



INNOVATION IN CHICAGO'S FOOD INDUSTRY

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Executive Summary



Food manufacturing is in Chicago's DNA. Throughout the 19th century, the city's proximity to the nation's most productive farmland, as well as an extensive transportation network, led to significant economic growth. Today, the metro area is home to the nation's largest food manufacturing workforce, as well as several of the industry's largest corporations.

Accelerated by the pandemic, shifting consumer preferences and global price pressures position the food industry for change. Chicago's **food innovation ecosystem** builds off of its well established manufacturing industry, helping companies develop and commoditize new food, as well as food-related technologies and distribution methods. An extensive network of local startups, incubators, corporate partners, investors, and food enthusiasts put the city on the forefront of food for a changing world.

In this issue of the Chicago Business Bulletin, the World Business Chicago Research Center shines a spotlight on an ecosystem important to the city's identity and economy. We describe the industry in Chicago and why it's been able to flourish here, while subsequently highlighting macro factors that have driven industry change.

Findings:

- Chicago has a historic food manufacturing industry, which thrives in the presence of the full production value chain. This clustering of food companies encourages innovation.
- Food innovation is one of Chicago's fastest growing verticals, and has more venture capital investment than Boston and Seattle. However, there is opportunity for increasing early-stage investments.
- Innovation in Chicago's food innovation ecosystem looks different than in other industries: large companies may acquire innovation rather than creating it, while small businesses spend more on R&D than larger corporations.
- Investments in Chicago's food innovation companies with active patents are at an all-time high, while investments in similar companies in other top tech ecosystems decline.

Fact Sheet:



Chicago's food and beverage manufacturing industry is the nation's largest, generating **\$9.4B annually** in output, and employing over **65K** individuals.



Chicago's food innovation ecosystem consists of **3 WBC-defined segments**, with over **2,800** locally headquartered companies.



In 2021, Chicago's food innovation companies raised **\$723M** in venture capital, an **508% increase** over 2019. In Q1 2022, companies raised \$111M in venture capital.



There are **48** known food and beverage companies in Chicago holding an aggregate total of **938** active patents.



There have been **36** known food-related pro-Chicago decisions since 2021, with **17** since the beginning of 2022 alone.

Chicago's Food Ecosystem



Chicago became the nation's capital for food manufacturing more than a century ago, and it remains so today.

Chicago has been a hub for the conversion of raw farm products into edible goods since the 19th century. Chicago's central location in the country's breadbasket made it an axis of exchange in the food industry. As agricultural activity grew and concentrated around Chicago, its manufacturing, finance, and transportation industries were developed. Key entities were established, including the Union Stock Yards and the Chicago Board of Trade, which was founded as a cash market for grain. The ability to finance production of food and transport it to anywhere in the US allowed Chicago companies to develop some of the nation's most ubiquitous foods throughout the 20th century.

Today, Chicago remains the nation's capital for food manufacturing. Chicago boasts both the nation's largest workforce and output, employing over 65,000 individuals with a GDP of over \$9.4 billion in 2021. Chicago is home to some of the world's most notable global food companies, and a plethora of supporting industries, such as transportation and warehousing or packaging manufacturing. Innovative companies and entrepreneurs continue a legacy of developing enticing new food products and concepts.

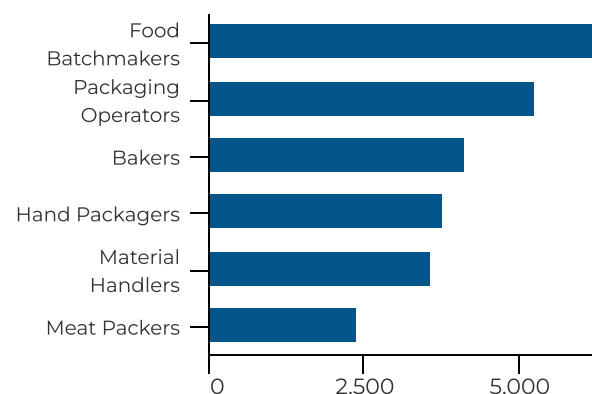
Chicago's food manufacturing industry outperforms with employment growth: **between 2019 and 2022, employment grew 9.4%, versus 4.2% nationally.** While total manufacturing employment continues to decline, food manufacturing offers a positive story. Top occupations in this industry illustrate the broad value chain Chicago offers. Chicago offers a strong workforce across a range of functions.

