

Strategic Foresight for the Future of Food

Scanning, scenario planning, experiential futures, and strategy development for Big Grocer Co. in 2035



Big
Grocer
Co.



Alimentum

This work is licensed under a Creative Commons
Attribution-NonCommercial-ShareAlike 3.0 Unported
License.

Table of Contents

Introduction	4	Changes in the Canadian “Appetite”	39
Canada’s Food System at a Glance	5	Slow down food	39
Who We Are	6	Urban Food Deserts	41
On Strategic Foresight	7	Rising Food Costs	43
Trends	7	The Zero Mile Diet	44
Scenarios	7	Community Gardens	46
Time Machine	7	The Emergence of the Connection Economy	47
Strategies	7	Scenarios	48
About Big Grocer Co.	9	Overview	49
Trends	10	Our 2 x 2 Matrix	50
Overview	11	Critical Uncertainty 1: Acquisition	50
Drivers	12	Critical Uncertainty 2: Distribution	50
Demographics of Canada	12	The Four Scenarios	50
Technology Advancement	12	Time Machine	54
Increasing Urbanization	13	Overview	55
Climate Change	13	Walkthrough	55
The Back-End of the Food System	14	Analysis	60
Agricultural Automation	14	Exploring four perspectives	60
Precision Farming	16	Selected Quotes	61
Sustainable Shipping Practices	18	Strategies & Recommendations	62
GMOs	20	Overview	63
Proliferating Boutique Farms	22	Strategic Pathways	64
Intensified Agriculture	24	On Indicators of Fit	64
Forever Fresh	26	On Wind-tunneling	64
Autonomous Transportation	27	Summary of Recommendations	66
Food Retail & Online Shopping	28	Conclusion	67
Subscription Food	28	References	68
3D Printing Food	30		
Active and Intelligent Food Packaging	32		
The Virtual Grocery Store	34		
Online Food Delivery	36		
The Future Aisles	38		

Introduction

We are Alimentum (Latin for “food”), a boutique management consulting firm that specializes in providing our clients with solutions for their business strategies, platforms and supply chains. We leverage our experience from across a variety of sectors and industries to identify for our clients how they can most effectively transform their enterprises - preparing them for a journey towards a more sustainable and profitable future.

This report was created to better understand what the futures of the Canadian Food System might look like and how today’s trends will shape and impact the future of the industry. We did this with the ultimate goal of providing Big Grocer Co. with the direction it requires to facilitate strategic long-term planning. Based on previous projects with Big Grocer Co, we converged upon a framework for this report by asking two questions critical to the future of a food retailer: *How will Canadians acquire their food in 2035?* and, *How will information and communication technology impact this relationship?*

This framework acknowledges that the agricultural industry and Canadian Food System is evolving rapidly, with several forces reshaping agriculture, the supply chain, and the way people acquire food by 2035. Increasing demand for high-quality yet affordable food products, developments in technology and science, emergent sociopolitical priorities, shifting demographics, and changing farming structures and practices are but a few of the elements confronting Big

Grocer Co. today. To succeed for tomorrow, however, Big Grocer Co. will need to harness these forces to help it maintain and grow its competitive advantage within an ever-changing industry.

Our approach for this report will leverage our unique understanding of Big Grocer Co.’s business and set it against the broader backdrop of change within the industry. Combining this with deep insight into the dynamics of food acquisition and distribution in Canada, we aim to provide Big Grocer Co. with a set of options that will help to maintain its competitive advantage by building a better prepared, more capable and future-ready food company.

Canada's Food System at a Glance

The Canadian Food System involves an intricate set of highly coordinated activities that comprise of the following four elements:

1. Production (farmers that grow food)
2. Processing (food packaging & refining)
3. Distribution (retail & wholesale of food)
4. Consumption (at home or restaurant)

Over the last 50 years, this complex chain has undergone massive transformation both in Canada and abroad. Rapid technological advances have facilitated the massive industrialization of farming alongside the revolution in the management and optimization of the modern grocers' supply chain. This has had a cascading effect across all levels of food acquisition and distribution in Canada, with varying impacts on consumers, manufacturers and farmers. Despite having already undergone such drastic changes, the Canadian Food System remains susceptible to various forms of disruption. Shifting demographics, technological advances, climate change and increasing urbanization will have an impact on how the industry captures and generates value. Mitigating the risks that these changes will bring to the industry will be a challenge that Big Grocer Co. must navigate in the years ahead.

Who We Are



Ryan Murphy
**Conquering the
Uncommon**



Anna Colagrossi
**Making Prosperity
Happen**



Robyn McCallum
Piloting Big Ideas



David Fascinato
**Storytelling the
Future**



Natale Dankotuwage
**Pursuing Constant
Change**

On Strategic Foresight

"The only thing that is constant is change."

Big Grocer Co. is an industry leader that is committed to maintaining its competitive advantage, delivering value to its shareholders by positioning itself for sustainable growth as a future-ready business. To accomplish this, an organization must not only rely on an analysis of the present, it must peer into uncertainty and discern a future worth pursuing. The use of strategic foresight accomplishes this by effectively bridging tomorrow with today. For clients like Big Grocer Co., bridging into the future results in two benefits: first, it provides insight into how they can grow their competitive advantage while creating new sources of value from within their business. With a firm view to building a future-ready organization, strategic foresight allows companies to better navigate and manage change and uncertainty.

This dossier includes the following sections:

Trends

To situate our analysis, we collected a comprehensive set of trends through a systematic environmental scanning process. This section describes these various trends and their implications for the future of the Canadian Food System. We based our research on items that were identified internally by our team and by other futurists. Extensive trend scanning provided our team with a collection of emerging issues and gave us insight on the many potential influences holding sway over the food industry's possible futures.

Scenarios

We leveraged the lessons of the scanning process to craft four scenarios that depict possible futures by using a 2x2 matrix of critical uncertainties about the Canadian Food System. This method – scenario planning – is a robust way to surface salient issues of the emerging future, allowing strategists to manifest concrete, socializable visions of these futures for deeper analysis. It's argued that to use scenarios is like rehearsing the future: organizations can train for the future and avoid unexpected surprises (Schwartz, 1991).

Time Machine

A Time Machine is a design fiction – an immersion transforming a given scenario into a tactile experience. Alimentum forged such a Time Machine out of one of the aforementioned scenarios. There is an element of transcendence in bringing a scenario to life: to walk into a room and experience how that future might play out. This process allows participants to engage with the scenario and unearth valuable insight for the team and the foresight process.

Strategies

With insights gathered and analyzed from the Time Machine, the four scenarios were revisited and enhanced. In parallel, we used these refined visions of the future to develop strategic pathways for Big Grocer Co. To assess the strength of each of these strategies against the futures we imagined, we meticulously evaluated each pathway using a wind-tunnel approach, measuring the cultural, strategic and financial risk and fit for the organization. This analysis resulted in the articulation of a grounded strategic recommendation

for Big Grocer Co., weaving consideration for various signals, certain risks, and performance measures that will help turn strategy into action.

The report aims to provide decision makers at Big Grocer Co. with the insight and support they require to make more informed decisions about uncertain future. Alimentum is proudly Canadian and, with that in mind, we feel the best way to set the tone of this report is with Wayne Gretzky's quote from his father, "A good hockey player plays where the puck is. A great hockey player plays where the puck is going to be." In exploring this report, we are confident that the merits of strategic foresight will provide Big Grocer Co. with the capacity to harness change and thrive in the Canada of 2035.

About Big Grocer Co.

Big Grocer Co. is one of the largest employers in Canada, with approximately 150,000 full-time and part-time employees across more than 1,100 locations, spread out throughout the country. Committed to providing Canadians with a wide range of products and services to meet everyday household and consumer needs, the company's mission is to be Canada's best food retailer by exceeding customer expectations by providing innovative products at great prices.

Big Grocer Co. successfully advanced a number of strategic initiatives in 2015. Targeted investments to improve the customer proposition yielded same-store sales growth of 1.1% in a competitive environment characterized by intense competitive square footage growth. Some of Big Grocer Co.'s key initiatives in 2015 included:

- Implemented and expanded IT system across seven distribution centres and 90 stores
- Exceeded customer expectations and achieved highest in company history positive customer feedback scores, primarily due to competitive prices and improved customer in-store experience
- Expanding the Big Grocer Co. Plus digital loyalty program to build customer loyalty by marketing on an individualized basis
- Effectively managed costs across the business with a focus on improved shrink (the amount of net margin lost to theft, waste and product spoilage), lower supply chain costs, and reduced labour and administrative expenses to drive operational efficiency

As one of the country's leading retailers, reaching 14.5 million consumers each week, Big Grocer Co. is uniquely positioned to not only deliver on its purpose, but to steer the industry toward a preferred future. This sui generis position, in tandem with Big Grocer Co's status as a vertically integrated organization (and thus engaging in multiple levels of the Canadian Food System), only further stresses the importance of strategic planning and the utilization of foresight tools to better prepare Big Grocer Co. for industry-wide change.

Overview

Environmental scanning is the systematic gathering of information about events, signals, and relationships relevant to the target organization (in this case Big Grocer Co.). This curated list of trends is then used to better understand the nature and pace of change in the environment in which Big Grocer Co. operates. This information will further assist management in strategy development and in determining the organization's path in the face of uncertain futures. Scanning is a critical step underpinning the foresight process, scenario planning, and ultimately strategy development.

In an attempt to gather as broad a view on the topic as possible, we classified the trends in line with the STEEP+V themes. The acronym refers to the following domains of thinking about the future: Social, Technology, Economics, Ecology, Politics and Values (Loveridge, 2002). However, the trends in this section are organized by their location within the Canadian Food System:

- 1) The Back-end - How food is made, how farming is conducted, and shipping
- 2) Distribution - Food retail and online shopping
- 3) Changes in the Canadian “appetite” and consumer behaviour (how the consumer interacts with the food system and what their preferences are).

For each trend we will provide a brief description of the trend, list signals as evidence that the trend is occurring, summarize potential implications the the Canadian Food System, list relevant trends and countertrends

Before delving into the results of the environmental

scan, we would first like to examine the driving forces that we identified as having the most drastic impact on the future. As it will be explored in greater detail below, these drivers are shaping the Canadian Food System in ways that are adding to the complexity and uncertainty of the future. Accordingly, understanding their transformative role will help Big Grocer Co. navigate challenges and opportunities alike.

Drivers

In order to properly execute a foresight plan, it is necessary to identify the driving forces that are shaping the futures in predetermined ways (Wilkinson, 1997). Accordingly, these drivers have the ability to impact Big Grocer Co.'s future, and are divided into social dynamics (demographic changes in values, lifestyle, health and demand), economic issues (macro and microeconomic trends shaping the economy and changing the ways industries function), climate change (accompanied by complex ecological and environmental concerns), and finally technology (how advances in internet and communications technologies will impact food futures).

Demographics of Canada

The Canadian population is perpetually transforming, and all indicators suggest its fabric will continue to evolve well into the future. There are three components to this transformation: generational shifts in culture and values; the expanding mosaic of Canadian multiculturalism; and the aging of the Canadian population. This last component is the most drastic to observe, with Canadians aged 65 and older outnumbering those who are younger than 15 years of age as of July 1, 2015 (cbc.ca, 2015).

All these changes are bound to impact the food sector in consideration of the role that the consumer plays within the Canadian Food System. This may include dwindling labour pools, increased strain on healthcare and social welfare, shifts in collective values, and an ever-increasing diversity in our multicultural mosaic.

Technology Advancement

Technological advancement is a critical element of our future as a nation and as a society. The world's leading nations, including Canada, are investing in continuous innovating in an era that will see advances in automation, digitalization, and biotechnology. There is an opportunity here for retail businesses who can successfully leverage these technologies to effectively capture and grow their competitive advantage. These advancements will likely be balanced by increasing collaboration among nations, sectors, and communities to address the myriad of social, economic, and environmental challenges facing us in the 21st century (such as global climate change and dwindling natural resources). For a food system like Canada's, technological advancement will continue to increase crop yields while addressing the decreasing number of agricultural workers in rural areas through automation and biotechnology.

However, it is worth noting that increasing access to the Canadian Food System through digital and virtual channels may also inadvertently spread forms of inequality across consumer segments who lack access to them. As in the past, future technological advancement will spur benefits while simultaneously spawning new problems. Big Grocer Co.'s capacity to capitalize on these opportunities, be it through innovating its production or processing systems or by exploring new ways to distribute and engaging with consumers, will influence its likelihood of becoming a future-ready industry leader.

Increasing Urbanization

In the last decade, Canada has witnessed the movement of its citizens to large urban centres from rural communities. This increasing urbanization parallels many other regions of the globe, with large segments of the world's population gravitating towards the economic opportunities and security offered by urban centres. According to Statistics Canada, "between July 1, 2013 and June 30, 2014, the population growth rate was considerably higher for Canada's census metropolitan areas (+1.4%) than for non-CMAs (+0.4%). In comparison, for Canada as a whole, the population growth rate was 1.1% during this period" (Statistics Canada, 2015). Canadian cities are therefore swelling in size and density, straining the social, economic, and infrastructure supports available in these urban areas.

Increasing urbanization is bringing new stresses to the Canadian Food System, as recently exemplified by the identification of urban "food deserts". This has fostered nascent trends in Canada's Food System innovation (such as urban farming, community gardens, and food subscription and digital delivery services) that are unlocking new ways to feed growing urban populations. Increase in urbanization also leads to the increase in real estate prices. The old logic of supply and demand can be perfectly applied: With more people gravitating to the cities, space becomes more expansive, and grocery stores like Big Grocer Co. will need to adapt. On the flip side, the increase in urbanization will mean a corresponding increase in customers in specific markets, which can be an opportunity for new business model innovations.

Climate Change

Climate change is a global force that will have a direct impact on how Big Grocer Co.'s business will continue to operate in a number of different ways. The rise in temperatures will make extreme weather events, such as temperature peaks, floods and droughts, more likely. This will reduce crop yields (quality/quantity), lower water availability and severely impact other nation's food systems along with Canada's. Climate change will likely increase costs and make certain food products less than profitable. Drastic changes in global weather patterns will increasingly impact the Canadian market, with shifts in demand and supply from regions affecting the availability and price of products in Canada.

Climate change may not only influence production, it may also have the power to influence distribution and consumption. The environmental concerns of consumers may increase their support for products and businesses that have a lighter impact in the environment. Moving forward, Big Grocer Co. may want to examine how it functions in a world with ever changing climate and weather patterns.



The Back-End of the Food System

AGRICULTURAL AUTOMATION

Technological

Summary:

As global demand for agricultural output increases in tandem with rising labour shortages in the farming industry, automation will enable farmers to manage the farm with fewer people while simultaneously increasing yield.

Description:

Automation in the agricultural sector is heavily tied to three trends: increasing labour shortages, increasing demand on yield to provide food for the world's growing population, and the consolidation and vertical integration of farms globally, thereby increasing the average farm size (and feeding the labour shortage). In response, the agricultural industry is acting like a business, optimizing operational efficiency through the application of automation technologies to improve returns on yields. Doing so will enable farmers to manage ever larger farms with fewer people while simultaneously increasing yield.

Maturity:

Early. In 2012, only 273 Canadian farms, representing ~3% of the industry, were using robotic systems (Mulligan, 2015)

Signals:

The FAO and the OECD predicted that global cereal production will increase by 350 million tonnes by 2023, representing a 15% increase compared to average annual yield from 2011 to 2013, however the planted

area for cereal is only predicted to increase by 2% - 4% globally (Corsini, Wagner, Gocke & Kurt, 2015).

In Canada, (although this trend seems to be manifesting globally) labour shortages was identified by Farm Credit Canada in 2015 as a key issue facing the agricultural industry. The report highlights some specific contributing factors: "rural de-population making it difficult for employers to access and attract workers; seasonality resulting in few full-time permanent jobs; and, perishable products including the handling of live animals and plants. (Agriculture and Agri-Food Tackle ag Labour Shortages, 2015)

The shifting labour-to-yield ratio: While the proportion of labourers working in agriculture has fallen precipitously (from 24% in the early 1800's to 1.5% in 2002 in the USA, for example; (Scully, 2002), global cultivated land increased by almost 500% from 1700 to the late 20th century (Matson, Parton, Power & Swift (1997) and global food production is growing exponentially, doubling with increasing rapidity in the 20th century (Scully, 2002).

Farm sizes in most regions has increased as ownership of continuous plots consolidate, often in an attempt to maximize advantage of scale. In Europe, the average farm has grown significantly during the last half-century. In France, for example, farm size increased by 145%, on average, between 1970 and 2010, from 22 hectares to 54 hectares. In Germany farms grew by 229 percent during the same period, from 17 hectares to 56 hectares (Corsini, Wagner, Gocke & Kurt, 2015). Robotics in agriculture are good for large farms and fields.

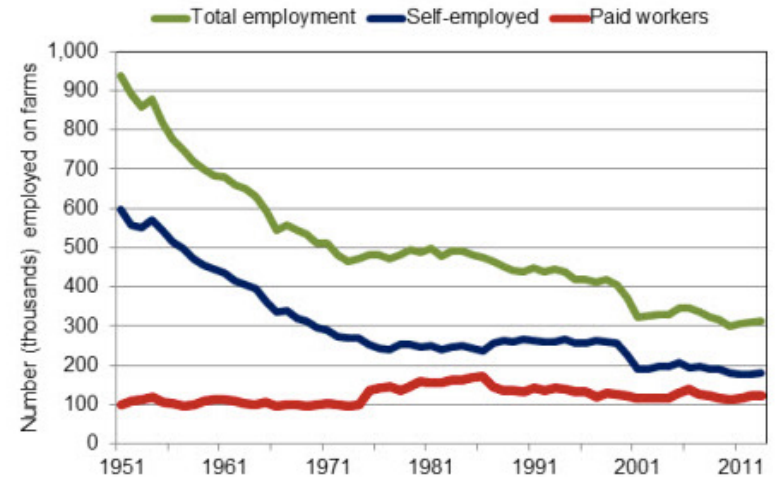
Implications:

The trend toward agricultural automation will likely indeed increase yields in the short term, which is critical as the agricultural industry struggles to provide adequate food for the world's growing population. While currently used primarily on large "factory" (see trend: Intensified Agriculture) agricultural automation potentially benefits small and/or organic farming practices as well. Automation, through its equipment and data services, creates opportunities for farmers undertaking all approaches to agriculture (factory/organic/etc.) to use traditional products - crop protection, seeds - more effectively and efficiently. Allowing agricultural workers to "do more with less" will impact the sector in its entirety.

Related Trends:

In several sectors, "green" farming is inhibiting the adoption of new technologies. In Europe, for example, the EU's new Common Agricultural Policy framework offers subsidies that favour smaller farms and programs that promote environmental sustainability. This trend in Europe works in opposition for the need to increase yield and organic farming produces only 70% - 80% of the crops of conventional farming. This, however, will likely drive the demand for increased efficiency in organic farming. (Lorenzo, Wagner, Gocke & Kurt, 2015)

Factory farming: As pressure from growing populations and increasing urbanization demands more of the world's food supply, farming responds as a business, maximizing the return-on-investment through technological and pharmacological interventions that carry potentially disastrous (hidden) side effects.



Source: Statistics Canada, Labour Force Survey, CANSIM Tables 282-0012.

