/wellness is a *much* more common driver than enviro/social susty, which are nice-to-haves/bonuses, or boxes to check wrt regulation
 - Innovations in this area are more likely to come from other departments, e.g., internal sustainability teams, RnD working with susty teams, or supply chain

Challenges for entrepreneurs in food/ag → opportunity for CVC

- Opps. for disruption have increased with technology and retail options
 - but getting to scale is still a challenge, logistics of mass market retail
 - upstream supply chain/production challenges are real and hard
- Urban Ag and Susty Protein as examples of sustainability-driven innovations
 - Susty moving beyond an add-or on risk assessment, to one of the core value propositions for innovation and WHY you need innovation

New Information:

- Forming CVC as more of a separate, traditional VC arm
 - don't have to get direct buy-in from BUs
 - can align strategy, investment thesis with executive team (get buy-in)

I need to understand:

- Differences between private and public CVCs?
- What makes CVCs attractive, or not to entrepreneurs/to co-investors

My theory:

- CVCs still new and overall not sure how to structure (buy-in, investment types, etc.)
- Risk evaluation for CVC is largely the traditional PE evaluation framework (market, tech, team)
 - Strategic fit to corporate is key
 - This depends on the relationship between the CVC arm and corporate

Appendix III: Forced Ranking Questions**1) Rank the following objectives, from most to least important, for venture investment:**

- a. < 5 Year Financial Gains
- b. 5-10 Year Financial Gains
- c. 10+ Year Financial Gains
- d. Social Sustainability Impact
- e. Environmental Sustainability Impact
- f. Hedging Risk
- g. Managing Risk (e.g., diversification)
- h. Brand Value
- i. Learning and Exploration

2) Rank main determinants for venture investment, from most to least valuable:

- a. Team
- b. Product
- c. Market
- d. Deal (terms, price, equity)
- e. Personal Connection
- f. Investment Expertise (investor knowledge of the technology)
- g. Location
- h. Syndicates
- i. Regulatory environment
- j. IPO environment

3) Rank the following, from most to least, in terms of how frequently you have invested in each:

- a. Venture you are a customer of
- b. Venture that creates a market for your existing products
- c. Venture that will lead to a new market offering/product
- d. Venture with high organizational learning potential
- e. Venture as a precursor to acquisition
- f. Other (elaborate if possible)

Appendix IV: Additional Forced Ranking Results