As a Midwestern hub, Chicago is the epicenter of many major food and beverage companies.

| Top locally HQ'ed food companies | Global employee count* |
|----------------------------------|------------------------|
| McDonald's | 2,000,000** |
| Mondelez International | 80,000 |
| ADM | 40,000 |
| Conagra Brands | 18,600 |
| Kraft Heinz Co. | 36,000 |
| Mars Wrigley | 36,000 |
| US Foods | 28,000 |
| Molson Coors Beverage Co. | 16,300 |
| Ingredion | 12,000 |
| Quaker Oats | 11,800 |

*Most recent employee count captured by PitchBook Data, Inc.
**Including all franchise employees.

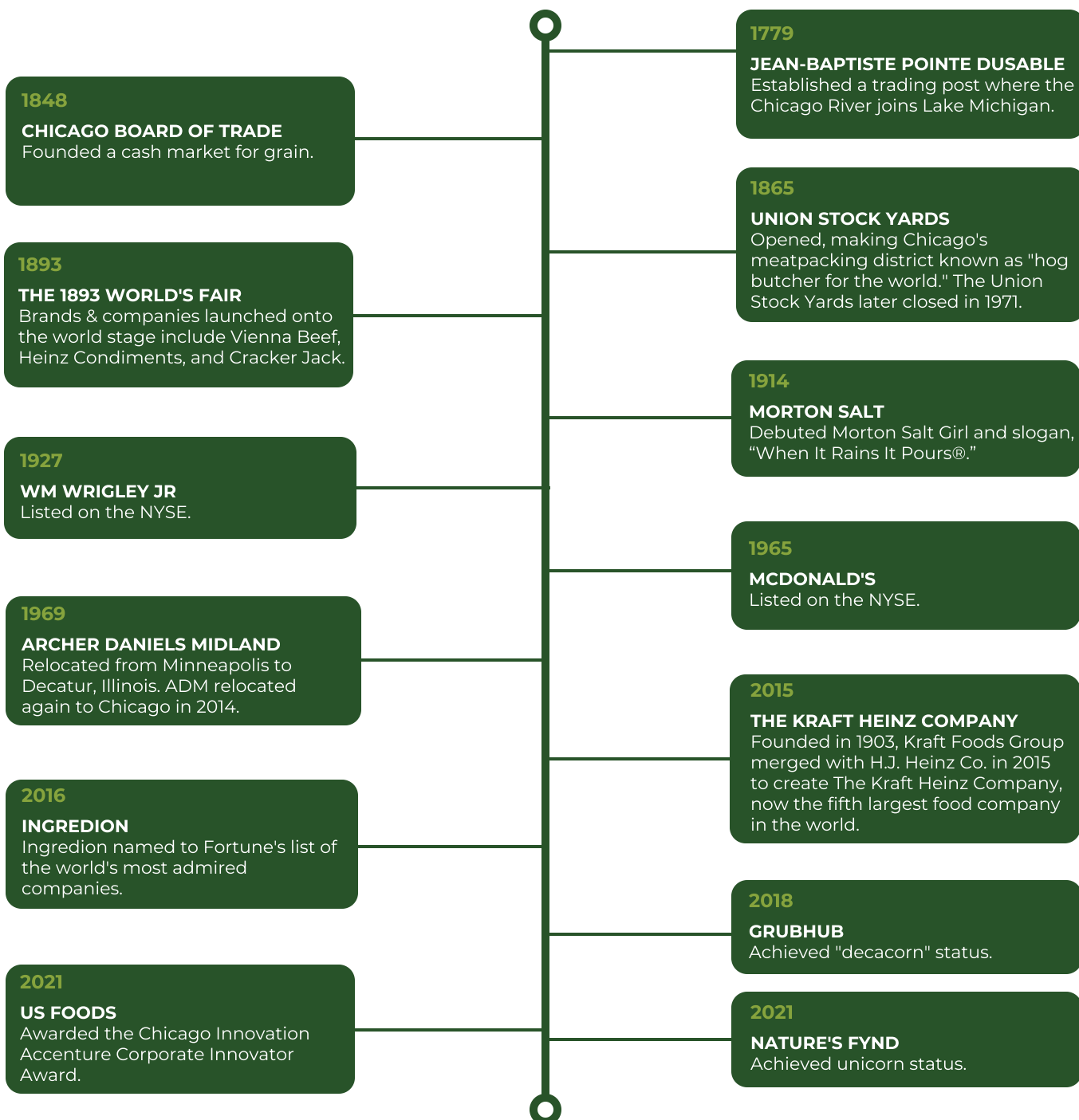
Top Occupations in Food Manufacturing, 2022 Employment



Sources:

- PitchBook Data, Inc.
- EMSI Burning Glass
- Moody's Analytics
- Chicago IFT | Chicago Food Industry
- Poiniski, M. (2019, October 1). "Why Chicago is the nation's capital of food and beverage manufacturing." Food Dive.
- Wilkins, P. (2019, April 18). "How Chicago fuels food-focused innovation." Forbes.