The above graph is taken from the 2011 Statistics Canada Labour Force Survey and demonstrates the decline in agricultural labour in Canada from 1951 to 2011.



PRECISION FARMING

Technological

Summary:

Precision farming aims to optimize field-level management by providing farmers with data-driven planting advice by using technology (ex, GPS technology and geolocation) to measure and react to the variable conditions across a single field, in an attempt to maximize yield while simultaneously reducing costs.

Description:

Precision farming is an agricultural method that delivers data-driven farming advice to farmers. Unlike traditional methods, precision farming can help the farmer determine variable planting rates to accommodate varying conditions across a single field. This optimizes field-level management and maximizes crop science, environmental protection, and economics by boosting competitiveness through the application of more efficient practices.

Maturity:

Early. In 2013, 10% of cultivated acreage in the United States was utilizing precision farming techniques to introduce variable-rate seeding. However, the practice is growing quickly and rapidly becoming more and more pervasive globally. (Corsini, Wagner, Gocke & Kurt, 2015)

Signals:

Number of patents dealing with "Precision Farming" recently filed indicates that agricultural workers have identified precision farming as an influential trend affecting farming practices and structures. (Corsini, Wagner, Gocke & Kurt, 2015)

In an attempt to limit the amount of fertilizers used on farms, governments in the United States are beginning to implement regulations that attempt to curb overuse. The State of Maryland, for instance, passed a law requiring farmers to have a documented "phosphorus management plan." (Herring, 2001)

Implications:

Interventions aimed at increasing agricultural efficiency and yield are only becoming increasingly significant as we continue to struggle to produce an adequate amount of food for our growing population.

This trend, along with other methods of implementing automation into the agricultural process (ex. robotics), is interesting in that it can accommodate the growing desire for organic produce by increasing yield without requiring the use of herbicides. For those concerned about the sustainability of more invasive methods (for example, GMOs and rampant herbicide use) and resulting vulnerability of our food system, agricultural automation of this sort is a welcome addition to the roster of possible interventions. Precision farming can and I'm sure does operate in tandem with these more contentious methods of fertilizing and crop protection, however, precision farming only uses the precise amount of fertilizer required, therefore farmers are typically putting less on the landscape thereby reducing cost of production as well as chemical runoff. (Herring, 2001)

Automation, through its equipment and data services, creates opportunities for farmers undertaking all approaches to the industry (factory/organic/etc) to use traditional products - crop protection, seeds - more

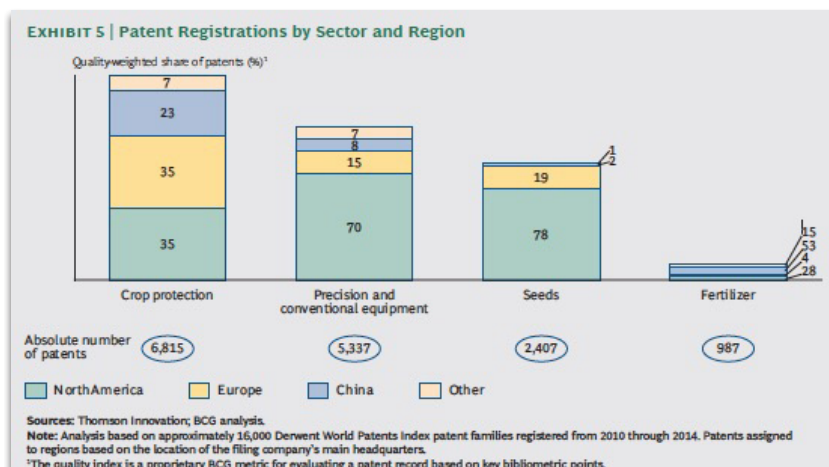
effectively and efficiently. Allowing agricultural workers to “do more with less” will impact the sector in its entirety.

Related Trends:

The movement against consolidated farms, pushing forward as a response to what this trend’s champions consider the unsustainable practices of intensive farming.



The Yara N-Sensor ALS mounted to the canopy of a tractor. “This sensor system 1) scans the crops roughly 5 - 6 metres left and right of the tractor lane, records the speed of light reflection of the plants as an indicator of their current nitrogen uptake, 2) translates the measured data into fertilisation recommendations, which then 3) are used by the applicator to vary the actually needed amount of fertilizer spread.” (Wikipedia Commons)



The above graph demonstrates different categories of agricultural patents from 2010 - 2014. From (Corsini, Wagner, Gocke & Kurt, 2015)



SUSTAINABLE SHIPPING PRACTICES

Environmental

Summary:

Responding to major global drivers including volatile and rising oil prices and pressure to respond to climate change, global shipping industry leaders are beginning to come together to explore more sustainable shipping practices.

Description:

This trend is interesting in that it is affecting while simultaneously being impacted by global climate change. The transportation of goods, including food products, around the world is a huge contributor to global greenhouse gas emissions. The shipping industry is responsible for approximately 6% of the total emissions (Badenschier). At the same time, climate change has drastically impacted the shipping industry through volatile and rising oil prices, changes to important logistic networks and routes, and damage to ports, causing disarray in the global food supply chain that depends on reliable transportation of goods. Research has been indicating that climate change is likely to increase the frequency and severity of storms, and may impact ocean currents. Additionally, coastal facilities for container shipping are particularly vulnerable to sea-level rises and damage through increased storm activity. This places the global shipping industry in a position where they need to prepare for the possible impact of climate change as well as explore ways to mitigate those impacts by reducing carbon emissions, investing in energy efficiency, and transitioning to new sources of fuel. Martin Stopford, a renowned British economist and director at Clarkson's pie, the world's largest shipping broker, summed up

the concern for the industry with the following quote: "Globalisation, climate change, and escalating energy costs are a strategic nightmare for shipping companies and they all have one thing in common - fossil fuels." (Forum For The Future, 2011)

Additionally, all of this is happening within an environment of increased pressure from commercial customers to address sustainability concerns through the supply chain, forcing the shipping industry to begin to address these concerns.

Maturity:

Early. Despite the size and influence of some of the industry leaders who have begun to take tangible steps toward more sustainable shipping practices, they are still in the minority. (Forum For The Future, 2011)

Signals:

Kellogg, Unilever and Kimberly Clark have come together to create a "collaborative distribution network". In this model, companies making shipments along the same routes will team up, in some cases building shared distribution centres, and split truckloads between the different companies increasing delivery frequency, maintaining transportation costs, and reducing each company's individual carbon footprint (Cooke, 2011).

Through a process called "slow steaming": container ships have begun to reduce their average speed by 15% - 20%. This is simultaneously a response to rising oil prices (they are attempting to conserve money on fuel) but it is also to reduce CO2 emissions in an attempt to gain an environmental competitive advantage over air freight (Badenschier, 2013).

The emergence of the Sustainable Shipping Initiative in 2011, a coalition of shipping leaders from across the globe, and the weight of their founding members (bp, Cargill, Maersk, Rio Tinto - to name a few) indicates that the global shipping industry is concerned with sustainable shipping and has committed to addressing the sector's greatest opportunities and challenges, including climate change. (Forum For The Future, 2011)

Finland has created a truck that is 15% more energy efficient than traditional transport trucks and Japan has built a "super eco-ship" that emits two-thirds less Carbon Dioxide than regular freighter ships. (Badenschier, 2013)

Implications:

Climate change, along with other mega-drivers such as overall growth of global economic activity and our quickly growing population are impacting the global shipping industry in a myriad of ways: Rising oil prices, increased storm activity, ocean currents changing, and increased vulnerability of port cities and facilities. These new realities coupled with increased pressure from government and industry to address carbon emissions, at times through the creating of new regulations and laws, means that the shipping industry should be motivated to explore more sustainable shipping practices for environmental reasons as well as economic ones.

As is often the case with several other calls to action regarding climate change, shipping industry leaders will need to look beyond short term concerns and focus instead on the long term opportunities and shortcomings. Shipping businesses should explore the wide range of opportunities before them to address these

issues should they hope to not only gain a competitive advantage but to ensure that they will 'weather the impending storm' that is climate change.

Related Trends:

A potential barrier of adoption is the tendency for some shipping businesses to focus only on the benefits of climate change to the industry. For example, rising sea levels could be beneficial as container ships grow larger. "A freighter can currently carry up to 8,000 standard containers that are 20 feet long (12.192 meters). But by the end of 2013, a new generation of ships will have the capacity to hold 18,000 standard containers. So the ships will need deeper water in the port and inlet areas." (Badenschier, 2013)



Photograph of the Wano Bhum, a large container ship transporting goods over water. From <http://maritime-connector.com/ships/>



GMOS

Values

Summary:

An estimated 800 million people lack access to adequate food. The emergence and subsequent widespread adoption of genetically modified crops (GMOs) is one way in which the agricultural industry is attempting to address this issue. (Wu & Butz, 2004)

Description:

GMOs are plants in which a portion of their DNA has been modified via genetic engineering techniques. The aim is typically to introduce a new trait to the plant that is not naturally occurring within the species but will somehow improve the plant's ability to grow, resist harm, or increase yield.

As with several other trends, the mega-driver of rapid global population growth is putting pressure on the agricultural industry to increase yield in response to the growing demand for food. GMOs have the capacity to make an enormous positive impact in addressing potential global food shortages, however they may also present significant risk and raise questions about the resiliency of these practices and their impact on the sustainability of crop production. Concerns surrounding the ethics of widespread GMO and the uncertainty around implications of long term use are serving as sizeable barriers to adoption, but regardless of sentiment this technology has proved to be a revolution in the crop production industry, the question is about whether or not we are about to sustain this revolution. Running counter to this sentiment, supporters of the technology stress its ability to reduce malnutrition and improve

food security, in particular in developing countries.

Maturity:

Near Peak - In 2004, the United States, Canada, China, and Argentina, genetically modified varieties of soybeans, corn, and cotton now made up from about a third to 80 percent of total plantings of those crops (Wu & Butz, 2004)

Signals:

According to the United States Department of Agriculture (USDA), herbicide- and insect- resistant crops in the USA are providing farmers with a greater number of options to ensure higher crop yields. "In terms of share of planted acres, soybeans and cotton have been the most widely adopted GE crops in the U.S., followed by corn." (USDA, 2015)

Evidence suggests that recent advances in biotechnology techniques are safer than at any time in the last three centuries, increasing our society's ability to increase crop yields dramatically. (Navarro, 2015)

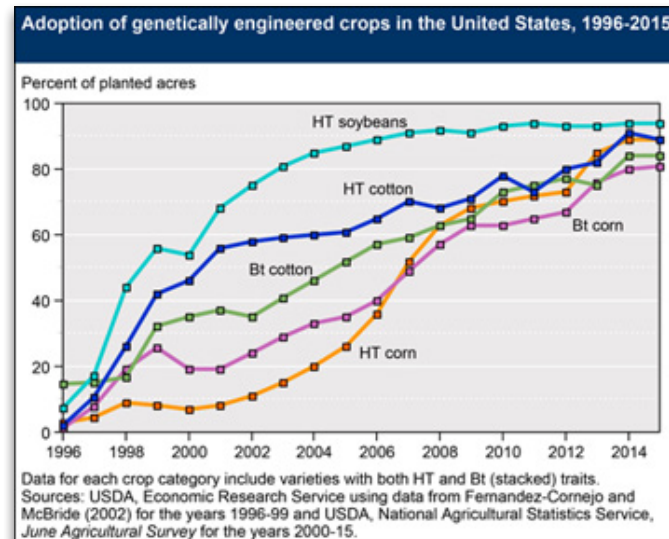
Implications:

As consumers and suppliers become more comfortable with GMO crops, the share of planted acres that are GE (genetically engineered) will likely increase, improving the yields for American farmers.

Combined with the pressing need to feed an increasing population and the challenges presented by climate change (and their impact on global crops), will likely result in pressure to use GMOs across more crops

Through the adoption of farming technologies like GMO / GE crops, there is a likelihood of increasing off-

farm income. Recent studies from the USDA suggest a correlation between managerial savings (attributed through tech adoption) and the ability to derive more income from a wider set of activities. This helps farmers and their families. (Fernandez-Cornejo, 2007)



The above graph demonstrates the rise in use of genetically modified crops from 1996 to 2014 in the United States. From (USDA)



PROLIFERATING BOUTIQUE FARMS

Economic

Summary:

A counter-trend of Intensified Agriculture, factory farming provides smaller farms with an economic opportunity: they can grow unique, localized, high-value products. 21st-century values and the technologies of industrial agriculture have created a market and a method for a new wave of farmers to do more with less in (literally) down-to-earth bespoke ways.

Description:

Boutique farming is facilitated by two factors. First, the inventions of intensive agriculture often benefit smaller scale farms as well. This use of technology to improve the efficiency and sustainability of agricultural practice is known as “appropriate technology”. In this sense, boutique farms are created as an environmental response to the unsustainable practices of intensive farming. Small-scale farms are also encouraged by market opportunities left in the wake of factory farming. These farms struggle to compete with the production of basic essential crops by intensive farms: mass production of staple products by large industry satiates the market base. On the other hand, massive farming operations are too specialized to supply bespoke high-end products. Thus, a market exists for non-staple foods (or even nonfood agricultural products) – niches that can be targeted by diversified, boutique small-scale farms.

In either case, the crops grown by boutique farms are often seen as up-market value-added products. Whether they celebrate their environmentally-friendly

(and “healthier”) approach to production (e.g., organic products), their social values (e.g., local farms feeding 100-mile diets), or are simply unique products (e.g., U-Pick “entertainment farms”), these farmers have found customers who are willing to pay more for their offerings. Thus, the proliferation of boutique farming is also linked to the gentrification of food.

Maturity:

Early-to-mid maturity. Boutique farming is not a self-sustaining trend; rather it will grow or shrink primarily in response to changes in other trends, primarily the technology developed in intensive agriculture, market changes in agriculture, and the gentrification of food. These three trends only coalesced to inspire boutique farming in the last several decades.

Signals:

The diversification of independent farms: Independent farmers diversify their crops and even their business model as they can no longer depend on revenues generated by previous staple crops (cf. Akerman, 2015; Keene, 1990).

The valuation of niche agriculture has increased substantially (and outpaces produce): flower nurseries reached from \$7m to \$20m in Washington State, USA within a fifteen year span in the late 1900’s, going from three times to six times the value of produce sales (Keene, 1990).

Farmers’ share of agribusiness revenues is declining (despite an increase in total market size) from 33% of \$420 billion in global revenues in 1950 to a projected 10% \$10 trillion in 2028, causing farmers to shift from

participating in the agribusiness supply chain to producing their own specialized goods (El Feki, 2000).

Implications:

This trend chiefly illustrates a widening gap between large-scale agribusiness and local, independent farms as small and medium enterprises. Access to technology may increasingly present boutique farmers with greater opportunity as innovation at factory farms has trickle-down effects. Likewise, the specialization of intensive farms is likely to continue as industry-wide drivers push these agribusinesses to maximize yield and minimize costs. Finally, gentrification could continue to increase the size of the market typically targeted by boutique farming. If these trends continue, this will be an area of opportunity in the near future.

Related Trends:

This trend is reinforced by and balances against Intensified Agriculture.



Pictured: A boutique orchid farm in Taiwan
(Photo credit: http://taiwannews.com/en/topics_detail.php?i=15)



Pictured: The family owners of Lester's Farm, an inner-city boutique farm in St. John's, Newfoundland & Labrador.
(Retrieved from <http://lestersfarmmarket.com/data1/images/thelesters.jpg>)



INTENSIFIED AGRICULTURE

Economic

Summary:

As pressure from growing populations and increasing urbanization demands more of the world's food supply, farming responds as a business, maximizing the return-on-investment through technological and pharmacological interventions that carry potentially disastrous (hidden) side effects. This trend is a major driver behind the trends shaping our collective food future.

Description:

The industrialization of farming (often referred to as “intensive farming”) involves optimizing the processes of agriculture to maximize product yield while minimizing the costs of those processes. Examples include (but are not limited to): Intensive animal husbandry (including Confined Animal Feeding Operations); the use of fertilizers and pesticides; and the expansion of genetic modification efforts.

These practices support soaring food demands in the present, but critics argue that they are unethical in short term and disastrous in the long term.

Maturity:

The trend is highly matured in the 21st century, but it continues to shift as the industry grapples with the (un)sustainability of its practices in the face of a continually growing population. Intensive farming as discussed here began in the 1600s. Early notions of mechanization, crop rotation, and selective breeding fed the industrial revolution, which in turn saw the invention of steam- and gas-powered mechanization, synthetic fertilizers

and pesticides, and an uncountable number of other innovations that defined the future of food.

Signals:

The shifting yield-to-field ratio: an increasing yield has been harvested from the same amount of land over the past century (e.g., from 3 tons of wheat per hectare in the UK in 1884 to 8 tons per hectare in 2004; Alston, Babcock & Pardey, 2010)

Consolidated ownership and vertical integration: the USA's approximately 1,000,000 pig farms of 1967 have been merged into 114,000 farms in 2002 (Scully, 2002). The WorldWatch Institute suggests similar patterns have shaped poultry, beef, and egg agriculture, too (Halweil, Mastny, Institute, & Assadourian, 2004).

Fertilizer use has increased by almost 300% since their introduction in the late 1800s (Federico, 2010). Meanwhile, increasing use of fertilizer had a positive linear correlation with increased crop yield (in the case of cereals from 1989 to 1992; Dyson, 1996) and a negative linear correlation with per-person grainland area (Brown & Starke, 1996).

Agricultural land use per capita has decreased over time: Global use of land has decreased from .45 hectares per person in the 1960s to .25 hectares per person in the early 2000s. This ratio is projected to continue to decrease by some researchers (Bruinsma, 2009).

Implications:

This trend is fickle. It is easy to paint factory farms in a negative light: the practices of industrial agriculture are often cited as examples of humanity's natural

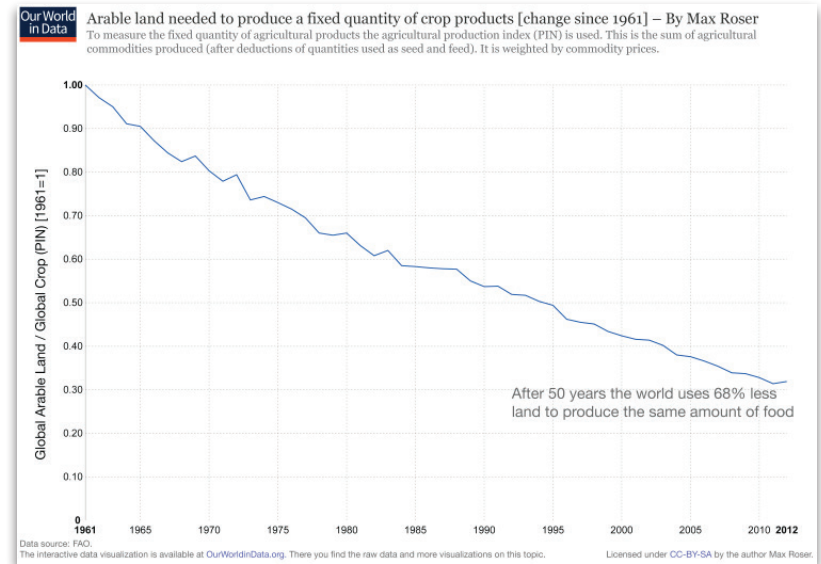
destructive ability or our unethical treatment of animals, for instance. On the other hand, improving agricultural processes freed us from existing in subsistence, and they continue to be key in order to provide adequate food for our growing population. Thus, the trajectory of Farms as Factories should be a balancing act, sustaining humanity while also avoiding long-term consequences.