Chicago's Food Ecosystem



Sources:

- Zippia, US Foods Office Locations and Headquarters.
- PitchBook Data Inc.
- Nagasawa, K. (2019, May). "From Vienna Beef To PBR: Five Food And Drink Legacies Of The 1893 World's Fair." NPR.
- The Kraft Heinz Company, 2022.

Chicago's Food Ecosystem



Chicago's food manufacturing industry has fostered a well-developed food innovation ecosystem.

Chicago's food and beverage industry is continuously innovating by developing new products, processes, and services to meet consumers' evolving needs. Innovation ensures profitability and survival for the industry. Standing on the shoulders of its historic food manufacturing industry, **Chicago is a national hub for food innovation, home to over 2,800 companies in its ecosystem.** Supporting this ecosystem is a network of food-focused:

- **Incubators and accelerators**, such as the Hatchery, the Food Foundry, and FoodLab Chicago, among others.
- **Corporate innovation centers**, such as Accenture's the Extract, Conagra Brands Center for Food Design, the Mars Wrigley Global Innovation Center, and the Kraft Heinz R&D Center, among others.
- **Venture capital firms**, such as Cleveland Avenue, Valor Equity Partners, Bluestein Ventures, and Hyde Park Angels, among others.
- **Other ecosystem partners**, such as the Chicagoland Food & Beverage Network or Naturally Chicago. This includes World Business Chicago's programmatic work to support expansions, relocations, and growth.

Investment in Chicago's food innovation ecosystem yields returns: Chicago is home to some of the nation's most innovative food products and services. From fungi-based proteins to online grocery, Chicago is a driving force in food for a modern world.

Three main segments in Chicago's food innovation ecosystem are raising venture capital.

These segments reflect Chicago's strong food manufacturing roots; of 100+ companies that have raised venture capital since 2019, half are related to new manufactured food products, while a third are related to distribution.

NEW FOODS & PRODUCTION

Innovation in ingredients and manufactured products, including food and beverages.



- Engineered ingredients
- Vegan foods
- Organic and natural foods
- Health and performance-maximizing foods
- "Free from" foods
- International cuisines
- Specialty pet food
- Other new consumer tastes

Examples: Nature's Fynd, Ayo Foods, GoodSport Nutrition, Because Animals

\$409.6 M

Total venture capital raised in 2021

DISTRIBUTION TO CONSUMERS

New ways in which grocers and restaurants can get their products to customers.



- Meal kits
- Meal and grocery delivery platforms, including dark stores and vending machines
- Online marketplaces
- Food & culinary incubators
- Payment processing
- Logistics and supply chain platforms

Examples: Grubhub, Foxtrot, Farmer's Fridge, Provi

\$238.3 M

Total venture capital raised in 2021

HARDTECH & MATERIALS

New physical technologies that improve food production or distribution.



- Sustainable packaging
- Restaurant tech, including robotics
- Kitchen tech, including machinery and tools

Examples: Hazel Technologies, Bartesian, SoFresh, PourMyBeer

\$70.0 M

Total venture capital raised in 2021

Source: PitchBook Data, Inc.

Chicago's Food Ecosystem



Food innovation is booming in Chicago, although stratified by pre-venture and later-stage venture capital deals.

Since 2019, venture capital in food innovation companies has increased 508%, marked by increasingly larger, later-stage deals. Further underscoring this is the increase of median post-deal valuations, from \$12.9M in 2019 to \$34M in 2021. Food innovation is one of Chicago's fastest growing verticals, topped only by healthtech and logistics tech.

At the other end of the spectrum, about half of food innovation deals in 2021 were in the pre-venture stage. Roughly a third of Chicago's food innovation companies receiving pre-venture capital go on to raise early- or later-stage deals.

| Stage - \$M | 2019 | 2020 | 2021 | 2022 (Q1) |
|-------------------------|---------|---------|---------|-----------|
| Pre-VC | \$28.6 | \$36.3 | \$62.8 | \$10.3 |
| Early-Stage VC | \$30.8 | N/A | \$30.2 | N/A |
| Later-Stage VC | \$59.6 | \$316.9 | \$630.2 | \$100.8 |
| Total VC Raised | \$119.0 | \$353.2 | \$723.2 | \$111.0 |
| Total Deal Count | 48 | 57 | 54 | 11 |

Investment in Chicago's food innovation companies outperforms some top ecosystems, but there is an opportunity to increase early-stage investments.