But this is a prescriptive direction. In reality, while some uses of appropriate technology will improve the moral and the environmental impact of our sustenance, intensive agriculture will continue to grow more intense, struggling to provide for the world's population. The implications are dark: intensive agriculture has a tendency to make the food system fragile, vulnerable to risks unanticipated by our highly controlled processes. Moreover, some fear that increasingly invasive interventions (such as GMOs and other genetic technology) could ultimately give us too much control over long-term impacts without fully understanding the consequences.

Related Trends:

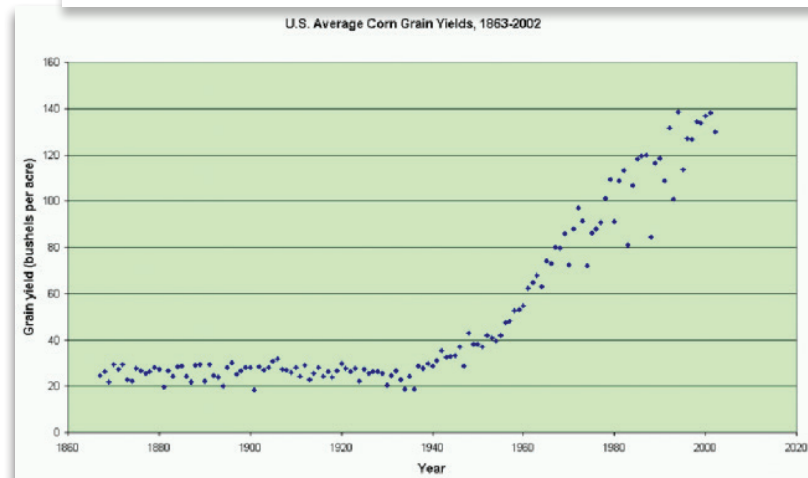
Technology that enables smaller, more sustainable intensive farms is a counter trend. See proliferation of boutique farms.

This trend is a driver for many other trends shaping the future of food: the rise of robotics in agriculture is one example.



Pictured above: Land needed to produce a fixed amount of crop over time. (<http://ourworldindata.org/data/food-agriculture/land-use-in-agriculture/#note-13>)

Below: US corn yields per hectare of land over time. (passel.unl.edu/pages/informationmodule.php?idinformationmodule=1075412493&topicorder=10&maxto=12&minto=1)





FOREVER FRESH

Technology

Summary:

From High Pressure Processing to bacteria-sensing materials to food powders, innovative methods for long-term food preservation are increasing food security, minimizing waste, and boosting food safety.

Description:

With increasing consumer awareness of food waste (Chavich, 2015), concerns over food scarcity (Walter, 2014), and frequent tainted food recalls (Mehler Paperny, 2015), there is a growing desire to explore new ways of preserving food freshness and safety. New treatments, such as HPP (High Pressure Processing) (Blum, 2012) and chitosan/lysozyme treatments are creating new ways to preserve food without sacrificing flavour or texture (Freedman, 2011). Meanwhile, methods of analyzing food for harmful bacteria with responsive colour changing materials reassure customers that their food is safe (Toor, 2013). These methods ensure that our food is safer for a longer time with less waste.

Maturity:

While some technologies, such as HPP, are more established, many of these preservation techniques are new and will require thorough scrutiny before being made widely available. As such, this trend is a slower moving curve that is in its early stages.

Signals:

In an effort to develop food that lasts for long journeys, NASA recently developed a bread pudding that stays fresh for a year (Preston, 2015).
Lund University students recently created “FoPo”, a

freeze-dried food powder made of near-expired foods like bananas and raspberries (Hutchings, 2015).

Oregon State food scientist Yanyun Zhao has developed an antibacterial food coating made of chitosan and lysozyme for delicate fruits and vegetables (Freedman, 2011).

Implications:

As these new methods grow in popularity, the definition of “fresh” may shift from how old the food is to how fresh it tastes. While many of these technologies are currently used for industrial food processing, consumer tools for HPP and food powders may enter the home, helping consumers reduce their own food waste. In other words, these methods could be future versions of freezing or canning. In a food scare world, truly fresh food may become a luxury item.

Related Trends:

Those who subscribe to the Zero Mile Diet, seen elsewhere in this report, may gain great benefits from new methods of preserving their home-grown food. MyBiome looks at the importance of food at the nano level, helping to feed the right bacteria and limit the harmful ones (Eisen, 2011).

3D food printing, could use food powders as a base material.



AUTONOMOUS TRANSPORTATION

Technology

Summary:

Autonomous vehicles require no driver or human input. These vehicles operate independently, providing a new opportunity not only for consumer passenger transit but also for shipping and delivery.

Description:

Companies like Google, Mercedes, and Tesla have self driving vehicles projects, and some experts estimate that 10 million self-driving cars will be on the road by 2020 (Greenough, 2015). The benefits of this technology could potentially reduce costs and improve safety, since these vehicles are not subject to human error (Brombacher, 2014). Thus, autonomous technology may be used for large-scale shipping needs. This solution could be applied for speed and convenience but also for regions where there isn't extant transit infrastructure, especially in remote and/or underprivileged regions (cf. Matternet; <https://mttr.net>).

Maturity

This trend is still in the early stages. Autonomous vehicles were first tested in the 1960s (Reynolds, 2001), but most forms of this technology has not yet been made readily available to consumers.

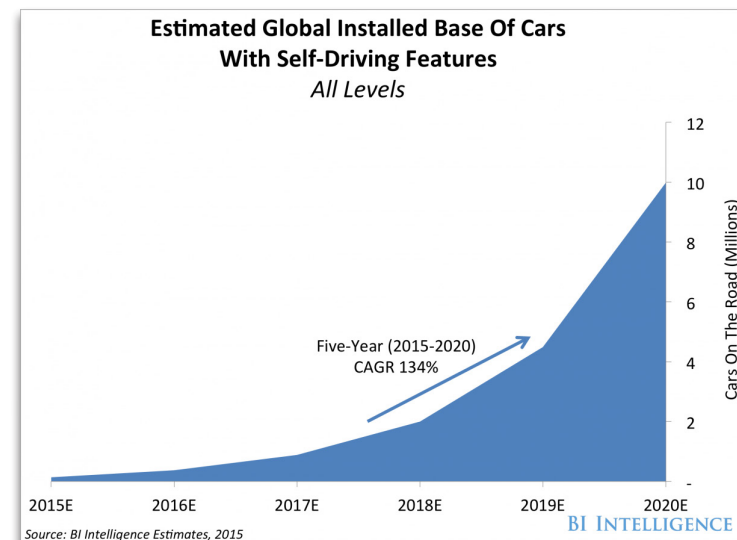
Signals

More companies are getting into the race to produce autonomous vehicles and the competition will increase in the next years (Hodson, 2016). Companies like Matternet (<https://mttr.net>) are investing in drone delivery systems and were used to deliver supplies in Haiti aid relief efforts. Amazon has also announced

that it is exploring a drone delivery system (Egan, 2014); potentially this shipping option will one day be as common as delivery trucks.

Implications

The diffusion of the autonomous vehicles might result in the reduction of accidents. The consulting firm KPMG estimates that self-driving cars will lead to 2,500 fewer deaths per year between the years of 2014 and 2030 (Greenough, 2015). This also means that the delivery speed of goods might increase, and possibly even make it more affordable. Locations and producers that were once cut off the transportation grid will be able to access goods and consumers.



Business Insider estimates of the growth in self-driving consumer cars, from from <http://www.businessinsider.com/report-10-million-self-driving-cars-will-be-on-the-road-by-2020-2015-5-6>



Food Retail & Online Shopping

SUBSCRIPTION FOOD

Social

Summary:

Boxed meal kits are changing our relationship with food.

Description:

Web-based meal kit companies take care of shopping, sorting, washing and planning for dinner. Customers are able to simply browse recipes and the company will deliver precise ingredients directly to them with step-by-step cooking instruction, typically in 30 minutes or less. This business is attracting primarily urbanites, among others with more expendable income who are looking for convenience and with little to no cooking skills (Segran, 2015).

Meal kit services are often characterized as fresh and seasonal, often locally sourced and/or sustainable. Many companies offer great detail on cooperating farmers, their families and their fields (Kruse, 2015).

Maturity:

In Canada, Early. Though new companies are taking the plunge into the market space, competition is far from crowded. However, the demographic attracted to these programs skew towards urbanites without kids, which is relevant because in 2011 Statistics Canada counted more one person households (3,673,305) than couple household with children (3,524, 915) for the first time, so their target demographic represents a significant proportion of the population (Statistics Canada, 2011).

Signals:

Knowledge about food was once conveyed in close proximity from parent or grandparent to child, but we are now often learning this from a company or mass media (Segran, 2015). Consumers are comfortable looking up recipes from food websites and online food personalities. This represents a fundamental shift in the source of people's food knowledge.

According to Darren Seifer, food analyst with market research firm NPD group, our notions of convenience are changing (Dunn, 2015). While having something that one could just "throw in the microwave" previously encapsulated this sentiment, consumers now want to be part of the process but still want to get out of the kitchen quickly. Often, consumers are too busy to cook complicated dishes but yearn for high quality, fresh food. Meal kits provide a guided way (Segran, 2015)

Implications:

Grocery stores may start competing by grouping products into meals to capitalize on the desires of the same market demographic that boxed meal kits are targeting. The same Grocery stores could look to decrease their physical footprints in the event that meal kits increase drastically in popularity, meaning consumers can enjoy home cooked meals without having to travel to the grocery store.

New distribution channel for farms - With the current crop of meal kit companies claiming to work with local suppliers and chefs closely planning meals based on seasonal availability, local farms may find boxed meal kits to be a more sustainable distribution channel and income stream.

This trend fosters in home cooking over eating out “It’s definitely broadened my horizons because the stuff that I would normally go to a restaurant for I can now do at home. It still gives me that ability to cook and it’s teaching me stuff, too. For me a lot of it is food discovery,” says Mario Quintero, a Plated customer (Johns, 2014).

Related Trends:

Farm to Table, a food movement that primarily refers to getting food directly from a specific farm without going through a third party distributor or processor; is a reinforcing trend given their ability to partner directly with farmers to distribute their produce (Watson, 2015).



3D PRINTING FOOD

Technology

Summary:

From digital assistants to 3D printing to cognitive cooking, computers are having a greater influence over what and how we eat.

Description:

Computers are now getting a seat at the dinner table, reinventing how food is made, what it contains, and even how we eat it. 3D printed food has been envisioned by designers for several years, and is now becoming a reality (Zoran & Coelho, 2010). The process uses ingredients to generate three-dimensional meals by placing layers of compounded food on top of each other. 3D printing could radically alter food production practices by enabling companies to manage resources more responsibly and reduce waste across the food continuum (Charlebois, 2015).

Luxury dining experiences are now serving 3D printed “fabricated food” (Future in Focus, 2015), and the prestigious Culinary Institute of America is exploring 3D printing technology (Culinary Institute of America, 2015). These new technologies point to an emerging field of “digital gastronomy”, where computers play a role throughout the dining experience (Van Mensvoort, 2010).

Maturity:

Early. There are some tools currently available to consumers, such as cognitive cooking and 3D printed dining. However, this is still a relatively new field that is still very much in its infancy.

Signals:

MIT Media Lab students created the Cornucopia 3D food printer, an early signal in the rise in 3D printed food (Zoran & Coelho, 2010).

The Culinary Institute of America (CIA) is currently exploring “the future of three-dimensional (3D) printed food and artisan culinary methods” (Culinary Institute of America, 2015).

This past May, Chef Mateo Blanch served the first five course 3D printed meal at a pop-up restaurant in London (Huen, 2015).

Dovetailed, a UX studio and innovation lab based in the UK, has developed a 3D printer that makes “fruit”—made from fruit juice and alginic acid – on demand (Boyd, 2014).

Implications:

With 3D printing requiring soft and pliable media, new ingredient combinations and textures could enter our culinary lexicon. More broadly, 3D printing could radically alter food production practices by enabling companies to manage resources more responsibly and reduce waste across the food continuum. In the home, 3D printed food could create new and novel experiences with respect to plating and ingredients, and may perhaps bring new rituals around special meals. However, in order to become a regular fixture in the kitchen, 3D printed food will have to move beyond the novel into the practical. For example, printing will have to be faster and capable of printing a broader range of foods, to meet our demands for speed and meal variety.

Related Trends:

Food powders discussed in the Forever Fresh trend could be used as interesting and sustainable ingredients for 3D food printers



The Foodini, an example of emerging 3D food printing technology. (<https://www.naturalmachines.com/>)



ACTIVE AND INTELLIGENT FOOD PACKAGING

Technology

Summary:

Food packaging can now use active agents to extend the shelf life of the food and intelligent packaging solutions have tiny embedded sensors to indicate and monitor the freshness of food.

Description:

Containment is the most basic function of a package. Even fresh produce, which is displayed unpackaged at the store, must be transported out of the store in some type of container. Packaging provides protection for the food from contamination and deterioration by exposure to elements such as water, gases, microorganisms, dust and punctures, etc. The emergence of intelligent packaging is the result of consumers' demand for packaging that is more advanced and creative than what is currently offered. Breakthroughs in nano and bio technology are enabling the development of "intelligent packaging" with functionality to promote food safety (Lickorish, 2012). These systems are developed to extend shelf life for foods and increase the period of time that the food is high quality, ultimately reducing food wastage in future.

Maturity:

Early, but growing rapidly. The global active and intelligent packaging market is estimated to increase from \$13.75 billion in 2014 to \$23.38 billion by the end of 2020 at a compound annual growth rate (CAGR) of 9.25%. (PRNewswire, 2015)

Signals:

German researchers recently developed a colour

changing material that detects toxins. One potential use case was identifying spoiled food through its packaging (Toor, 2013).

Oxygen scavengers are the best known and most widely used active packaging technologies today. Cryovac® OS Films Extends the quality of food products through oxygen-absorbing packaging, not formulations; slowing aerobic microbial growth and oxidative deterioration of flavors, color and nutrients. (Packworld, 2009)

Sanocoat Anti-microbial packaging (2004) by Mondi Consumer Coatings prevents germs growth, offers odour control, Hygiene maintenance and significant bacteria reduction thereby increasing the shelf life and ensure product freshness (Packaging Europe, 2012)

Viridiflex by Ultimate Packaging and QV Foods is a film made from renewable raw materials that can extend the shelf-life of fresh produce by modifying the atmosphere in pack. (Active Packaging, 2013)

The International Rice Research Institute Super Bag is designed to keep rice fresh for longer. This product reduces oxygen levels inside the pack, cutting the number of live insects inside to fewer than one insect per kg of grain. The outcome sees the germination life of seeds double to 12 months. (The Dieline, 2014)

Implications:

Growing consumer demand for fresh food and packaged consumables with a long shelf life, along with lifestyle changes that demand ready-to-eat and easy-to-cook food are bolstering the active and intelligent food packaging industry.

A major issue is that most active and intelligent packaging systems require that food be in direct contact with a sensor of some kind, and substances from the sensor may migrate into foods. Whether these migrations are intentional or unintentional, the substance, amount of the substance, and possible health effects of the substance must be determined in order for the substances to be allowed and regulated. That said, dynamic expiry dates on packaging based that respond to bacterial contamination may become required through legislation

Related Trends:

Nonstick packaging will eliminate the 3-15 percent of wasted food left inside of bottles and other containers. Liquiglide, developed in an MIT lab, is a “permanently wet slippery surface” that makes “viscous liquids slide easily.” (The National Geographic, 2014)

Size Reduction is a material-saving innovation endeavoring to squeeze more product into less packaging, Walkers, for example, have reduced the wrapping for their Quavers crisps by 30% just by changing the dimensions of the packet. The new version is said to use less space, which saves on transportation costs and fuel emissions too. (The Dieline, 2014)

Ipswich Root Beer was the product of a group project involving designer James Utley. The project centered around bottle re-usability, but hand-drawn typography and an attractive wood carrier take the design beyond just utility. (Mashable, 2014)



THE VIRTUAL GROCERY STORE

Technology/Economic

Summary:

Bricks and Mortar grocery chains are enticing new and existing customers to acquire their food products through virtual shopping experiences.

Description:

Grocery chains are creating virtual grocery stores that more effectively allow customers to acquire their products, while also providing grocers with a more direct distribution channel. The emphasis on order-at-home is geared towards certain customers who place a value on accessibility and convenience, providing them with savings in both time and money. While many virtual grocery stores, like those of Loblaws and Wal-Mart (both launched in 2015), encourage in-store pick up, other chains (like Target) are partnering with online food delivery services to complete acquisition and distribution loop.

Meanwhile, in other markets like South Korea, Tesco has established a very strong and robust virtual grocery store made available in public spaces where consumers can scan and order products direct to their home using mobile devices.

Maturity:

Early (in North America). While online shopping has been very popular among consumers and retailers for a number of years, selling food online is still very new. Recognizing this, the creation of virtual grocery stores is the result of chains seizing upon various economic and technological drivers to compete with the rise of online food delivery services. This has propelled a number of

large grocery chains to either launch their own virtual grocery stores in the last year or partner with an online food delivery service to ensure they retain customer and dollars.

Signals:

It's already happening, elsewhere: "The virtual store has been a huge success with commuters (...). Online sales increased 130 percent since the introduction of the virtual stores (...) In February 2012, Tesco Homeplus announced it was extending the virtual store concept (...). Today, there are 22 Homeplus virtual stores in South Korea, and (...) is the country's No. 1 online retailer" (Petit de Meurville, 2015)

There is a realization that it is coming, sooner rather than later: "The virtual world is a channel being exploited by some very important players, particularly south of the border. Amazon, (...), has a growing interest in food e-retailing. The company (...) may run pilots in other countries, including Canada. With our greying population, harsh winters and increasingly demanding work schedules, online shopping is slowly making a case for itself" (Charlesbois, 2014)

New ways to access current and future customers are needed: "Customers will come to expect a different type of shopping experiences – one that stretches seamlessly across various channels and that can be accessed wherever and however the customer chooses." (Salsberg et al, 2012)

This compels the formation of new partnerships to open up untapped value: "Target has teamed up with established grocery delivery start-up Instacart to begin a

pilot program in (...) Minneapolis, Minnesota. Customers in some areas of the city will be able to order from two local Targets' full stock of groceries, home supplies, and other commodities like pet food and baby products." (Statt, 2015)

Implications:

Virtual grocery stores have the ability to directly tap into the existing customer base of their bricks and mortar counterpart, giving them an ability to potentially grow their presence and popularity in the coming years.

Virtual grocery stores can also circumvent the barrier of technology adoption (or scepticism) since virtual grocery stores will likely have improved brand recognition and awareness among customer segments.

Like with online food delivery services, there is a need to address consumer behaviours and concerns regarding shopping for food online or having someone else choose your items.

Barriers: include slow rates of tech adoption and potential consumer scepticism concerning reliability and quality of the service.