Chicago's food innovation companies received more venture capital investments than both Seattle and Boston, two ecosystems that tend to outperform Chicago for overall venture investments. This is driven by **higher amounts of later-stage venture capital and pre-venture stage investments**. Conversely, **Chicago lags other tech ecosystems in early-stage venture funding**, suggesting the ecosystem would benefit from support for food innovation companies moving from pre-venture to early-stage venture capital investments.

Venture Capital Invested in Top Tech Ecosystems - 2021 \$M

| Stage | SF Bay | LA | NYC | Boston | Seattle | Chicago |
|-----------------------|---------|---------|---------|--------|---------|---------|
| Pre-VC | \$161 | \$134 | \$214 | \$32 | \$35 | \$63 |
| Early-Stage VC | \$521 | \$299 | \$1,370 | \$242 | \$19 | \$30 |
| Later-Stage VC | \$5,020 | \$1,450 | \$1,500 | \$380 | \$92 | \$630 |
| Total | \$5,700 | \$1,880 | \$3,080 | \$654 | \$145 | \$723 |

Source: PitchBook Data, Inc.

Chicago's Food Ecosystem



Chicago is a hub for venture capital investment in food-related startups.

Chicago's food ecosystem is supported by a strong network of local investors. In 2021, 25% of investors in food-related venture capital deals in Chicago were local. This figure is on par with local investment in the Bay Area and New York, both of which are home to significantly more venture capital firms than Chicago.

Furthermore, Chicago has a greater proportion of venture capital firms with a preference for food and beverage startups: 5% of firms nationwide are located in Chicago, versus 4% of all venture capital firms. Several local firms focus exclusively on food-related startups, such as Bluestein Ventures, Germin8, or S2G Ventures.

Chicago's food innovation startups are also attracting more investors: the number of investors increased 21% between 2020 and 2021, trailing only New York and Los Angeles.

| Food Innovation Ecosystem | # Investors in 2021 VC deals | % Change over 2020 | % Local Investors |
|---------------------------|------------------------------|--------------------|-------------------|
| Chicago | 138 | +21% | 25% |
| Bay Area | 697 | +11% | 25% |
| New York | 505 | +33% | 25% |
| Los Angeles | 387 | +56% | 12% |
| Boston | 120 | -8% | 13% |
| Seattle | 62 | -7% | 13% |

273

Total investors in food-related venture capital deals between 2019 and Q1 2022.

79

Chicago-based venture capital firms involved in food-related deals between 2019 and Q1 2022, of which 9 have an explicit preference for food and beverage companies.

Hyde Park Angels
Valor Equity Partners
Chicago Early Growth Ventures
Cleveland Avenue
Beliade (NYC)
M25

Venture capital firms involved in the most food-related deals between 2019 and Q1 2022.

Source: PitchBook Data, Inc.

Why is Chicago a Food Innovation Hub?



Chicago's concentrated supply chain allows innovation to flourish.

Chicago has the full value chain for food manufacturing. The region's strategic location — in America's breadbasket and at the nation's crossroads — means easier access to inputs and getting products to market. Combined with the fact that Chicago is a leader in the professional services industry and home to preeminent research institutions, food manufacturers and innovators have the tools they need to develop and commoditize products, processes, and services.

Chicago's proximity to inputs and customers:

1. Creates a clustering of assets that give rise to an innovation ecosystem.
2. Encourages cost savings from greater supply and lower transportation costs. This creates a lower barrier to entry for early-stage firms, and frees up capital for established food manufacturers and innovators.

Case in point: the Chicago metro area is home to key manufacturing inputs, like box manufacturing and meat processing, as well as the nation's most trucking companies. Surrounding the city are over 5,500 crop and animal producers.

| Top Inputs | Firm count in the Chicago metro area | National metro area rank by firm count | Combined firm count in IL, WI, IN |
|--|--------------------------------------|--|-----------------------------------|
| Animal Production | 89 | #27 | 2,360 |
| Crop Production | 303 | #24 | 3,226 |
| Animal Slaughtering & Meat Processing | 92 | #1 | 372 |
| Corrugated and Solid Fiber Box Manufacturing | 87 | #1 | 234 |
| General Long-Distance Freight Trucking | 5,506 | #1 | 9,140 |
| Grocery Merchant Wholesalers | 741 | #4 | 2,052 |

THE FOOD INNOVATION SUPPLY CHAIN



Sources:

- Emsi Burning Glass
- U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.
- Katz, Bruce and Julie Wagner (May 2014). "The Rise of Innovation Districts: A New Geography of Innovation in America." Metropolitan Policy Program at Brookings Institution.

Why is Chicago a Food Innovation Hub?

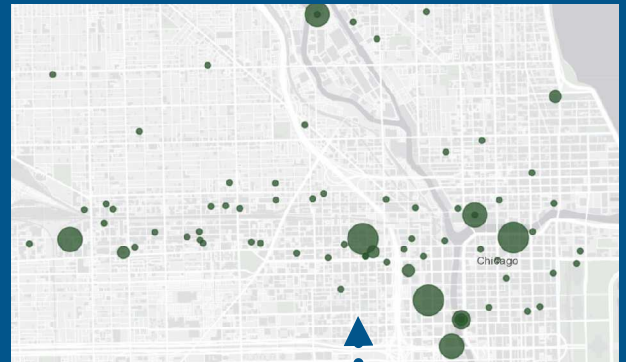


Historical food manufacturing clusters are still present in Chicago, and modern trends have created new ones.

Chicago's legacy food manufacturing industry provides the space for new innovation. Even today, food innovators are choosing to locate near historic clusters.

Building on the idea that clustering of companies and assets allows innovation to flourish, Chicago's urban environment puts legacy firms, startups, and other ecosystem partners in proximity to each other. This density not only concentrates a skilled workforce, it allows for greater innovative collaboration.

The **Kinzie Industrial Corridor and Goose Island** still draw food and beverage companies, like the Mars Wrigley Global Innovation Center.



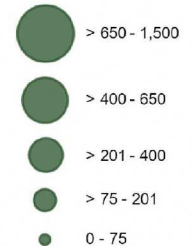
Food and beverage companies are clustered around **O'Hare Airport**, the country's top port by trade value.



The **Union Stockyards** are still home to dozens of food and beverage companies.

NAICS 311, NAICS 312

Number of Employees



Source: Esri Business Analyst

Why is Chicago a Food Innovation Hub?



Chicago's reputation as a food innovation hub is evidenced by companies continuing to relocate or expand here.

Companies generally establish themselves where there is the most opportunity for growth. Expansions or relocations are a reflection of an area's established industry, or potential to accommodate one.

At the start of last year, World Business Chicago developed an original methodology to track "pro-Chicago decisions," which reflects positive economic impact for the city. **Since 2021, there have been 36 food-related pro-Chicago decisions.**



In addition to traditional food manufacturers, these pro-Chicago decisions include innovative businesses developing engineered ingredients, food delivery platforms, and online grocers that utilize dark stores. Included are also ecosystem catalysts, like Mars Wrigley's forthcoming R&D center, or Univar Solutions' partnership the Hatchery to develop a new food laboratory.

EXAMPLE PRO-CHICAGO DECISIONS

| | |
|------------------------------------|--|
| Nature's Fynd 2021 | A fungi-based protein manufacturer. In 2021, they announced a 200K square foot facility in Chicago's historic Union Stock Yards. |
| Getir 2021 | An online-grocery and restaurant rapid delivery service, based in Turkey, that debuted its first U.S. location in Chicago's Andersonville neighborhood. |
| Mars Wrigley 2022 | A leading confectionery manufacturer that announced plans for a new \$40 million R&D center next to its world headquarters on Chicago's Goose Island. |
| Mark Anthony Brands 2022 | An alcohol beverage manufacturer and distributor, renowned for a portfolio of brands. In 2022, they announced a new, 47K square foot headquarters in Chicago's Fulton Market District. |

Source: WBC Research Center

Food Industry Change Factors



Change is accelerating in the food industry.

The food industry was highly competitive prior to the pandemic. The resulting shutdowns and continued disruptions has increased competition, and accelerated innovation activities for food manufacturers. **A review of recent academic literature shows there are four main drivers of change within the food industry** that can stimulate additional innovation activities: changing consumer spending patterns, evolving technology, supply chain disruptions, and environmental concerns.