Related Trends:

Online food delivery services compete with brick and mortar grocery stores as well as their virtual equivalents, with their ability to close the loop on the acquisition of food products.



ONLINE FOOD DELIVERY

Economic

Summary:

Online food delivery services provide consumers with same-day delivery of food products.

Description:

The goal of an online food delivery service is to make acquiring food products more accessible, affordable and convenient for the consumer. This is done through a technology platform (like an app) that consumers use to find, select and have food products delivered to their home. In 2015, the American online food delivery market saw established upstarts like Instacart and PeaPod welcome Amazon, Google and most recently Uber as competitors. (Meijers, 2014)

Maturity:

Mid. With the entrance of large tech firms like Google and Amazon, these platforms are poised to reach more consumers across more cities in a shorter amount of time. New entrants, combined with a growing number of partnerships between grocers and online food delivery services, is making this lucrative market more competitive for service providers while increasing accessibility, affordability and convenience for consumers.

Signals:

Economic drivers (market valuation) attracts competitors large and small: "The online grocery market is nearly \$11 billion in the US, with an expected annual growth rate of around 9.6 percent." (IBISWorld , 2015)

Technology drivers (better tech) reduce barriers to

consumer-adoption: "Limited selection, high cost and inconvenient delivery timing has kept it a niche business in mostly urban areas. But now online groceries are starting to make sense for the rest of us and, thanks to growing competition, they can even save you money." (Fowler, 2014)

New entrants increase competition among platforms: "Google Inc. will start testing a delivery service for fresh food and groceries in two U.S. cities later this year, stepping up competition with online retailer Amazon.com Inc. and start-up Instacart Inc" (Womack, 2015)



Smart strategy: Koreans 'virtually shopping' at a subway station (Image Courtesy : Lildoremi.org), from: (Petit de Meurville, 2015)

Implications:

Between improved platform technology, a more competitive ecosystem and a stronger post-recession economy, online food delivery services will likely continue to reach more consumers, making it increasingly accessible, affordable and convenient. (IBISWorld, 2015). Barriers still exist, however: increased competition from bricks and mortar grocers, along with potential downturns in the economy (less disposable income) or slower rates of technology adoption (lack of comfort with platform) could easily compromise much of the future and current investment. Like with virtual grocery stores, there is a need to address consumer behaviours and concerns regarding shopping for food online or having someone else choose your items.

Related Trends:

Virtual Grocery Stores: While existing stores / chains are partnering with online food delivery companies, some chains are going online themselves to create virtual shopping experiences for customers. These include Loblaws and Walmart.



In a demonstration of the service, personal shopper Paul Aspek loads groceries into a car at the designated Click-and-Collect spots outside the Barrhaven store. JULIE OLIVER / OTTAWA CITIZEN (From: <http://ottawacitizen.com/business/local-business/grocer-does-the-shopping-for-busy-consumers-with-click-and-collect-service>)



THE FUTURE AISLES

Values/Technology

Summary:

In the future, consumer behavior and technology will shape the way we shop for groceries.

Description:

By now, many countries have adopted the habit of bringing their own reusable bags to the grocery store. In the future, along with the bags, consumers will take recipients to buy many ingredients, like rice, pasta, sugar, bread, sauces and even beer. This way, food and package waste are reduced. Groceries stores will rely even more on RFID technology for selling and stocking. Traceability will also be a concern, like we today check for gluten or sodium content, consumers will want to know where their product was sourced. Consumers will be caught at the ZMOT. Technology will permit that FMCG brands deliver consumer opinions directly in the aisle.

Maturity:

This trend is still in the early phase, some stores are testing the different types of technology but it is still very limited.

Signals:

Traceability is important: Consumers want to know where their food was sourced. (Ratti, 2015)

Supermarkets are already testing smart shelves technology, that gathers information on consumer profile and behavior. (Coolidge, 2015)

Restocking is getting more efficient: technology sends

alerts when products need to be restocked. (Gilbert, 2003)

Implications:

Groceries stores will have technology to become more efficient and promote a better customer experience. Customer recognition and big data will allow clients will be identified and visualize personalized ads, catering to their needs and shopping history. (Camilo, 2014) The Smart Shelf will detect age, gender and impulse will be recognized. Companies will have more data to create a better marketing experience and receive aggregated feedback of customer behavior. This will provide unique insight for the ZMOT for FMCG (Lecinski, 2014) : brands will create sales and build up on consumer loyalty by reaching out to consumers on the moments that matter, when they are looking for answers. Smart shelves will also be restocked quicker and with less need for labour. Also, environmental concerns will play a role on how stores operate: many products will be sold without packaging, in order to reduce waste. Consumers will buy exactly the amount they want (Hvidtfeldt, Grann, Galea, Toft & Blok, 2014) and have access to product origin information. (Ratti, 2015)

Changes in the Canadian “Appetite”



SLOW DOWN FOOD

Values

Summary:

The Slow Food Movement seeks to change the way we cultivate, produce, distribute and consume food by emphasizing both ecological and culinary sustainability through the preservation of traditional and regional cuisines.

Description:

The Slow Food Movement takes a holistic approach to bring about change in the way global communities cultivate, produce, distribute and consume food. The movement accomplishes this by seeking to raise awareness about individual food choices, preserve traditional and regional cuisines. The Slow Food Movement was fostered in reaction to the Fast Food craze epitomized by the boomer generation. Finally, there is an element of environmental, political and social advocacy since the movement sees food and food culture impacting these and many other facets of life. (Slow Food.org, 2015)

Maturity:

Mid. As a global movement in over 160 countries, it has harnessed and channelled communities to improve access to locally grown food and preserved diverse regional cuisines. It organizes and hosts awareness generating events across a number of continents with funding and donor support from across the public and private sectors. It is internationally recognized for organizing local, national and supranational initiatives to promote Slow Food culture within entire distribution

and acquisition of food cycle.

All this being said, it has yet to reach complete market saturation and therefore has much room for future expansion, should that be in line with the mandate of the organization. Still generally a niche movement (albeit niche across the whole world), it has a core membership that is actively seeking to expand its reach as global organization with pan-regional focuses.

Signals:

The movement is strong and action oriented: “This is why Slow Food is directing the appeal “Let’s Not Eat Up Our Planet! Fight Climate Change” to the representatives of the nations and international organizations gathered in Paris, in the hope that agriculture is placed at the center of the debate” (SlowFood.org, 2015)

It is expanding its reach and motivating new markets to adopt its tenets: South Korea has been very active in organizing its farmers and producers to mount shows on Slow Food (...) this year, it has grown triple in size as it was held from November 18 to 22” (Juan, 2015)

Implications:

The Slow Food Movement is expanding its reach and as a collective is actively engaging various levels of government (like the Paris Climate Talks) to discuss food-related issues as varied as indigenous rights, agriculture, climate change, and biodiversity.

The movement has gained, and will likely continue to gain attention and awareness as its mandate to change the way communities cultivate, produce, distribute and consume food as issues like climate change, environmental degradation, obesity, and other systemic.

The movement represents a grassroots cause that has expanded across cultures and unified communities, forming a bloc of support for the movement's mandate that are actively engaging national and regional communities

Some critics of the slow food movement like to point out that the movement does not fully challenge the neo-liberal consumer agenda and instead operates within the populist mantra of an inclusive elite that (Hall, 2012).

Related Trends

Fast Food trends and the conveniences afforded to us through the McDonalidization of our food chain stand as a direct barrier to all that the Slow Food Movement seeks to accomplish.

Technological trends both accelerate the adoption and dissemination of the movement, while potentially facilitating convenience, access and affordability (when it comes to food products) having potentially negative consequences on preserving food cultures.



Carlo Petrini, founder of the Slow Food Movement (centre, with plaid shirt, arm outstretched with wine) surrounded by fellow Slow Food activists in this undated photo from the mid 1980s, Italy. From: <http://www.slowfood.com/about-us/our-history/>



URBAN FOOD DESERTS

Economic/Political

Summary:

Food deserts are regions in which access to healthy food is limited by geographical or economic barriers, especially relative to the regions' broader geographical context. They are the symptom of complexity, as gentrification, economic disparity, population aging, urbanization, and other pressures result in inequitable distribution of healthy food sources.

Description:

A food desert is a geographic area in which healthy food is hard to access. The precise definition depends on the region and the organization in mind, but in general, food deserts exist where people have to travel far or pay disproportionate amounts to buy fresh produce. Birmingham, Alabama, for example, is rife with fast food services, but lacks sufficient full-service grocery stores for 1.8 million citizens (Kim, 2015). Researchers link the lack of access with a number of health issues, from obesity to mental health and beyond, and it's for this reason that food deserts have become a political priority in recent years (e.g., accessible healthy food is a major component of the First Lady's Let's Move initiative in the USA; Healthy Communities, n.d.).

Broadly, interventions in food deserts take two forms: market/community responses and policy development. In the former category, farmer's markets (McCracken, Sage & Sage, 2012), gardens or "foodscaping" (Branom, 2015), and even delivery services (Whitacre, Tsai, & Mulligan, 2009) are being used to ensure healthy food

reaches those without access to full-service grocery stores. Public policy, on the other hand, could incentivize grocers to set up shop and keep costs down in food deserts. Pushed by the Let's Move initiative, the Obama administration's Healthy Food Financing Initiative (HFFI; Healthy Food Financing Initiative, n.d.) is a prominent example of policy interventions on food deserts.

Maturity:

Peaked. Food deserts first became a topic of research in the 1990's, and since then have become a major issue in municipal politics and urban planning (Wrigley, 2002). Market and cultural interventions combined with political attention are having an impact (e.g., food deserts in Chicago declined by 39% between 2006 and 2011; Bowean, 2011).

Signals:

Throughout the 1980s and 90s, the rise of suburban superstores overshadowed the shuttering of smaller inner-city supermarkets, leading to the what we observe today as the uneven distribution of healthy, affordable food opportunities for inner-city communities. (Larsen, 2008)

While popularized in urban planning circles in the 1990s, in the last five years the term 'food desert' has become increasingly popular on Google Trends, with mentions growing steadily since 2009, this suggests it has entered the realm of public discourse (Cortright, 2015)

While cities, like Toronto and Chicago, have taken strides to combat food deserts in their most challenging neighbourhoods, the problem persists with less than

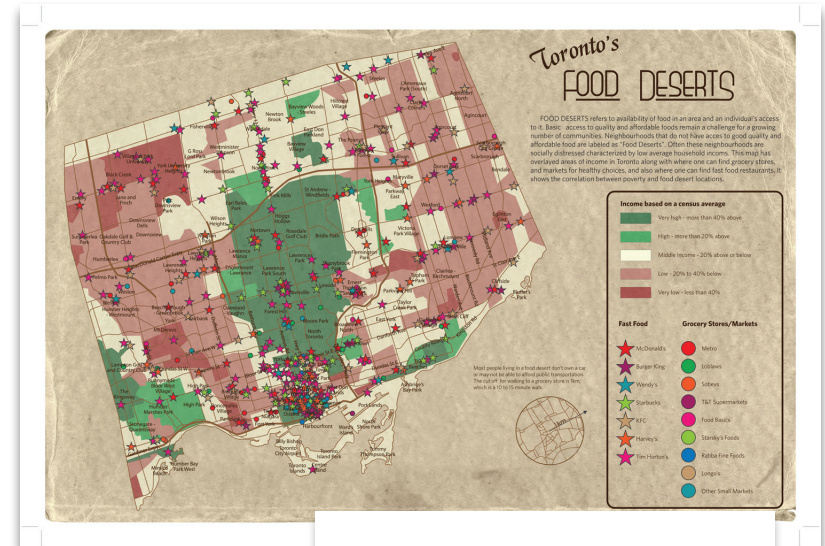
healthy food options (like convenience stores and fast food restaurants) being among the only food options available in many of these neighbourhoods. (Florida, 2010)

Implications

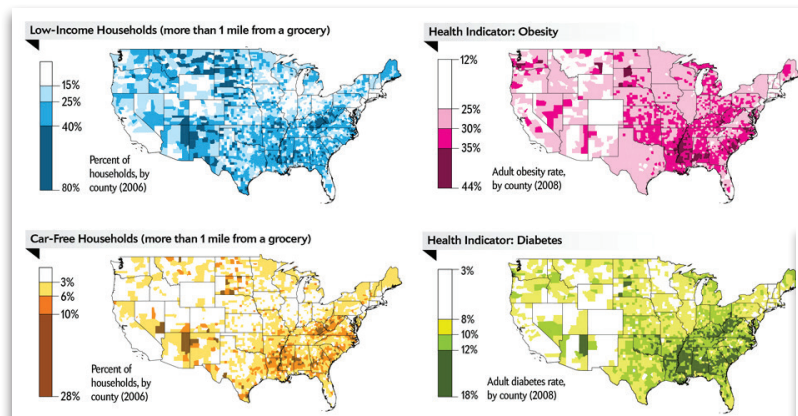
These food deserts have important implications for policymakers at multiple levels of governance. Urban planners need to account for the location and accessibility of food retailers and markets while other leaders must focus on the economics of these regions to ensure all members of the public have cost-friendly food.

Related Trends

Community gardens and related urban agriculture products bring food production closer to these deserts, combatting their consequences. Meal ordering and food subscriptions are other countertrends, removing the need for urban centres to have grocery stores at all.



Pictured: A map of Toronto's food deserts as of 2011.
(http://sustainontario.com/wp2011/wp-content/uploads/2011/01/LaRocque_Rachelle_Food_Infoposter.jpg?dbc94d)



Pictured: Correlates between food access and diet-related health issues (Source: Food Environment Atlas, U.S. Department of Agriculture, Economic Research Service; retrieved from <http://scientificamerican.com/article/high-and-dry-in-the-food/>)



RISING FOOD COSTS

Economic

Summary:

In 2016, for the fourth year in a row, rising food costs in Canada are expected to outpace inflation.

Description:

There are a number of factors contributing to the rising cost of particular food items in Canada. One is macroeconomic trends, specifically the current state of the currency, having recently dropped to below 69 cents U.S. for the first time in 13 years (Powell, 2016). Contributing heavily to this drop in value is the steep decline in oil prices over the past several years, pushing down the loonie significantly (The Toronto Star, 2016). Further exacerbating the issue is climate change and the impacts of various seasonal weather patterns on the supply of specific crops that Canadian consumers rely on. These factors combined have led to a dramatic increase in food prices for consumers and executives from Canada's top food retailers are indicating that there will be no immediate relief in sight (cbc.ca, 2016).

Maturity:

Unknown. Food prices fluctuate based on a variety of factors, such as the strength of the currency. However, it is extremely difficult to predict food inflation and therefore the longevity of this trend is unknown.

Signals:

Statistics Canada's consumer price index stated that the cost of food rose 4 per cent in January 2016 — with fresh vegetable prices up 18.2 per cent and fruits up 12.9 per cent compared to a year earlier (The Toronto Star, 2016).

In 2015, the average Canadian household spent an additional \$325 on food (above the previous year) and in 2016, consumers are facing an additional annual increase on \$345 on top of the 2015 rise in costs (cbc.ca, 2016).

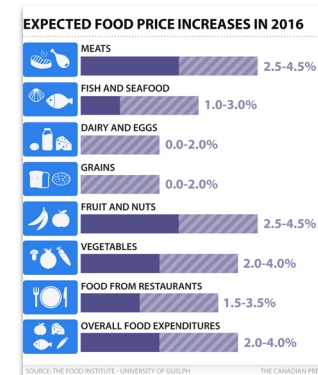
Implications:

81 per cent of all vegetables and fruit consumed in Canada are imported and as a result are highly vulnerable to currency fluctuations (Cbc.ca, 2016). Food price increases in 2015 are primarily attributed to the sinking loonie, a scenario expected to continue into 2016 as well.

Related Trends:

According to The Food Institute at Guelph University, food waste is considered far more costly to consumers than inflation, therefore consumers should make efforts to reduce food waste (Cbc.ca, 2016). This desire to reduce food waste, regardless of one's motivations, speaks to consumer demand for active and intelligent packaging for their food, a trend explored elsewhere in this document.

Rising meat prices (particularly beef) could be encouraging vegetarianism as Canadians look to alternate, less costly, sources of protein (Kohut, 2015). In a survey conducted by The Food Institute at the University of Guelph in 2015 found that 37.9% of respondents stated that they reduced consumption of beef, or stopped altogether, primarily as a result of rising food costs (Kohut, 2015).



The above chart shows the projected increase in food price for different types of food during 2016 in Canada. From <http://www.cbc.ca/news/business/food-prices-inflation-1.3382872>



THE ZERO MILE DIET

Technology

Summary:

In-home aeroponics and aquaponics systems are providing small scale urban agriculture solutions, allowing urban dwellers to sustainably grow a complete diet in their own kitchens.

Description:

While kitchen gardens, patio tomatoes and other small scale urban farming methods are well-established (Associated Press, 2008; Herriot, 2010) technological developments are providing new methods of growing an independent, sustainable and complete diet in urban homes. Home aeroponics systems, which grow plants in moist air rather than in soil or water, enables high-volume crop growth in reduced spaces (National Geographic Live, 2015). Meanwhile, advances in aquaponics – a symbiotic system that combines aquaculture and hydroponics – are allowing people to grow their own vegetables and fish in their own home (Back to the Roots, 2015; Dezeen, 2008). In a more unorthodox vein, mealworm hives and home algae gardens are allowing people to harvest their own alternative protein source (Pena, 2015; Pincus, 2014). Oftentimes, these systems are designed to resemble modern kitchen cabinets, fitting right into the aesthetic compact urban kitchens (Qiu, 2014). Targeting young, eco-conscious urban dwellers, these systems are packed with smart-monitoring features to increase production (Qiu, 2014).

Maturity:

Urban gardening is a well-established trend, however aeroponics, aquaponics, and bug farming are much more in their infancy, with many products at the

conceptual or v1.0 stage.

Signals:

The Nano Garden is a fashionable hydroponic kitchen garden concept that grows herbs and vegetables in a futuristic form factor (Mok, 2013).

A fish tank and herb garden in one, The Water Garden is a small-scale aquaponics system where the fish feed the plants and the plants clean the water (Back to the Roots, 2015). Vegua is a similar system (Brick, 2015).

MIT CityFarm founder and 2015 National Geographic emerging explorer Caleb Harper is developing smart home aeroponics systems that allow food to be “farmed from anywhere via a personal food computer” (National Geographic Live, 2015).

Another product from former MIT students, Grove Labs is an in-home gardening system that uses advanced digital monitoring and is styled like a domestic kitchen cabinet (Qiu, 2014; Grove Ecosystem, 2015).

LIVIN Farms is a mealworm hive, providing urban dwellers with a sustainable and home-grown protein source (Pena, 2015).

WaterLilly is a home algae farm that provides an energy and sustainable protein source⁷.

An early signal to this trend, Mathieu Lehanneur’s Local River project was a conceptual in-home aquaculture garden designed in 2008 (Dezeen, 2008).

Implications:

As consumers increasingly grow their diet at home, demand for produce in local farmer’s markets and

grocery stores may decrease. Alternatively, these businesses may refocus their efforts to foods that cannot easily be grown at home.

Many of these systems require a high amount of electricity, which could hinder adoption or increase the need for affordable energy alternatives.