1. Consumers are spending more than ever, especially on essential items.

Although total consumer spending fell during the early months of the pandemic, it quickly rebounded: as of Q1 2022, national consumer spending is 14% above the pre-pandemic peak. Although 40-year-high inflation rates threaten to tame spending, retail sales remains stable because of factors like rising income: **year-over-year comparisons show 6.9% growth in retail sales in March 2022.**

Spending on non-durable goods, like food and household supplies, has sharply increased. Throughout the pandemic, consumers across the nation prioritized necessary spending — especially as 17 million individuals became unemployed — while restaurant and other leisure-related spending plummeted. Consumers also benefitted from easier options for spending at home, including food and grocery delivery services.

2. Technology and ideas continue to evolve, prompting more opportunities for innovation.

Research and innovation in related fields, like biotechnology, artificial intelligence, or software development, create new applications for the food industry. For example, until recently there were few alternatives to traditional animal proteins, which consisted mostly of soy-based products. Today, mainstream supermarkets provide consumers with new options, ranging from clean meats to fungi- or algae-based foods.

New ideas and technologies make operating in the food industry cheaper and easier than ever. Restaurants are able to access better software at more accessible prices, like online sales platforms or accelerated checkout processes. Similarly, shared or ghost kitchens, food trucks, and food halls reduce the capital required to start up, encouraging new ideas and foods to enter the market.

NEW IDEAS IN CHICAGO

Minority- and black-owned restaurants and food producers in Chicago were especially impacted during the pandemic: over 40% were forced to close in the initial round of shutdowns.

Businesses that could no longer keep up costs for brick-and-mortar operations found a lifeline from food trucks, ghost kitchens, and food halls.

Sources:

- Ghosh, R. (2022, April 18). "Retail sector continues to grow despite challenges: 5 picks." Nasdaq.
- (2021, December 14). "US consumer sentiment and behaviors during the coronavirus crisis." McKinsey & Company.
- Remes, J., et al. (2021, December 15). "The consumer demand recovery and lasting effects of COVID-19." U.S. Bureau of Labor Statistics.
- St. Louis Federal Reserve, FRED Economic Data: Personal Consumption Expenditures.
- Chu, L. (2021, February 9). "How Chicago's Black-owned restaurants have fared during the pandemic." Chicago Tribune.
- Knowles, F. (2020, July 16). "With limited access to resources, black-owned businesses hit especially hard by pandemic." Chicago Tribune.
- U.S. Bureau of Labor Statistics
- PitchBook Data Inc.

Food Industry Change Factors



Change is accelerating in the food industry (cont.)

3. Recent volatility in import and export prices have drastically impacted supply and demand.

Over the past year, demand shocks, supply chains disruptions, higher energy prices, and geopolitical tensions contributed to increased instability in import, export, producer, and consumer prices.

Throughout the pandemic, meat, dairy, and eggs were the products most affected by the pandemic. Initially, shutdowns prevented these products from getting to market, while imports into the US from other countries' producers were limited and demand from institutional customers waned. For example, export prices for all dairy products and eggs declined 5.3% from January to April of 2020 prior to plummeting drastically again by 11.9% in May of 2020. The subsequent oversupply of milk and cheese led to a limiting of production: in June of 2020, export prices then increased by 24.5%, reaching levels well above those prior to pandemic-driven decreases.

More recently, the conflict in Ukraine has continued to drive global agriculture commodity prices to near-record levels. Globally, wheat and soybean prices have both doubled in the past eighteen months, which can be attributed to rising energy prices and increased demand. Sanctions on Russia, the world's largest fertilizer producer, in addition to the disruption of grain exports from the region, further exacerbated price increases.

As the cost of basic food products increase, imports & exports decrease, and vice versa. Meat and fish prices provide a clear example: as trade for meat and fish products decreases, prices increase. The diagrams below demonstrate the how pandemic-related shortages impacted trade, prices, and livelihoods.

After meat processing plant shutdowns and decreased Asian imports caused shortages, meat prices continued to rise. Even after plant re-openings and increased demand from Asia, by June 2020 prices reached 8.1% over pre-pandemic levels.

OUTCOME



The value of U.S. meat exports falls 22.5% between March and May 2020, lowering prices.

April 2020, pork prices increase as imports decline due to decreased production in China.

April 2020, COVID-19 outbreaks in U.S. meat processing plants led to a domestic meat shortage, causing an increase in demand for imports.

FACTORS + EFFECTS

Exported fish and shellfish prices fell 17.1% from January to June 2020, while import fish and shellfish prices declined 8.4% over the same period.

OUTCOME



Lobster prices decreased because of the reduction in demand from restaurants and the cruise industry, which was effectively shut down.