In times of bountiful harvest, consumers may need different methods to store their crops for the long term (see Forever Fresh trend)

With an increasing awareness of where their food comes from, consumers growing their own food may have more scrutiny in their store-bought food. For example, they may be more concerned about animal well-being, or the farming methods used on their vegetables.

Related Trends:

Discussed elsewhere on this report, Forever Fresh would provide alternative methods of storing home-grown harvests for the long term.

Vertical Farming: Numerous building concepts are exploring how to engage in large-scale farming in compact urban environments (Marks, 2014).

Taking the Ick out of Crickets: while alternative proteins such as mealworms, crickets, and algae have been celebrated as a sustainable option, consumers are reluctant to add them to their diet. Methods of processing “hide” these protein alternatives in other foods, gradually alleviating consumers’ “ick-factor” (Washington, 2015).



COMMUNITY GARDENS

Social, Values and Environmental

Summary:

Community gardens are becoming one of Canada's fastest growing outdoor activities as more people look for a way to get outdoors, grow their own plants and get back to nature.

Description

Community Gardens look to enhance biodiversity, expand urban greening, foster appreciation and conservation of water, and reduce waste (McLean 2015). At the heart of these initiatives is a concern for environmental issues and the connection between the environment and our health. People are utilizing these community gardens as a platform to improve the wellbeing of individuals, families, and communities in Toronto.

The plots in these community gardens are typically leased to individuals on an annual basis, or for a growing season (Town of Richmond Hill, 2015). Often, individuals use these community gardens because they may not have a place to grow produce at their own homes. For others, the community aspect of growing in common with neighbours draws them to such spaces.

Maturity

While community gardens have been around for generations, the movement is becoming more mainstream. This is likely tied to growing consumer preference for organic and local produce in developed nations (Corsini, Wagner, Gocke & Kurt, 2015).

Signals

There are a few community garden projects in Toronto. The Eglinton Park Heritage Community Garden (EPHCG) was the result of the organizing efforts of Seeds of Diversity Canada and TGC, in partnership with City of Toronto Parks. Similarly, Toronto Green Community is a grassroots, charitable organization.

Green Communities Canada (GCC) is a national association of community organizations that help people go green – in their homes and gardens, on the road, at work, and in the community (Toronto Green Community, 2015).

Implications

These endeavours aim towards behavioural change for a health and sustainability. And to increase access to local and organic food. By ensuring abundant green spaces are preserved. It also produces minimal waste (Toronto Green Community 2015). It also allows for low-income families to access budget friendly nutritious vegetables. For the process of build a garden in one's neighbourhoods has led to the fostering of community and stimulation of social interactions (McLean 2015).

Related Trends

Roof-Top Gardening, Urban Gardening, Permaculture



THE EMERGENCE OF THE CONNECTION ECONOMY

Economic

Summary

In a world where mass production, mass marketing, and mass media constantly bombard, er, the masses, attention is scarce. Craft, care, and connection emerge as the most valuable experiences of this new economy: the connection economy. In the interaction economy, success comes to those who create real engagement between customer, product/service, and business.

Description

A product of the fourth industrial revolution (Schwab, 2016), the connection economy (sometimes referred to as the interaction or the attention economy) recognizes the new value of connection in the 21st century. The McDonaldization trends of the late 20th century (cf. Ritzer, 1983) created an economic environment of conformity. Devoid of personal engagement, in this economy, anyone who can generate genuine connection will stand out in crowded markets.

“The connection economy is based on generosity. After all, why would someone want to connect to a selfish organization?” (Godin, 2014). The connection economy rewards those businesses and organizations that pay attention to their customers, crafting products and services that create genuine, personal experiences. The connection economy also recognizes a new cost of business: wasted attention (Godin, 2011). In this new economy, brands must know how to achieve and maintain their customers’ attention – losing it is equivalent to losing revenue.

Maturity

Early-to-mid maturity. The connection economy is a new phenomena of the 21st century, but – like any other competitive advantage – it grows in viral fashion, as businesses and organizations discover its importance as soon as their rivals use it.

Signals

The growth of Etsy (etsy.com) presents a tremendous example of commercial success generated by the connection economy.

The emergence of sponsored Instagram photographers, multi-millionaire YouTube vloggers, and other forms of product placement in social media points towards the power of C2C connection. Direct advertising is no longer the mainstream way to reach an audience.

Implications

The connection economy rewards connection. Thus, products, services, and the businesses that make them will gain value if they find ways to reach their customers with genuine engagement. This rewards craft, art, and story; craftsperson, artist, and storyteller. It leads customers to seek out the farmer’s market instead of the superstore and the local mom-and-pop shop instead of the big-box store. Moreover, brand trust becomes more volatile: missteps and mistakes become nearly impossible to cover up, and therefore must be owned and publicized by the companies that make them.

Related trends

Slow Down Food, Proliferating Boutique Farms, Zero Mile Diet, Community Gardens, Subscription Food

Overview

While environmental scanning provides depth and context to emerging issues, scenarios takes these elements and blends them with drivers and uncertainties to explore the way a system may evolve. The aim of this section is to explore the interaction of these forces in the creation of scenarios for the future of the Canadian Food System. These scenarios are powerful tools for strategic foresight, offering strategists and clients alike concrete visions of potential futures through which they might anticipate and preempt the inflection points of the present.

This process – scenario planning – begins by appreciating the past and understanding the present with an analysis of the emerging issues, trends, and drivers discovered in scanning (e.g., “breathing in”; Wilkinson, 1997). This analysis revealed a collection of uncertainties about the future of the Canadian Food System. In attempting to reconcile these uncertainties, we discovered contrasting forces that, when intersected, provided fertile ground for imagining provocative futures. Thus, the scenarios presented here are the result of a scenario logic derived through a 2x2 matrix of critical uncertainties (e.g., Wilkinson, 1997).

The next step involved synthesizing the uncertainties from the scanning process, selecting two orthogonal axes that explored how Canada’s Food System would acquire or distribute food products to consumers. These axes – the critical uncertainties of our scenario logic – define a matrix with four quadrants. In each of these quadrants, the polarities of our axes intersect, inspiring an image of the future.

The next phase of scenario planning is then to illustrate and describe these futures. Wilkinson (1997) cautions that the goal of this process is not to expect one of these to be a “true” future, but rather to assume that elements of each will comprise the future that will happen. Crucially, scenario planning is not a process of prediction, nor mere storytelling – rather, it is a tool that helps to make important pressures on the future visible in such a way that we can make better decisions about those pressures as we recognize them in the real world (Wilkinson, 1997). The ultimate phase of scenario planning is therefore to engage with each future scenario for its implications in the present. This results in a “so what?” for each narrative, detailing the steps we may take to prepare for the future we’ve described.

Taking the drivers, trends, and other uncertainties delineated previously as “characters” of these narratives, we set out to create scenarios representing the intersections of the two polarities in each quadrant. From agricultural automation, the digitization of retail, and various consumer-based movements to shifts in food politics, values, and social behaviours, the Food System’s landscape has been shifting underneath our feet for decades, if not centuries. In the scenarios below you will see some of the trends we discussed earlier become prevalent, illuminating images of the future that may present itself to Big Grocer Co.

Our 2 x 2 Matrix

Critical Uncertainty 1: Acquisition

How will the Food System acquire food for Canadian consumers?

The acquisition axis asks whether the Canadian Food System will be dominated by global (import) or local (production) forces. This uncertainty is struck by several competing trends. Globalization is one such force, making the world effectively smaller as technology makes both communication and shipping easier and more efficient. Further, an increasingly multicultural Canada brings with it diverse tastes and desires. At the same time, both economic and environmental forces encourage the consumer to “buy local”. This emphasizes the social-, economic-, environmental-, political-, and value-based pressures on the consumer to minimize the distance their food travels and to support their neighbours. This manifests in one critical uncertainty for the Canadian Food System: will our food come from beyond our borders or from next door?

GLOBAL: Our Food System consists almost entirely of imported international products.

LOCAL: Our Food System consists almost entirely of locally-made domestic products.

Critical Uncertainty 2: Distribution

How will the Food System distribute food to Canadian consumers?

The distribution axis contrasts whether Canadians will

obtain their food through low technology solutions or in ways that are wholly dependent upon technological advances. Often examined through the lens of the consumer, uncertainty is fostered by the growing prevalence of online and virtual commerce. As these services are relatively new – and as ever-newer platforms continue to be created for both consumers and enterprises – the influence and adoption of technological advances are having a volatile impact across the Canadian Food System. As such, it is difficult to predict the degree to which these platforms will monopolize Canadian manufacturer, retailer and consumer behaviour by 2035. It is possible that the use of Internet services will collapse, whether due to the collapse of net neutrality or changes in social values; however, recalling one of the primary drivers, this analysis assumes technology’s advance. Thus, our second critical uncertainty is gauges how the Food System is reticent to technological change or is susceptible to innovative technologies.

LOW-TECH: Our Food System is less dependent on and susceptible to technological solutions

HIGH-TECH: Our Food System is extremely dependent on disruptive innovations and technologies

The Four Scenarios

GLOBAL x LOW-TECH: Bazaar Experiences

Walking into a large grocery store in 2035, customers are presented with a panoply of culinary options to satisfy nearly every want and need. Going well beyond the ethnic aisles of grocery chains popular in the early 2000s, stores provide opportunities for consumers to experience not just the food, but to gain a deeper

GLOBAL

Bazaar
Experiences

“We Deliver
Anywhere!”

LOW-TECH

HIGH-TECH

Chain Farmers’
Markets

Farm-to-
Tablet

LOCAL

understanding of the cultures and traditions from whence these food products come. With increased globalization of global food stocks, consumers have access to food products well beyond the capacity of Canada's agricultural sector.

Expert food advice is available in every aisle. Ingredients can be experimented with in-store. Sensorial inspiration will encourage customers to not only shop, but to experience their favourite cuisine in a holistic manner. Canada's rich multicultural traditions will be reflected in the bustling layout of stores that transport customers from Toronto to Tokyo or Montreal to Mumbai. The food experience is nurtured by bringing the community together in-store to go beyond food, leveraging the effect of food to bring people, families, and communities together. Grocery stores gather the community around the table, employing, catering and serving them as more than just customers: they are neighbours.

Related trends: Sustainable Shipping Practices, Rising Food Costs, Forever Fresh, Active and Intelligent Food Packaging, Subscription Food, The Emergence of Connection Economy

GLOBAL x HIGH-TECH: "We Deliver Anywhere!"

Looking back today, it's hard to understand why consumers spent so much time walking the aisles of grocery stores when they could have been saving time and money shopping from the comfort of home. Instead of spending time walking or driving to the local grocery store, everything you think you need and want is now procured online through virtual grocery portals. Large grocery retailers have joined the game, opening up their expansive supply chains and purchasing power

to customers wanting just the right ingredient for that ratatouille. Disruptive technological solutions augment the consumer experience while vastly improving the efficiency of the food production and processing systems supporting increasingly dense Canada's cities.

When browsing for your favourite foods online, you have access to expert advice and recommendations from friendly staff – virtually! Shop, click, share, and save: complete social media integration lets you know what your favourite celebrities are eating and where you can get the same ingredients. Some grocers have even gamified shopping for consumers with impressive results for their bottom line. While many initially relented on using online food delivery since a lot of people didn't want other people picking out their food, in time, more and more people saw this service as increasingly reliable. The model spread throughout the industry: the big box grocery stores are now slimmed down versions of their former selves (where they still stand at all). What's more, food access issues in dense urban centres are a distant memory: no matter where the food is coming from, robust shipping and delivery systems standardized in the last decades ensure it finds you quickly and safely.

Related trends: The Virtual Grocery Store, Online Food Delivery, The Future Aisles

LOCAL x LOW-TECH: Chain Farmer's Markets

Walk into a marketplace today and you will find open spaces, full of natural light and wide aisles perfect for families to shop together, strollers and all. The grocery store is now a massive farmers' market, with local producers staffing tables and stalls. With each

department falling inside the store ecosystem, payment is seamlessly integrated across all platforms. Through the branded farmer's market, consumers will be able to tap into a broader, more diverse local food experience. The duress of finding healthy food in the urban environment is less of a challenge for many, with mega-markets having a long reach into many communities.

Once-independently run, urban farms and local community gardens now come under the umbrella of large grocery stores, allowing consumers to access the food where and when they want, but with the convenience and reliability of larger grocer. Large retailers of the past now act as brokers for strategic partnerships with these small and medium businesses and agricultural entrepreneurs, the result of disciplined forecasting of the environmental and socio-economic disadvantages of global imports. No longer are food prices inflated with international shipping and trade fees. Instead, local agribusiness is empowered and locally owned and operated small and medium food enterprises are rampant, enabled despite labour shortages by recent advances in automation. Large retailers' mega-farmers' markets encourage local entrants, giving them a platform to launch new products and services. Gone are the days where the products of other nations dominated the shelves. Today when someone enters a Canadian food retailer, they know that the products and services come from their neighbours.

Related trends: Slow down food, Proliferating Boutique Farms, The Future Aisles

LOCAL x HIGH-TECH: Farm-to-Tablet

Starting your day as a consumer in 2035, you toss on your virtual reality lenses and from the comfort of your home, you can digest the weekend's news events, look up activities, plan your day, and engage with friends and family – along with making choices about what you'll eat this week. As an ethical consumer, you appreciate knowing exactly where your food comes from – knowledge facilitated by the present-day saturation of big data and the internet of things. The food you order on Saturday morning is locally-sourced, filled by a circuit of farms and agribusinesses in your region. You differentiate your order between generic items (which are sourced from the nearest supplier that can offer that product) and specific selections (ensuring that you get your favourite foods from your favourite sources). What's more, these services make life infinitely easier and less complicated: getting from "A" to "B" is less of a hassle for those with mobility issues when "B" comes to you. With no crowds, no mess, and less stress, eating healthy, locally-grown food was never this convenient.

Related trends: Agricultural Automation, Precision Farming, GMOs, The Virtual Aisles, Grocery Store, Online Food Delivery, Intensified Agriculture, Forever Fresh, The Zero Mile Diet

[illegible]

Overview

Time Machines are immersive design fiction tools that bring foresight work to life, allowing an audience (targeted or public) to engage with a potential future (Candy, 2010). Time Machines and other tools of experiential futures allow strategic futurists to test and explore those futures almost in situ. By constructing high-fidelity mimetic experiences, an audience might probe scenarios in ways the futurist/designer never could. Further, by opening up scenarios to a wider public in a captivating way, we invite a plurality of perspectives to examine these imagined futures. Thus, we use Time Machines to develop a richer, more holistic understanding of the futures we construct in the strategic foresight process. Time Machines also allow the audience to discover and reveal incoherencies and false assumptions in our foresight work, providing a field test of the validity of our scanning and scenario planning.

Here we describe a Time Machine constructed in January of 2016 exploring the Local x High Tech scenario described in the previous section. We crafted an experience that studies the ubiquitous integration of technology in the food industries of the Greater Toronto Area. Further, the seeds of this future are salient trends in 2016 (e.g., autonomous vehicles and robotics; urbanization). Thus, this scenario provided an accessible vignette for the audience: researchers and industry leaders in the Ontario Food System. By leveraging these “big topics” that hit close to home in the diegesis of the Time Machine, we hoped that the deeper truths of this fiction would be easily unearthed by the participants.

Walkthrough

The **Local x High-Tech** scenario describes a world where Canada’s Food System has grown robust: Canadians eat Canadian-produced food. This is enabled by technological development and the integration of those technologies with farming processes. In other words, this scenario is a radical extension of the intensification and automation of agriculture we have already observed in the 20th century. Here, however, the extent of technological integration is so profound that farming no longer exists as a profession or lifestyle: farms can be operated effectively and efficiently (arguably more so) by an autonomous, remotely-maintained system. This has manifold consequences. First, automated farm/food conglomerates become highly-integrated massive businesses. Second, urbanization is basically “finished”; rural communities that once depended on and existed for their farms no longer have a purpose, and people immigrate to urban and peri-urban centres for other professions. Finally, farming – once a hallmark of Canadian culture – no longer exists, in the traditional sense. Farming’s deep cultural hooks (e.g., Thanksgiving) therefore become transformed: in our Time Machine, Canada honours the importance of agriculture in the country’s history by creating a Harvest Month out of Thanksgiving, for instance.

To explore this future, we invited audience members to an exhibition at the Toronto Museum of Natural History in 2036. Titled ‘agri**culture**’, the exhibition was sponsored by Parallel Foods, Autofarm Industries, and North Meridian Digital Banking; a large grocery conglomerate, autonomous farming company, and a bank, respectively. The exhibition included fine art, photography, and artefacts that offered windows into

the lost profession of farming. The primary purpose of the exhibition was how these exhibits demonstrated farming's influence on Canadian society. In addition to the artwork and archaeological items, a historical timeline displayed major local and global events, reminding the audience of the antecedents leading to that year in Canadian progress. During the exhibition, three speeches were made to accent the narrative of the art and to reinforce that the exhibition was proudly sponsored by three institutions to whom farming was heritage.

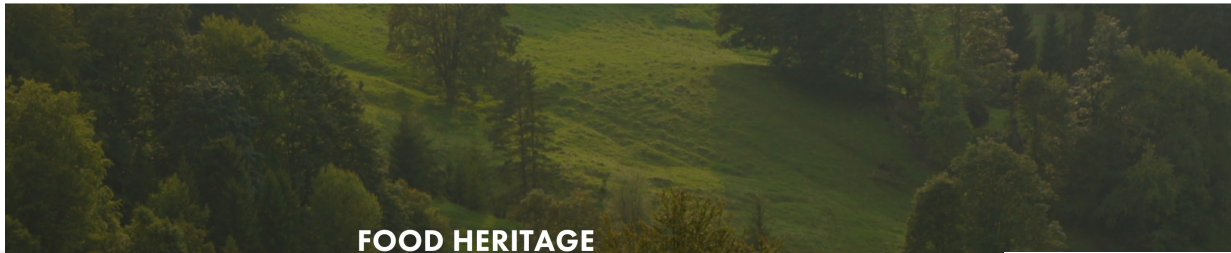
These components are collected with descriptions on the next pages.



agriculture

An exhibition of the Toronto Museum of Natural History exploring the impact of the lost profession and lifestyle of farming in Canada.

Strategic Foresight for the Future of Food



FOOD HERITAGE

is a national charity that supports Canadian food heritage
al of preserving and celebrating our nation's rich

oundation has provided more than \$8 million to nearly
ects across Canada. These include *Cultural Preservation*
place and support for the *Canadian Farm Artists*
oundation also proudly supports farmer transition through
olarship.

Parallel Foundation

The backwards-compatible website for
Parallel Foundation can be found by
navigating any browser (old or new!) to
parallel.foundation.



Farmers' Testimonials

On loan from Library and Archives Canada, these short video clips were captured by an unknown documentarian it is believed in 2016. Shown here in their original format as they would have been viewed at the time, the filmmaker interviews farmers at a Farmers' Market, where individual farmers would gather to sell their produce directly to the general public.

2016 was a period prior to the mass adoption of autofarming and therefore the words of the individuals captured on film are particularly evocative, given what would come to pass over the next few years, rendering all of their professions, and in their own words, their way of life, obsolete.

[The testimonials can be watched by using the password "alimentum" at parallel.foundation/testimonials]

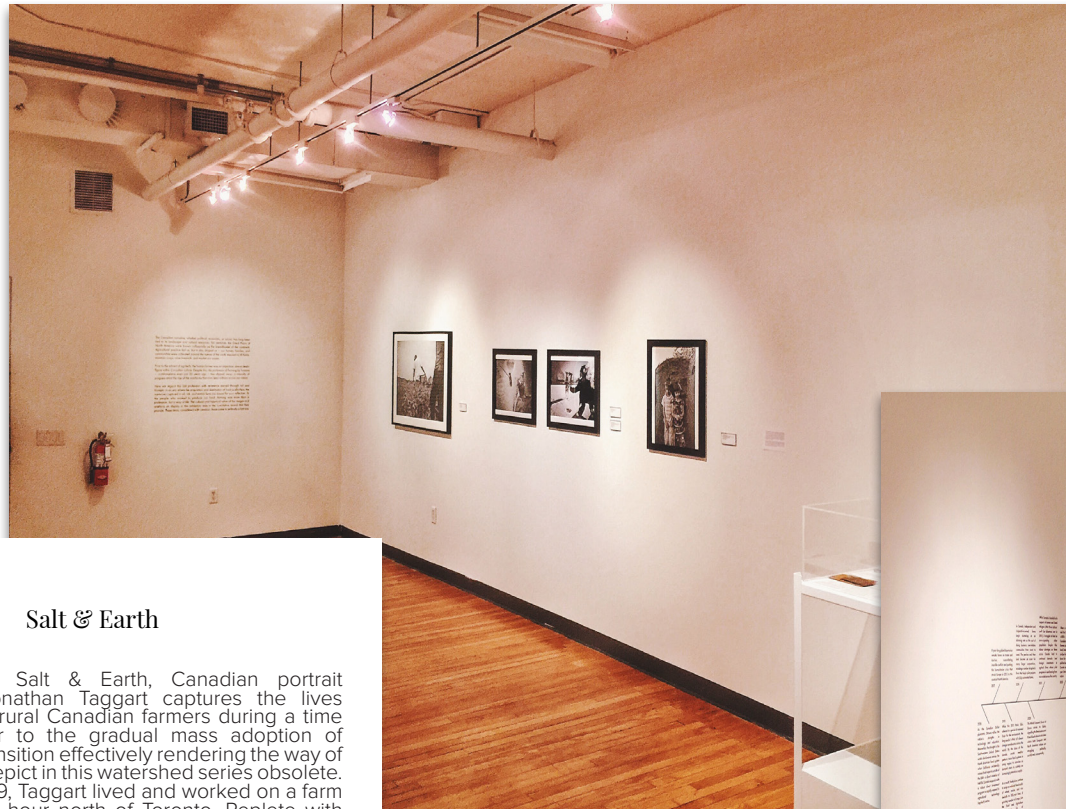


Visit the Toronto Museum of Natural History to learn about **agriculture** from January 26 to February 28, 2036.

This exhibition curates fine art, photography, and artefacts to offer a window into the lost profession of farming and to examine how it once shaped many elements of our way of life.

In our era of autofarms and skyranes, it is difficult to pause and consider where we were only twenty years ago. This is why it is vital that we reflect on the cost of progress and explore its impact on Canada through exhibitions like agriculture.

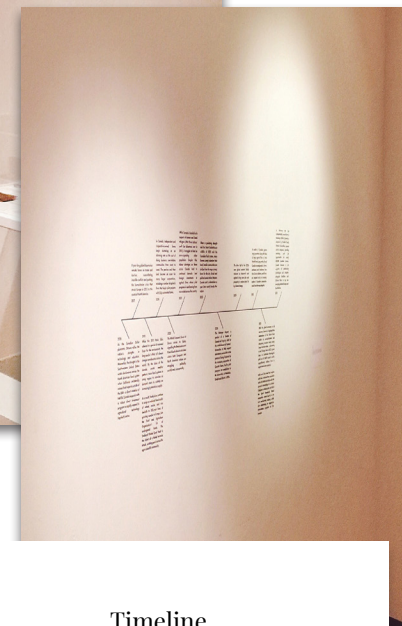
At Parallel Foods, we are extremely proud to sponsor this exhibition and others like it, as a way to continuously honour our food heritage across Canada's many urban communities.



Salt & Earth

With his series Salt & Earth, Canadian portrait photographer Jonathan Taggart captures the lives and emotions of rural Canadian farmers during a time immediately prior to the gradual mass adoption of autofarming, a transition effectively rendering the way of life he strove to depict in this watershed series obsolete. From 2007 - 2009, Taggart lived and worked on a farm approximately an hour north of Toronto. Replete with magical realism, these photographs depict the spirit of a way of life that was once considered the everyday, but is absent from our current paradigm. Taggart's photographs do not reflect a particular ideology; they are a communicating a perspective he formed as he unflinchingly followed his subjects throughout their daily lives.

Making the photographs even more poignant is the remarkable oeuvre of black and white fibre prints, produced through a long abandoned method to hand print photographs from an archival means of capturing still images on what was called film. The amount of effort put into producing these photographs, which was standard practice at the time of production, harkens back to the work once undertaken by farmers across the world in an effort to produce the food that we rely on for survival.



Timeline

THIS TIMELINE CHARTS THE TUMULTUOUS COURSE OF EVENTS IN RECENT YEARS, PROFILING HOW LOCAL, NATIONAL, AND INTERNATIONAL SHIFTS IN POLITICS, TECHNOLOGY, AGRIBUSINESS, AND BEYOND IMPACTED THE CONTINUOUSLY EVOLVING RELATIONSHIP BETWEEN CANADIANS AND THEIR CULTURE.

Strategic Foresight for the Future of Food



Farm Equipment Toy Set

THIS MODEL SET DEPICTING PRE-AUTOFARM AGRICULTURAL EQUIPMENT WAS A POPULAR CHILDREN'S TOY IN THE LATE 1900'S. INCLUDED HERE ARE TRACTORS, WAGONS, AND OTHER VEHICLES THAT NEEDED TO BE MANUALLY OPERATED BY AGRICULTURAL LABOURERS. MANY FARMS WERE FAMILY BUSINESSES, AND THIS EQUIPMENT WAS OPERATED BY FAMILY MEMBERS AND HIRED HANDS. PLAY WITH THE TOYS OFTEN TRANSLATED TO THE REAL THING: CHILDREN WOULD LEARN TO OPERATE THIS EQUIPMENT IN THEIR TEENS OR EVEN EARLIER, WORKING ON THE FARM BEFORE AND AFTER SCHOOL OR OTHER JOBS.



Antoine Mauve's *Returning Home*

ANTOINE MAUVE WAS A QUEBECOIS PAINTER KNOWN PRIMARILY FOR HIS DEPICTIONS OF PEOPLE AND ANIMALS IN OUTDOOR SETTINGS. BORN IN AMSTERDAM, MAUVE IMMIGRATED WITH HIS FAMILY TO WHAT IS NOW JOLIETTE IN RURAL QUEBEC IN 1856. MAUVE WAS FIERCELY COMMITTED TO REALISM, AND PASSIONATELY DEPICTED THE WAY OF LIFE IN RURAL QUEBEC AT THE TIME. WHILE MAUVE'S SUBJECTS INCLUDED FISHERMEN, SHEPHERDS, CROFTERS AND PEDLARS, A LARGE PORTION OF HIS WORK REPRESENTED FARM LABOURERS. MAUVE'S PAINTINGS ARE SUBDUED IN COLOUR, BUT EXHIBIT MASTERFUL BRUSHWORK AND STRIKING HARMONIES OF GREYS AND BLUES.

RETURNING HOME IS A SIGNIFICANT PIECE AS IT WAS PAINTED DURING HIS FIRST YEAR IN CANADA WHEN THE ARTIST WAS ONLY 18 YEARS OLD, SPEAKING TO HIS VIRTUOSITY APPARENT AT EVEN SUCH A YOUNG AGE. MAUVE WAS ALSO AN ACCOMPLISHED WATERCOLOURIST.

Analysis

The Time Machine experience lasted for twenty minutes and was followed by a forty minute debrief. When entering the gallery, the participants were greeted by staff of the museum. The participants gathered inside the art gallery and, after three short speeches, were left to explore on their own. The audience put on their pins and almost everyone assumed the position of a gallery guest: they spoke in hushed tones, arms behind their backs, leaning to read a caption or admire the details in the art. Gallery staff circulated and answered questions. Participants formed small clusters around each piece, discussing their interpretation of the art.

The goal of **agriculture** was to create an immersive experience that would encourage reflection and curiosity. The experience of the exhibition had a subtle elegance with somber tones. Our aim was to maximize suspension of disbelief through a seamless web of subtleties. We sought to allow the audience to interact with the exhibition at their own direction, making the experience their own and leading to a stronger gestalt of this scenario in their minds.

Exploring four perspectives

Time Machines are not a one-step exercise. Once participants are taken through the experience, they are left with mindsets and insights that must be unearthed through a debriefing session. A debrief, conducted effectively, becomes an interesting space not only to develop a common understanding of participants' perceptions of the experience, but also – having returned to the present from the fictional future – to leverage their collective intelligence in developing next steps and strategies to deal with the future's consequences.

Thus, the debrief provides an opportunity to lead a “strategic conversation” about the implications of the Time Machine.

Following **agriculture**, participants were encouraged to role-play as significant stakeholders that influence and are influenced by the growth of agritech in Canada. The dialogue was captured through recording devices, then transcribed and analyzed for the purpose of gauging what the audience thought about the possible erosion of farming culture in Canada from the agricultural system.

Opportunities

The audience stuck to their roles often theatrically and discussed many different issues through which several key themes emerged. They recognized that the integration of technology in agribusiness has allowed for the optimization of economic and environmental opportunities. Further, they discussed how these efficiencies come at a critical time in Canadian history, when social, political, and environmental unrest will make the agricultural yields of autofarming not simply beneficial, but necessary.

These ideas were reinforced by a variety of the stakeholders. Governmental role-players discussed the imperative of food security for the Canadian people; the impact on farmers as a subset of the population was secondary to them. Second, they noted that the efficient production of foods through agritech might bring the costs of food down. Agritech actors reaffirmed the profitability of this future, suggesting that the success of these initiatives would diversify job opportunities, ensure an abundance of food, and justifying the loss of the farming profession with

retraining programs. The participants acting as farmers recognized the inevitability of the loss of their jobs to technology, relieved that it might grant them freedom, financial opportunity, or simply to remove the burden of carrying on their heritage profession. Finally, consumers highlighted the potential gains in quality, affordability, and food security that might come from automation.

Challenges

However, much of the discussion hinged on the key challenge of turning to agritech: it will significantly alter the profession and lifestyle of countless farmers that are keystone components of manage and control the current agricultural system. The challenge is understanding these consequences and working to adapt the sector to these changes. Governmental representatives discussed the costs of these changes for small-scale farmers, worrying about the potential for monopolization and managing antitrust dimensions of agribusiness. They also lamented the loss of farming as an element of Canadian cultural heritage. Agritech representatives echoed this, worrying about the need to deal with government oversight – and about whether their competitors will monopolize first. Finally, they showed a strikingly humanistic side by worrying about the responsibility of feeding the nation. Farmers, however, had many concerns: the loss of their land (and business); the inability to regulate the agritech businesses; the loss of diversification in the agricultural industry; and the kinds of programs that will provide them and their families with retraining and transition into other professionals. Last, consumers worried about the implications of corporate control on the Food System – from price to the reliability of a centralized producer.

Selected Quotes

OPTIMISM:

“In India, farmers commit suicide because of natural calamity. And a lot of farmers are giving up their job. Therefore this is a good solution.”

“It hasn’t really changed much for the consumer. My cousins are farmers. They have tractors that are routed on certain paths. They don’t really do much farming. Farming is already automated.”

“From the development standpoint it would create different jobs.”

“Well, it could be a generational thing too because maybe the new generation said “there’s a better way! We don’t want to live like this anymore! We don’t want to be farmers anymore...”

PESSIMISM:

“What about the small scale farmers. How can small farmers afford technology?”

“To feed a nation is a huge responsibility. We have to ensure that we have the right people to lead the movement forward. To ensure that we don’t let our people down.”

“What if I’m a capitalist? I can take over the land and utilize technological advancement to control it.”

“You know that 7 out of 10 farmers have committed suicide in this country over the past 20 years, 7 out of 10! You know that... do you know why they have committed suicide? Because they can’t afford... when you guys first started basically making them sharecroppers they couldn’t afford it!”

Overview

"A good hockey player plays where the puck is. A great hockey player plays where the puck is going to be."

Wayne Gretzky (Kirby, 2014)

In this section, we will explore a set of strategic pathways that we believe will support Big Grocer Co.'s objectives of maintaining shareholder value and increasing their competitive advantage. Building on previous sections that outlined sets of drivers, trends and scenarios, these strategies take specific aim to ensure Big Grocer Co. is ready to build sustainably upon its current market dominance and profitability. Acknowledging the volatile forces that may play into any future, the four strategic pathways that we will explore in the following pages provide Big Grocer Co. with insight to help transform challenges into opportunities for continuous and sustainable growth.

Constructing these strategies revealed four distinct pathways – two, however, share business transformation elements while the other two entail business pivots. This distinction is an important one and reflects not only the two initial questions that guided our formative analysis:

How will Canadians acquire their food in 2035?

How will information and communication technology impact this relationship?

It also included a third and equally important question:

What strategy will most effectively position Big Grocer Co. for continuous growth in any future?

Thinking a few steps ahead in this manner required a rigorous evaluation of the capabilities, capacities and resources available to Big Grocer Co. that may exist in any number of uncertain futures. Diverging in our analysis was a deliberate choice to carefully cover each immediate step while casting a long-view to ensure future readiness. In converging, we diligently crafted the pathways around a business- pivot or transformation, with each preparing Big Grocer Co. for the scope and scale of change necessary for success in the future.

This necessary change is at once helped along and hindered by the resources at Big Grocer Co.'s disposal: national market dominance, supply chain excellence, unrivalled purchasing power and distributed access to physical and intellectual assets. While these elements can combine to accelerate the pace of change, any strategy must be carefully structured to ensure the effective management of transformation. Otherwise, any business pivot or transformation can be stopped in its tracks by cultural, financial and strategic risk aversion. Despite each of the four strategic pathways requiring Big Grocer Co. to absorb these risks, we believe it a necessary step to be a future-ready industry leader.

Summary of Strategic Pathways

The four strategic pathways that we will explore in the following map provide options for continued profitability and growth by either pivoting or transforming Big Grocer Co.’s operating models. First is **Lose the façade**, which recommends Big Grocer Co. takes steps to lead the disruptive curve by transforming itself into a food-technology firm. The next is **Omni-integration**; a strategy that pivots Big Grocer Co. to attain complete market dominance within the Canadian Food System as truly and fully integrated food company. Meanwhile, **The World is Flatter** sees Big Grocer Co. pivoting to become a global player, expanding operations into lucrative markets abroad to become a food distributor and processor well beyond Canada’s shores. Finally, Selling **Science 2.0** will transform Big Grocer Co. into a science-driven powerhouse through cutting edge investment in food science innovation and technology.