Shutdowns inhibited fish farming, causing shortages and price increases. The damage on fish farmers' livelihoods was followed by food insecurity for vulnerable consumers.

FACTORS + EFFECTS

Sources:

- U.S. Bureau of Labor Statistics
- PitchBook Data, Inc.
- Liu, Yizao and Adam Rabinowitz. (Winter 2021). "The impact of the COVID-19 pandemic on retail dairy prices." Agribusiness.
- (2022, April 6) "The Ukraine Conflict and Other Factors Contributing to High Commodity Prices and Food Insecurity." USDA Foreign Agricultural Service.

Food Industry Change Factors



Change is accelerating in the food industry (cont.)

4. Consumers and food companies are more aware of the impact food systems have on the environment.

An estimated 20% to 30% of all greenhouse gas emissions are attributable to food systems, with emissions from animal-based foods being nearly twice those of plant-based foods. Simultaneously, humans will need more food than ever: the UN estimates food production will need to increase by 70% between 2009 and 2050 to meet demand. As such, food companies are dialing up sustainable products, while shoppers are increasingly choosing eco-friendly products. Climate change mitigation has also become an important issue for investors, as investment in cultured meats and alternative farming have increased in recent years.



31%

of Chicago households used environmentally friendly products in the last six months.

What about AgTech?

Roughly 75% of the Illinois' total land area is farmland, while there are nearly 900 community gardens and commercial urban farms in the Chicago-area. **While Chicago's strengths lie in food manufacturing, its proximity to abundant agriculture, as well as its thriving tech workforce, make it a well-suited hub for the related AgTech vertical.** AgTech bridges traditional farming with advanced technology, to create hardware and software that improves efficiency, productivity, profitability and sustainability.

Although a young industry, AgTech is emerging as a powerfully strategic vertical under the conventional agri-food industry. In 2021, Chicago's AgTech companies raised \$89.9 million in growth capital, a 284% increase over 2020. In fact, this was more than the \$87.9 million in growth capital raised by AgTech companies from 2013 to 2020 combined. AgTech companies are increasingly pioneering new methodologies for more sustainable agriculture, as **the exponential growth of AgTech has two drivers: population growth and climate change.** The agriculture industry will need to adapt quickly to feed a projected 9.8 billion people by 2050. In tandem, extreme weather patterns caused by climate change have the potential to jeopardize agricultural output.

Chicago also benefits from close proximity to the **University of Illinois Urbana-Champaign**, a global epicenter for AgTech. [Learn more about AgTech at UIUC](#)

AgTech companies that recently expanded in Chicago:



Four Star Mushrooms

Sustainably produces gourmet mushrooms with greater longevity in a controlled environment facility.



Hazel Technologies

Develops products for produce, such as packaging inserts, that extend shelf life.



Deere & Company

Manufactures and distributes agricultural, forestry and lawn care equipment and machinery.

Sources:

- PitchBook Data, Inc
- Advocates for Urban Agriculture
- "The Global Startup Ecosystem Report: Agtech & New Food Edition." Startup Genome.
- Illinois Department of Agriculture
- Kuethe, T. "Changes in Farms and Farmland in Illinois." farmdoc daily (9):76, Department of Agricultural and Consumer Economics
- Xu, Xiaoming, et al. (September 2021). "Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods." Nature Food.
- Watson, Audrey. (23 March 2020). "The Food System & Climate Change." Princeton Student Climate Initiative.

Methods of Food Innovation in Chicago



Food innovation companies spend more on other innovation activities compared to traditional research and development.

Industry innovation can take many forms: it is not limited to government-incentivized research and development, but can include any activity that improves a process or a product. While typical research and development typically focuses on product development, food innovation companies often focus on process improvements. As such, **innovation in the food and beverage industry is often overlooked because it does not typically adhere to traditional research and development methods used in other industries.**

Case in point: food and beverage companies spent a total of \$36.7B nationally on total innovation costs, but only \$3.4B on traditional R&D. Because the food industry is among the world's most competitive industries, and often the target of imitations, **research shows that the food industry focuses more on process innovation rather than product innovation:** 30% of food and beverage companies have developed innovative processes, versus 24% with innovative products. **A focus on process innovation may explain lower expenditures on traditional research and development as compared to total innovation expenditures.**