Strategic Pathway Map

note: ^ denotes an increase					
STRATEGY	WHAT TO WATCH FOR (INDICATORS OF FIT) Customer/Government/Industry	ACTIVITIES	SUCCESS FACTORS	COMPETITORS	TIMELINE
Lose the façade Recommends Big Grocer Co. takes steps to lead the disruptive curve by transforming itself into a food-technology firm	C: ^affordability of various consumer-tech (digital/virtual); ^ penetration (e.g. 75%) of tech solutions among key customer segments; ^digital sales (achieving critical mass) across other sectors /industries (incl. competitors); ^dependence on competitive food delivery services; decreasing instore sales; decreasing loyalty membership #s; decreasing effect of in-store sales. G: ^regulations focused on mandating digital consumer protectionism; ^regulation on food delivery + digital grocer services; decreasing influence of labour + trade lobbies at federal + provincial levels of gov't (as a result of workplace automation?); I: ^sales of AR/VR; ^market saturation of advanced tech solutions among aligned customer segments; ^number of digital grocer /food delivery start-ups; ^valuation of digital grocer/food delivery start-ups; ^market adoption of digital grocer solutions (applications & software); ^penetration of digital grocer-enterprise solutions (among competitors); any ^ in competitor acquisition of digital grocer or delivery firm; ^impact of IoT on enterprise level supply chain management among competitors/other industries;	-Partner with the GoC to conduct a feasibility study examining foreign food markets for investment -Divest of poorly performing assets (stores), farmland (food-to-energy), and shed any excess labour capacity -Establish presence in select foreign markets by founding national subsidiaries, hire/acquire assets (talent/space) -Buy into foreign food systems through targeted investments in food production, processing + manufacturing -With remaining dividends (or JV mechanism), invest in global shipping firm to build organic capacity to export/import -Continue foreign market penetration through acquisitions of grocery/retail properties -Invest in rebranding and re-launching foreign properties under pan-regional umbrella -If further capital required, divest of low-yield properties domestically / abroad after 1 year performance review -Invest in tech-based systems implementation to streamline labour and supply chain management, domestically + abroad -Establish foreign food processing + manufacturing hubs, outsource processes from Canada abroad as required -Export franchise operations into foreign markets using diversified-property (discount, luxury) platform to engage multiple customer segments -Invest in property-wide program to reduce waste + overage -Examine moving global headquarters to tax-friendly jurisdiction (e.g. Ireland)	-Maintain market share among key customer segments within urban markets -Increase digital customer conversions -Increase digital customer end sales -Increase of incidental digital sales -Increase customer satisfaction (digital + in-store) -Increase in digital literacy among customers -Increase ROI on digital advertising activities -Decrease in food wastage (fresh produce spoilage) -Decrease impact of competition from food delivery/digital grocers	-Large Canadian food retailers, convenience stores, mass-grocery retailers, farmers markets -Food-delivery services & final-mile grocers -Technology firms (with dynamic platforms) whose lines of business may compete -Food innovation companies, incl. start-ups	Initial roll-out is a 5 yrs (change management program) and full implementation and conversion over a following 10yr transition span
Omni-integration An approach that pivots Big Grocer Co. to attain complete market dominance within the Canadian Food System as truly and fully integrated food company.	C: ^consumer awareness + vigilance concerning food sources; ^consumer wants/scrutiny for local, organic and farm-fresh foods; ^consumer literacy + advocacy for local/Canadian foods; ^customer frustration with costs of food; ^frequency of farmers markets vs. properties G: ^encouragement of urban farming through legislation + regulation at municipality; ^support for agro-innovators (funding and regulations); ^applications for farming zoning approvals within municipalities; ^increasing transportation / labour costs; ^inflation due to rising costs of food; ^in subsidies for food processing manufacturers; ^agitation from local growers for political + social support; I: ^cost of food processing due to weak currency; ^defaults on farmers mortgages; ^#s of urban farming associations; discernable ^ in competition from local farmers markets for key customer segments (start measuring); ^number of urban farm supplies + tools sold; ^number of urban greenhouses sold;	-Continue acquisition of rural and peri-urban farmland in proximity to urban markets -Integrate acquisitions into a consolidated supply chain to support retail activities -Invest in building surplus capacity within supply chain by optimizing existing processes using most recent enterprise-level solutions -Conduct a feasibility study in cooperation with municipalities to expand urban farming practices -Begin acquisition of urban farms within target urban markets, pilot in key markets and scale pan-regionally -Consolidate urban farm (incl. vertical farm) properties into a consolidated brand, re-launch to target key customer segments -Expand partnerships with local farmers markets through targeted marketing initiatives -Expand processing capacity through acquisition of manufacturing facilities -Expand distribution capacity through peri-urban/urban distribution centres -Expand upstream market share by selling to competitor retail properties -Examine consolidating operations within proximity to major urban centres (post a 1-3 year performance review) -Invest in a marketing campaign to educate Canadians on necessity to “buy local”; establish the City-to-Farm Institute, an employment/education program to connect urban Canadians with farming careers -Divest mass-locations (i.e. supercentres) in urban markets (as necessary)	-Increase customer acquisition, retention and satisfaction (return visits, across all properties) -Increase visits per property -Increase market share among identified customer segments within select markets (urban) -Increase customer loyalty program #s (sign-ups, point churn) -Decrease in fresh produce spoilage -Decrease in overall food spoilage numbers	-Large Canadian food retailers, convenience stores, mass-grocery retailers, farmers markets -Other food innovators, startups, and organizations (local through pan-regional) with shared interests to retain build or retain market share	Phased acquisition dependent on capital capacity; likely 5-10 yrs for initial efforts to materialise with full optimization over 15 years
The World is Flatter Sees Big Grocer Co. pivoting to become a global player, expanding operations into lucrative markets abroad to become a food distributor and processor well beyond Canada’s shores	C: ^consumer demand for affordable food solutions; ^consumer desire for global foods; decreasing dependence on local (produce) foods among key customer segments; decreasing consumer preferences for local foods; decreasing sales of local foods; G: ^cost of locally grown food; continued ^liberalisation of global food supply; ^(and sustained) strength of currency; ^policies/regulation to encourage Canadian food-investments abroad; decreasing barriers to FDI in foreign food systems; decreasing protectionist regimes within Canada Food System; decreasing influence of regional farm lobbies; decreasing influence of Canadian farmers across political spectrum; I: ^movement of capital from Canadian assets (liability); ^increasing conversion of Cdn farms to fuel production; ^flight of food processing + manufacturing abroad; ^investments by Canadian-owned food firms (competitors) in foreign markets; decreasing cost of transportation (global); ^value of foreign farm-based commodities (balanced by decrease in Cdn farm-based commodities)	-Partner with the GoC to conduct a feasibility study examining foreign food markets for investment -Divest of poorly performing assets (stores), farmland (food-to-energy), and shed any excess labour capacity -Establish presence in select foreign markets by founding national subsidiaries, hire/acquire assets (talent/space) -Buy into foreign food systems through targeted investments in food production, processing + manufacturing -With remaining dividends (or JV mechanism), invest in global shipping firm to build organic capacity to export/import -Continue foreign market penetration through acquisitions of grocery/retail properties -Invest in rebranding and re-launching foreign properties under pan-regional umbrella -If further capital required, divest of low-yield properties domestically / abroad after 1 year performance review -Invest in tech-based systems implementation to streamline labour and supply chain management, domestically + abroad -Establish foreign food processing + manufacturing hubs, outsource processes from Canada abroad as required -Export franchise operations into foreign markets using diversified-property (discount, luxury) platform to engage multiple customer segments -Invest in property-wide program to reduce waste + overage -Examine moving global headquarters to tax-friendly jurisdiction (e.g. Ireland)	-Increase sales #s domestically + abroad -Increase (new) revenue from foreign markets -Sustained foreign market penetration -Increase engagement (sales) with customer segments abroad -Increase in membership/loyalty #s domestically/abroad -Increase in per capita spending in select markets (abroad) -Increase in government subsidies / dividends -Decrease in taxes with shifts in operations abroad -Increase revenue from supporting lines of business (processing, shipping, etc)	-Large Canadian food retailers, mass-grocery retailers with similar intentions -Foreign food retailers, foreign food system's regulatory bodies -Foreign competition laws	Initial implementation will depend on capital-raising capacity, penetrating foreign markets will require maximal time and flexibility; full roll-out may require more than 10 years
Selling Science 2.0 Will transform Big Grocer Co. into a science-driven powerhouse through cutting edge investment in food science innovation and technology	C: ^demands for convenient, nutrient-rich, affordable foods; ^acceptance of scientifically engineered foods; ^consumer-demand for scientifically engineered foods; ^consumption of scientifically engineered foods; G: ^strain on Canadian Food System; systematic decrease of food system capacity + stock; ^strain on Global Food System; ^barrier to global food trade; ^cost of food stuff (fresh and processed); ^cost of transportation + labour; decreasing value of currency; ^regulation around agro-tech food safety; ^establishment + influence of agro-science food associations (lobby) I: ^investments in agro-science; ^investments in agro-tech; ^# of agro-science/tech startups; ^valuation of said start-ups; ^commodification of agro-science food products; ^market adoption/penetration of agro-tech/science solutions; ^# scientifically engineered food products on consumer shelves; ^acquisition of agro-science/tech firms	-Institute a ‘Science-First’ approach through a multi-year change management program -Acquire agro-science firms domestically + abroad (applying for subsidies from GoC for domestic investments) -Develop in-house food product design + manufacturing (bioengineering foods) -Examine divesting of existing farm/rural land assets, along with any underperforming retail locations -Increase innovation (R&D) budget along with affiliated lines of business (e.g. marketing + design) -Invest in construction of multiple manufacturing + food testing facilities across Canada -Generate new product lines based on R&D in agro-science/tech, pilot feasibility of products in key markets -Explore alternative supply chain models (home food printing) along traditional logistical optimizations -Investigate cost-reduction approaches to low-yield properties, including tighter product lifecycles -Invest in marketing new product lines to customers across all key markets -Expand existing gov’t-industry/sector-wide innovation partnerships -Invest in education initiatives (marketing) on benefits of scientifically engineered foods -Establish food science institutes across nation’s school boards and sponsoring innovative research	-Increase # new products (made in house) -Increase # of new products to market -Increase # of new product sales -Increase adoption of agro-science food-based solutions -Increase awareness of benefits of food science across Cdn population -Increase food-science literacy among key customer segments -Increase # of students in agro-science faculties across Canada	-Large Canadian food retailers, mass-grocery retailers with similar intentions -Agricultural science & tech firms (start-ups, established) -Food innovators, domestic and foreign	Pivot dependent on demand, with ability to raise capital and implement a successful change management plan (>5yrs) providing the basis for a 10-15 year roll out across the entire organization (including divestments)

Strategic Pathways

On Indicators of Fit

To support the pursuit of any strategic pathway, Big Grocer Co. will need to scan an evolving environment for a variety of indicators of fit. In support of this challenging task, we interpreted these indicators using three lenses. The first is consumer behaviours and actions, to better understand the driving values and their impact of Big Grocer Co.'s customer base. This is followed by government, with a view to deciphering what policy and regulatory actions may have implications for the future. Finally, mapping industry's indicators provides insight into what is happening among sector-wide competitors, additionally how it might impact the future of food retail in Canada. As a caveat, many of these indicators may not manifest themselves in any distinct manner – which impacts the formulation of a pragmatic recommendation below.

On Wind-tunneling

Recommending a dynamic strategy to Big Grocer Co. required careful testing of each strategic pathway against the scenarios of the future. Shaped by the drivers and trends that will impact the acquisition and distribution of food, the scenarios provide a critical backdrop against which to measure the potency of the various strategies. To this end, we gauged each strategic pathway's potency – defined here as their potential success rate – with a consideration for the cultural, financial and strategic risk and fit within each possible scenario. In this evaluation, we rated each strategic pathway's potency on a scale of low, medium to high. Accordingly, a low potency rating means a strategic pathway is less of fit within a given scenario, while a high potency rating means it is more appropriate. A brief analysis reveals (see table above) that no strategic pathway stands above the rest; however, it is worth noting that certain scenarios appear more likely, such as the Farm-to-Tablet scenario. Our findings led to the next step of this process, which involved reflecting on how Big Grocer Co. should proceed in the face of a variety of indicators it might observe in the coming years. This step combined the rating of each strategic pathway's potency with a rigorous evaluation of the common elements across each pathway. Doing this resulted in the articulation of the strategic recommendation that will have the greatest impact on Big Grocer Co.'s ability to increase its competitive advantage and maintain its shareholder value.



Windtunneling strategies against the scenarios



Mapping Big Grocer Co.'s strategic pathways against future critical uncertainties

Summary of Recommendations

In consideration of the findings outlined in this report, we recommend that Big Grocer Co. pursues a multiple-coverage strategy. This recommendation is built upon the wind-tunneling evaluation and reflects the resources at Big Grocer Co.'s disposal. A multi-coverage strategy will best manage risk (cultural, financial) while enabling Big Grocer Co. to leverage its scale in such a way that it can capitalize upon the uncertain futures while not excluding any opportunities to necessarily pivot or transform. This is important, as certain indicators of fit that might suggest one pathway over another will only become clearer with the passage of time. Another feature of this recommendation is that it permits Big Grocer Co. to pursue certain activities common across the four pathways explored earlier. While this approach might entail capital-rich investments for Big Grocer Co., the final component of this recommendation manages this risk by binding several activities that rose to the surface during the design of four strategic pathways. Listed below, these collective actions will pay off in time and help to position Big Grocer Co. for a more sustainable and profitable future, no matter its contents.

Alimentum recommends that Big Grocer Co. take immediate action to:

- Invest in continuous supply chain optimization solutions;
 - Reducing food spoilage & wastage as currently exists; and,
 - Reducing carbon footprint through a deliberate greening of physical assets;
- Consolidate processing & distribution centres in proximity to urban markets; and,
- Invest heavily in innovation through expanding intellectual property and human capital assets

Pursuing these immediate actions as a component of a multi-coverage strategy will ensure Big Grocer Co. maintains its competitive advantage while increasing shareholder value and customer impact. In light of the uncertainties for the acquisition and distribution of food, this multi-coverage strategy seeks to effectively manage risk while maximizing options to pursue sustainable growth as a future-ready organization.

Conclusion

The future is already pretty uncertain; how you plan to get there doesn't need to be.

For the journey upon which you have already embarked, we at Alimentum are prepared to act as your shepherd.

Big Grocer Co. is currently confronting dynamic forces that we know are transforming the way your business captures and generates value. With your history as one of Canada's leading food retailers, we understand that bringing maximum value to your customers and shareholders drives your success across every property you hold and every product you provide. This report was created to better understand what the futures of the food in Canada might look like and how today's trends and drivers will shape and impact the future of the industry.

An in-depth analysis of these trends and drivers enabled us to carefully craft scenarios of the future, exploring the critical uncertainties of acquisition and distribution within the Canadian Food System. Against this backdrop we then examined a variety of strategic pathways – transformation or pivots – that would set Big Grocer Co. on a course towards achieving a more sustainable and profitable future.

While these pathways depend on indicators of fit, success factors, and managing complex risk, we know a journey is more than just a destination and a set of directions. It is the collection of experiences of getting to where you need to go. Our recommendation for Big Grocer Co. is to pursue a multi-coverage strategy.

Explored in detail in this report, we believe this approach will ensure Big Grocer Co. maintains its competitive advantage while increasing shareholder value and customer impact. Even though immediate actions are necessary, it is a first step in a journey that you need not embark upon alone.

Let us be your shepherd to guide you through this change.

References

Introduction

Candy, S. (2010). The Futures of Everyday Life: Politics and the Design of Experiential Scenarios (Doctoral). University of Hawai'i at Mānoa.

CBC.ca,. (2015). It's official — there are more Canadians 65 and older than under 15. Retrieved 14 December 2015, from <http://www.cbc.ca/news/business/statistics-canada-seniors-1.3248295>

Choo, C. W. (1999). The Art of Scanning the Environment. Bulletin of the American Society for Information Science and Technology, 25(3), 21–24. <http://doi.org/10.1002/bult.117>

Dator, J. (2009). Alternative futures at the Manoa School. Journal of Futures Studies, 14(2), 1–18.

Kirby, J. (2014). CEOs: stop quoting Wayne Gretzky's "where the puck is going" quote. Canadian Business - Your Source For Business News. Retrieved 23 February 2016, from <http://www.canadianbusiness.com/blogs-and-comment/stop-using-gretzky-where-the-puck-is-quote/>

Loveridge, D. (2016). The STEEPV acronym and process - a clarification. Manchester: University of Manchester PREST - Policy Research in Engineering, Science and Technology. Retrieved from https://php.portals.mbs.ac.uk/Portals/49/docs/dloveridge/steepv_wp29.PDF

Schwartz, P. (1991). The art of the long view. New York: Doubleday/Currency.

Statistics Canada,. (2015). Canada's population estimates: Subprovincial areas, July 1, 2014. Retrieved 14 December 2015, from <http://www.statcan.gc.ca/daily-quotidien/150211/dq150211a-eng.htm>

Wilkinson, L. (1997). How to Build Scenarios: Planning for“ long fuse, big bang” problems in an era of uncertainty. Wired.

Environmental Scanning

Agriculture and Agri-Food Canada,. (2013). Agricultural Innovation Program Guide. The Government of Canada. Retrieved from http://www5.agr.gc.ca/resources/prod/pdf/SPT_aip-pia/aip-pia_guide_eng.pdf

Agriculture and Agri-Food Tackle ag Labour Shortages. (2015, June 9). Retrieved November 14, 2015, from <http://www.cahrc-ccrha.ca/node/2216>

Akerman, T. (2015, September 19). Boutique bushies boom. The Australian. Retrieved from <http://www.theaustralian.com.au/business/boutique-bushies-boom-in-a-new-golden-age-of-australian-farming/story-e6frg8zx-1227533886294?sv=733d9acc6cfc00b0d8cb590810b5eb07>

Alston, J. M., Babcock, B. A., & Pardey, P. G. (2010). The shifting patterns of agricultural production and productivity worldwide. Midwest Agribusiness Trade Research and Information Center.

Associated Press. (2008, May 20). As food prices rise, more people grow their own. Retrieved November 23, 2015, from <http://www.nbcnews.com/id/24729307/ns/business-retail/t/food-prices-rise-more-people-grow-their-own/>

Back to the Roots. (2015). Water Garden. Retrieved November 12, 2015, from <http://backtotheroots.com/products/watergarden>

Badenschier, F. (2013, May 21). Shipping industry steers cleaner course | Global Ideas | DW.COM | 21.05.2013. Retrieved November 22, 2015, from <http://www.dw.com/en/shipping-industry-steers-cleaner-course/a-16826618>

Big bills left in the shipping container. (2013, May 20). Retrieved November 22, 2015, from <http://www.economist.com/blogs/freeexchange/2013/05/innovation>

Blum, D. (2012, March 12). 5. Food That Lasts Forever. Time. Retrieved from <http://content.time.com/time/magazine/article/0,9171,2108051,00.html>

Bollman, R. (2014, July 7). Will a labour shortage impact agricultural growth? Retrieved November 14, 2015, from <https://www.fcc-fac.ca/en/ag-knowledge/ag-economist/will-a-labour-shortage-impact-agricultural-growth.html>

Bowean, L. (2011, June 24). Chicago's food desert shrinking, report shows. Chicago Tribune. Retrieved from http://articles.chicagotribune.com/2011-06-24/news/ct-met-food-deserts-0624-20110624_1_food-desert-food-summit-healthy-food

- Boyd, H. (2014, May 28). 3D Printer Will Print Futuristic Fruit On Demand. Retrieved from <http://www.psfk.com/2014/05/3d-printed-fruit.html>
- Branom, M. (2015, October 1). Grow Your Own Grocery Store: A Beautiful Solution to Food Deserts. Retrieved from <http://www.thedailybeast.com/articles/2015/10/01/foodscaping-a-beautiful-solution-to-food-deserts.html>
- Brick, J. (2015, February 13). Tabletop Aquaponic Farm is Functional Fish Bowl. Retrieved from <http://www.psfk.com/2015/02/vegua-aquaponic-farm-fish-bowl-food.html>
- Brody, A. (2008). Innovative Food Packaging Solutions. Retrieved November 22, 2015, from [http://www.ift.org/~media/Knowledge Center/Science Reports/Scientific Status Summaries/InnovFoodPkg_1008.pdf](http://www.ift.org/~media/Knowledge%20Center/Science%20Reports/Scientific%20Status%20Summaries/InnovFoodPkg_1008.pdf)
- Brombacher, A. (2014). (Re)liability of Self-driving Cars. An Interesting Challenge! Qual. Reliab. Engng. Int. Quality and Reliability Engineering International, 30(5), 613-614.
- Brown, L. R., & Starke, L. (1996). State of the World 1995: a Worldwatch Institute report on progress toward a sustainable society. Cambridge University Press.
- Bruinsma, J. (2009). The Resource Outlook to 2050: By How Much Do Land, Water Use and Crop Yields Need to Increase by 2050? Paper prepared for the Expert Meeting on How to Feed the World in 2050, Food and Agriculture Organization, Rome.
- Cbc.ca,. (2016). Think food prices went up a lot this year? You ain't seen nothing yet. Retrieved 22 February 2016, from <http://www.cbc.ca/news/business/food-prices-inflation-1.3382872>
- Challapata, J. (2012, April 3). Quinoa: The Dark Side of an Andean Superfood. Retrieved November 25, 2015, from <http://content.time.com/time/world/article/0,8599,2110890,00.html>
- Charlebois, S. (2015, June 17). Is 3-D printing the future of global food? Retrieved November 21, 2015, from <http://www.theglobeandmail.com/report-on-business/rob-commentary/is-3-d-printing-the-future-of-global-food/article24981139/>
- Chavich, C. (2015, May 5). How to solve the food waste problem. Retrieved from <http://www.macleans.ca/society/life/how-to-solve-the-food-waste-problem/>

- Chicago Tribune,. (2015). Florida orange crop getting wiped out by tree-killing disease. Retrieved 23 February 2016, from <http://www.chicagotribune.com/news/nationworld/ct-florida-orange-juice-crop-disease-20151124-story.html>
- "Community Garden - Toronto Green Community." Toronto Green Community. N.p., n.d. Web. 18 Nov. 2015.
- Cooke, J. (2011, October 2). Sharing supply chains for mutual gain. Retrieved November 24, 2015, from <http://www.supplychainquarterly.com/topics/Global/scq201102kimberly/>
- Cooksey, K. (2010, April). Encyclopedia Of Polymer Science and Technology. Retrieved November 23, 2015, from <http://onlinelibrary.wiley.com/doi/10.1002/0471440264.pst570/pdf>
- Cooper, R. (2014, April 25). Sorry, there's no such thing as 'food gentrification' Retrieved November 25, 2015, from <http://theweek.com/articles/447513/sorry-theres-no-such-thing-food-gentrification>
- Corsini, L., Wagner, K., Gocke, A., & Kurt, T. (2015). Crop Farming 2030: The Reinvention of the Sector. The Boston Consulting Group. Retrieved from <https://www.bcgperspectives.com/content/articles/process-industries-innovation-crop-farming-2030-reinvention-sector/>
- Cortright, J. (2015, May 1). City Observatory - Where are the food deserts? Retrieved November 25, 2015, from <http://cityobservatory.org/food-deserts/>
- Culinary Institute of America. (2015, March 10). 3D Food Printing Comes to the CIA. Retrieved November 21, 2015, from <http://www.ciachef.edu/fh-3dprinting/>
- D. Dainelli et al. Trends in Food Science & Technology 19 (2008) S103eS112
- Cruz, R. (n.d.). Chapter 2: Oxygen Scavengers: An Approach on Food Preservation. Retrieved November 25, 2015, from <http://www.intechopen.com/books/structure-and-function-of-food-engineering/oxygen-scavengers-an-approach-on-food-preservation>
- Dezeen. (2008, April 27). Local River by Mathieu Lehanneur. Retrieved November 21, 2015, from <http://www.dezeen.com/2008/04/07/local-river-by-mathieu-lehanneur/>
- Duin, P. V. (2016). Foresight in organizations: Methods and tools. Taylor & Francis.

- Dunn, E. (2015, March 11). Gourmet Meal-Delivery Competition Heats Up. Retrieved November 24, 2015, from <http://www.bloomberg.com/news/articles/2015-03-11/gourmet-meal-delivery-competition-heats-up>
- Dyson, T. (1996). Population and Food: Global Trends and Future Prospects. Routledge.
- Egan, M. (2014, August 06). 6 companies behind the drone revolution. Retrieved February 23, 2016, from <http://money.cnn.com/gallery/investing/2014/08/06/drone-stocks/2.html>
- Eisen, L. (2015, October 29). Microbes: The Hidden Reason Behind the Obesity Epidemic? The Nature of Things. CBC. Retrieved from <http://www.cbc.ca/natureofthings/it-takes-guts>
- El Feki, S. (2000, March 23). Growing pains. The Economist. Retrieved from <http://www.economist.com/node/295632>
- Federico, G. (2010). Feeding the World: An Economic History of Agriculture, 1800-2000. Princeton University Press.
- Fernandez-Cornejo, J. (2007, February 1). USDA ERS - Off-Farm Income, Technology Adoption, and Farm Economic Performance. Retrieved November 25, 2015, from <http://www.ers.usda.gov/publications/err-economic-research-report/err36.aspx>
- Flavelle, D. (2014, December 12). The meal kit is served | Toronto Star. Retrieved November 24, 2015, from http://www.thestar.com/business/2014/12/12/the_meal_kit_is_served.html
- Florida, R. (2010, June 15). Food deserts and priority neighbourhoods in Toronto | Martin Prosperity Institute. Retrieved from <http://martinprosperity.org/food-deserts-and-priority-neighbourhoods-in-toronto/>
- Forum For The Future,. (2011). Sustainable Shipping Initiative: The Case for Action. The Sustainable Shipping Initiative. Retrieved from <https://www.forumforthefuture.org/project/sustainable-shipping-initiative/overview>
- Fowler, G. (2014, January 7). Do Online Grocers Beat Supermarkets? Retrieved November 18, 2015, from <http://www.wsj.com/articles/SB10001424052702304617404579304901729135002>
- Freedman, D. (2011, September 2). The Bright, Hi-Tech Future of Food Preservation. Discover Magazine. Retrieved

- November 12, 2015, from <http://discovermagazine.com/2011/sep/17-impatient-futurist-hi-tech-future-food-preservation>
- Future in Focus. (2015). Fabricated Food: In the Lab, Factory, at Home. Retrieved November 12, 2015, from <http://futureinfofocus.com/briefs/fabricated-food-in-the-lab-factory-at-home/>
- Godin, Seth. (2014). Deconstructing generosity. Seth's Blog. Retrieved from http://sethgodin.typepad.com/seths_blog/2014/04/deconstructing-generosity.html
- Godin, Seth. (2011). Getting serious about the attention economy. Seth's Blog. Retrieved from http://sethgodin.typepad.com/seths_blog/2011/12/getting-serious-about-the-attention-economy.html
- Greenough, J. (2015, July 29). 10 million self-driving cars will be on the road by 2020. Retrieved February 23, 2016, from <http://www.businessinsider.com/report-10-million-self-driving-cars-will-be-on-the-road-by-2020-2015-5-6>
- Grove Ecosystem - Grow Fresh Food In Your Home. (2015). Retrieved November 21, 2015, from <https://www.kickstarter.com/projects/grove-ecosystem/grove-ecosystem-grow-fresh-food-in-your-home>
- Hall, C.M. (2012), The contradictions and paradoxes of slow food: Environmental change, sustainability and the conservation of taste. In *Slow Tourism: Experiences and Mobilities*, eds. S. Fullagar, K. Markwell & E. Wilson, (pp.53-68) Channel View, Bristol.
- Halweil, B., Mastny, L., Institute, W., & Assadourian, E. (2004). *State of the World, 2004: A Worldwatch Institute Report on Progress Toward a Sustainable Society*. W.W. Norton & Company.
- Herring, D. (2001, January 29). Precision Farming : Feature Articles. Retrieved November 24, 2015, from <http://earthobservatory.nasa.gov/Features/PrecisionFarming/>
- Herriot, C. (2010). *The Zero Mile Diet: A Year-Round Guide to Growing Organic Food*. Harbour.
- Ho, S. (2014a, January 23). #FoodGentrification and Culinary Rebranding of Traditional Foods | Bitch Media. Retrieved November 25, 2015, from <https://bitchmedia.org/post/foodgentrification-and-culinary-rebranding-of-traditional-foods>
- Ho, S. (2014b, March 12). The Cost of Kale: How Foodie Trends Can Hurt Low-Income Families | Bitch Media.

- Retrieved November 24, 2015, from <https://bitchmedia.org/post/the-cost-of-kale-how-foodie-trends-can-hurt-low-income-families>
- Hodson, H. (2016, January 16). The firms who will beat Google to get us into self-driving cars. Retrieved February 23, 2016, from <https://www.newscientist.com/article/dn28749-the-firms-who-will-beat-google-to-get-us-into-self-driving-cars/>
- Holthaus, E. (2015, April 17). Stop Vilifying Almonds. Slate. Retrieved from http://www.slate.com/articles/business/moneybox/2015/04/almonds_in_california_they_use_up_a_lot_of_water_but_they_deserve_a_place.html
- "Home - The Stop Community Food Centre." The Stop Community Food Centre. N.p., n.d. Web. 18 Nov. 2015.
- Huen, E. (2015, July 31). 3D Food Printing: Is It Ready for Luxury Dining? Retrieved November 21, 2015, from <http://www.forbes.com/sites/eustaciahuen/2015/07/31/3d-food-printing-is-it-ready-for-luxury-dining/>
- Huff, K. (n.d.). Active and Intelligent Packaging: Innovations for the Future. Retrieved November 23, 2015, from <http://www.iopp.org/files/public/VirginiaTechKarleighHuff.pdf>
- Hutchings, E. (2015, August 7). From Two Weeks to Two Years: Powdered Food Curbs Waste, Saves Lives. PSFK. Retrieved from <http://www.psfk.com/2015/08/powdered-food-waste-disaster-relief.html>
- IBISWorld (Ed.). (2015, September 1). Online Grocery Sales in the US: Market Research Report. Retrieved November 18, 2015, from <http://www.ibisworld.com/industry/online-grocery-sales.html>
- Johns, C. (2014, June 10). Dinner's in the bag – meal kits give home cooks a helping hand. Retrieved November 24, 2015, from <http://www.theglobeandmail.com/life/food-and-wine/dinners-in-the-bag-meal-kits-give-home-cooks-a-helping-hand/article19075666/>
- Juan, C. (2015, November 25). Slow Food Korea. Retrieved November 25, 2015, from <http://www.manilatimes.net/slow-food-korea/230757/>
- Keene, L. (1990, May 21). The Era Of The Yuppie Crops -- Diverse 'Boutique' Farming Becomes The Fashion. Seattle Times. Retrieved from <http://community.seattletimes.nwsources.com/archive/?date=19900521&slug=1073031>
- Kendall, M. (2014, January 20). #Breaking Black: 1 in 5 children face food insecurity. Retrieved November 25, 2015,

- from <http://thegrio.com/2014/01/20/breaking-black-1-in-5-children-face-food-insecurity/>
- Kim, A. (2015, August 5). Fixing “food deserts,” one grocery store at a time. Retrieved from http://www.washingtonmonthly.com/republic3-0/2015/08/xing_food_deserts_one_g056923.php
- Kohut, T. (2015). Canadian grocery prices will continue to skyrocket next year. Global News. Retrieved 22 February 2016, from <http://globalnews.ca/news/2391270/canadian-grocery-prices-will-continue-to-skyrocket-next-year/>
- Krasny, J. (2014, November 13). These Chefs Want You to Cook Your Own Dinner. Retrieved November 24, 2015, from <http://www.esquire.com/food-drink/food/a31447/cook-your-own-dinner/>
- Kruse, N. (2015, August 15). The rise in meal kit services: A discussion. Retrieved November 24, 2015, from <http://nrrn.com/food-trends/nancy-kruse-bret-thorn-discuss-meal-kit-services>
- Kuswandi, B., et al. (2011, December). Smart packaging: Sensors for monitoring of food quality and safety. Retrieved November 25, 2015, from <http://link.springer.com/article/10.1007/s11694-011-9120-x#page-2>
- Larsen, K., & Gilliland, J. (2008). Mapping the evolution of “food deserts” in a Canadian city: Supermarket accessibility in London, Ontario, 1961–2005. *International Journal of Health Geographics*, 7(1), 16. <http://doi.org/10.1186/1476-072X-7-16>
- Laughlin, S., & Rees, T. (2014, July 14). MyBiome. Retrieved November 12, 2015, from <https://www.lsnnglobal.com/micro-trends/article/16127/mybiome>
- Let's Not Eat Up Our Planet! Fight Climate Change. (2015, November 19). Retrieved November 25, 2015, from <http://www.slowfood.com/lets-not-eat-up-our-planet-fight-climate-change/>
- Lickorish, F. (2012). *Horizon Scanning in the Detection of Emerging Food Safety Risks* (1st ed., pp. 22 - 28). Cranfield: Cranfield University Centre for Environmental Risks and Futures. Retrieved from <http://www.food.gov.uk/sites/default/files/multimedia/pdfs/fionalickorishpres.pdf>
- Malone Kircher, M. (2015, November 12). What it's really like to be a professional Instacart shopper. Retrieved November 18, 2015, from <http://www.techinsider.io/what-its-like-to-be-an-instacart-shopper-2015-11>
- Marks, P. (2014, January 18). Vertical farms sprouting all over the world | New Scientist. New Scientist. Retrieved

- from <https://www.newscientist.com/article/mg22129524-100-vertical-farms-sprouting-all-over-the-world/>
- McLean, Terry. "Community Gardens Cultivate Healthier Neighbors in Flint." MSU Extension. Michigan State University, 2015. Web. 25 Nov. 2015
- Meijers, N. (2014, December 18). 2015 Food Trends: Grocery Delivery Explodes, Gadgets Enable Transparency More | Food Tech Connect. Retrieved November 18, 2015, from <http://www.foodtechconnect.com/2014/12/18/2015-food-trends-grocery-delivery-explodes-gadgets-food-transparency/>
- Mehler Paperny, A. (2015, June 1). Tainted lunch: Navigating gaps in Canada's food safety system. Retrieved from <http://globalnews.ca/news/2016254/tainted-lunch-navigating-gaps-in-canadas-food-safety-system/>
- Mok, K. (2013, February 28). Sleek hydroponic unit lets you grow a garden in your kitchen. Retrieved November 21, 2015, from <http://www.treehugger.com/sustainable-product-design/kitchen-nano-garden-hydroponic-hyundai.html>
- Moskin, J. (2013, February 12). Everything but the Cook. Retrieved November 24, 2015, from http://www.nytimes.com/2013/02/13/dining/the-dinner-kit-is-served.html?_r=0
- Mulligan, C. (2015, January 22). The Automation of Agriculture: Part 1. Retrieved November 15, 2015, from <https://www.fcc-fac.ca/en/ag-knowledge/ag-economist/the-automation-of-agriculture-part-one.html>
- National Geographic Live. (2015). Revolutionizing the Way We Grow Food. Retrieved from <http://video.nationalgeographic.com/video/ng-live/151027-harper-technology-food-lecture-nglive>
- Navarro, M. (Ed.). (2015). ISAAA Brief 50: Voices and Views Why Biotech? Retrieved November 25, 2015, from <http://www.isaaa.org/resources/publications/briefs/50/download/isaaa-brief-50-2015.pdf>
- Norberg-Hodge, H., Merrield, T., & Gorelick, S. (2002). Bringing the Food Economy Home: Local Alternatives to Global Agribusiness. Zed Books.
- Our history - About us - Slow Food International. (2015). Retrieved November 25, 2015, from <http://www.slowfood.com/about-us/our-history/>
- Pena, A. (2015, November 12). From Hive to the Table: Harvest and Cook Mealworms. Retrieved November 12,

- 2015 from <http://www.psfk.com/2015/11/livin-farms-desk-hive-super-food-how-to-cook-mealworms.html>
- Pincus, R. (2014, February 11). Micro-Algae Factories Could Be A Food And Energy Source For The Home. Retrieved from <http://www.psfk.com/2014/02/household-algae-factories.html>
- Powell, J. (2016). Boom, bust, peg, parity – the Canadian dollar has seen it all before. The Globe and Mail. Retrieved 23 February 2016, from <http://www.theglobeandmail.com/report-on-business/rob-commentary/boom-bust-peg-parity-the-canadian-dollar-has-seen-it-all-before/article28227022/>
- Preston, E. (2015, September 17). How NASA Is Solving the Space Food Problem. Eater. Retrieved November 17, 2015, from <http://www.eater.com/2015/9/17/9338665/space-food-nasa-astronauts-mars>
- Qiu, L. (2014, March 31). MIT Grads Create A Personal Farm For Your Kitchen. Retrieved November 12, 2015 from <http://www.psfk.com/2014/03/mit-grads-create-a-personal-farm-for-your-kitchen.html>
- Reisig, V., & Hobbiss, A. (2000). Food deserts and how to tackle them: a study of one city's approach. Health Education Journal, 59(2), 137–149. <http://doi.org/10.1177/001789690005900203>
- Reynolds, J. (2001, May 26). Cruising into the future. Retrieved February 23, 2016, from <http://www.telegraph.co.uk/motoring/4750544/Cruising-into-the-future.html>
- Ronald, P. (2009, November 17). Appropriate technology for sustainable agriculture. Retrieved November 24, 2015, from <http://scienceblogs.com/tomorrowstable/2009/11/17/appropriate-technology-for-sus/>
- Roth, A. (2015, July 9). Dinner by the Numbers: How Do Meal Kits Stack Up? | Civil Eats. Retrieved November 24, 2015, from <http://civileats.com/2015/07/09/dinner-by-the-numbers-how-do-meal-kits-stack-up/>
- Schwab, Charles. (2016). The Fourth Industrial Revolution. World Economic Forum.
- Ritzer, G. (1983), The “McDonaldization” of Society. Journal of American Culture, 6: 100–107. doi: 10.1111/j.1542-734X.1983.0601_100.x
- Scully, M. (2002). Dominion: The Power of Man, the Suffering of Animals, and the Call to Mercy. St. Martin's Press.
- Segran, E. (2015, June 8). The \$5 Billion Battle For The American Dinner Plate. Retrieved November 24, 2015, from <http://www.fastcompany.com/3046685/most-creative-people/the-5-billion-battle-for-the-american-dinner-plate>

- Smith, C. (2015, April 22). Membership-based delivery services are beginning to disrupt the \$600 billion-a-year grocery industry. Retrieved November 24, 2015, from <http://www.businessinsider.com/e-commerce-disrupting-grocery-industry-2015-4>
- Smith, S. (2015, November). Global Active and Intelligent Packaging Market By Type, Applications, Geography, Vendors and The Challengers - Forecasts, Trends and Shares (2015- 2020)
- Statistics Canada,. (2011). Canadian households in 2011: Type and growth. Retrieved 23 February 2016, from https://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-312-x/98-312-x2011003_2-eng.cfm
- The Toronto Star,. (2016). Rising food prices push Canadian inflation to 2% | Toronto Star. Retrieved 21 February 2016, from <http://www.thestar.com/business/2016/02/19/rising-food-prices-push-canadian-inflation-to-2.html>
- Toor, A. (2013, May 4). Color-changing gloves detect airborne toxins with shades of blue. The Verge. Retrieved November 15, 2015, from <http://www.theverge.com/2013/5/4/4299528/fraunhofer-gloves-change-color-in-presence-of-toxins>
- "Town of Richmond Hill - Community Allotment Garden." Town of Richmond Hill - Community Allotment Garden. N.p., n.d. Web. 18 Nov. 2015
- USDA. (2015, July 9). USDA ERS - Adoption of Genetically Engineered Crops in the U.S.: Documentation. Retrieved November 25, 2015, from <http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/documentation.aspx>
- Van Mensvoort, K. (2010, January 23). Digital Gastronomy. Retrieved November 12, 2015, from <https://www.nextnature.net/2010/01/digital-gastronomy/>
- Walker, S. (2014, October 12). Why Canada may be heading into a food security crisis. The Toronto Star. Retrieved from http://www.thestar.com/news/insight/2014/10/12/canada_may_be_heading_into_a_food_security_crisis.html
- Washington, N. (2015, May 20). Bug Off: Why Insect Eating Is More Gimmick Than Reality. Retrieved from <http://theplate.nationalgeographic.com/2015/05/20/bug-off-why-insect-eating-is-more-gimmick-than-reality/>

- Womack, B. (2015, September 8). Google to Start Testing Grocery Deliveries This Year. Retrieved November 18, 2015, from <http://www.bloomberg.com/news/articles/2015-09-08/google-to-start-testing-grocery-deliveries-this-year>
- Whitacre, P. T., Tsai, P., & Mulligan, J. (2009). The Public Health Effects of Food Deserts: Workshop Summary. National Academies Press.
- Wrigley, N. (2002). "Food Deserts" in British Cities: Policy Context and Research Priorities. *Urban Studies*, 39(11), 2029–2040.
- Wu, F., & Butz, W. (2004). The future of genetically modified crops : lessons from the Green Revolution. RAND Corporation. Retrieved from http://www.rand.org/content/dam/rand/pubs/monographs/2004/RAND_MG161.pdf
- Zoran, A. and Coelho, M. (2010) "Cornucopia: The Concept of Digital Gastronomy." in *Leonardo: Journal of the International Society for the Arts, Sciences and Technology*. Volume 44, Number 5, October 2011, pp. 425-431.



Created by Ollie Taylor
from the Noun Project



Created by Creative Stall
from the Noun Project



Created by Franc
from the Noun Project



Created by Yazmin Alanis
from the Noun Project



Created by Joel McKinney
from the Noun Project



Created by Creative Stall
from the Noun Project



Created by Michael Wohlwend
from the Noun Project



Created by Ollie Taylor
from the Noun Project



Created by Creative Stall
from the Noun Project



Created by Aha-Soft
from the Noun Project



Created by Mathies Janssen
from the Noun Project



Created by Ed Harrison
from the Noun Project



Created by Krisada
from the Noun Project



Created by Anton Hakanson
from the Noun Project



Created by Jane Pellicciotto
from the Noun Project



Created by Rediffusion
from the Noun Project