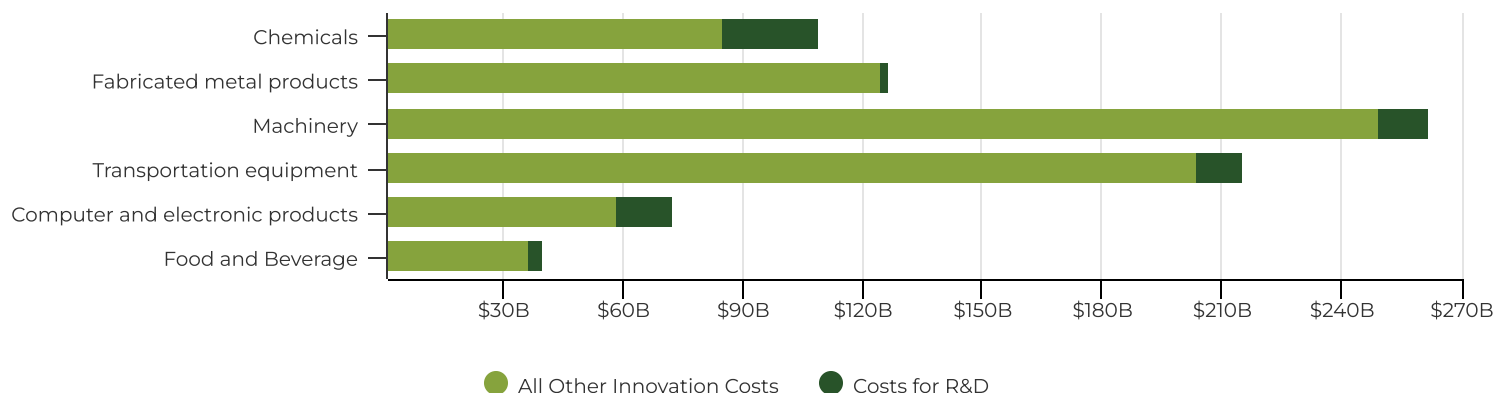
Two meaningful differences in research and development activities set food innovation companies apart from other industries.

The research and development that does occur within the industry has some important differences from research and development performed by other industries:

- First, **small food and beverage businesses spend more on research and development than larger businesses, and they are outliers among small businesses in any industry** — food and beverage companies with fewer than 50 employees represent 51% of all innovation expenditures within the industry, spending \$18.9B compared to \$6.4B by companies with greater than 250 employees.
- Second, **food and beverage companies spend a higher percentage of research and development costs on materials and supplies** and salaries of researchers.

Propensity to invest in research and development by small businesses, coupled with higher materials costs suggest a policy intervention would help the food manufacturing industry shift from process innovation to research supported product innovation.

Industries with Highest Innovation Expenditures



Source: "Annual Business Survey: 2019 (Data Year 2018)," National Center for Science and Engineering Statistics (NCSES).

Methods of Food Innovation in Chicago



Chicago's food companies use acquisition as a tool for innovation.

Chicago overperforms national averages for food companies acquiring and being acquired, suggesting that:

1. More of Chicago's industry giants are turning towards acquisition to fuel innovation, and
2. More of Chicago's early-stage companies are exiting the VC ecosystem through acquisitions.

In 2021, 14 Chicago corporations acquired 27 companies. Over 0.5% of all food companies in Chicago acquired a subsidiary company, compared to 0.3% of all companies nationwide. On the flip side, 17 food companies in Chicago were acquired by 16 companies; 0.7% of Chicago's food companies were acquired, compared to 0.6% of all companies nationwide.

This fact, combined with the food industry's underperformance for expenditures dedicated to internal innovation, suggests that innovation in Chicago's food ecosystem is less traditional than other industries. **Instead of investing in costly research and development, larger food companies may use acquisition to fold in new products and technologies.** The appetite for acquisitions suggests that smaller food innovation companies represent a value proposition to not just investors, but other food manufacturing giants.

Strategic acquisitions by Chicago companies

Mondelez

- Vegan food producers
- Nutrient dense food manufacturers

Kraft Heinz

- International food manufacturers
- Health food manufacturers
- Plant-based food joint venture

McDonald's

- AI ordering tech

Archer Daniels Midland

- Probiotic & enzyme manufacturer
- Fragrance & flavor producers
- Pet treat manufacturer
- Soybean processor

Ingredion

- Plant-based ingredient producers
- Ingredient tech

Source: PitchBook Data, Inc.

Chicago: the Nation's Food Innovation Capital



Chicago's food innovation ecosystem is a national leader in patent development.

There are 48 known food and beverage companies in Chicago holding an aggregate total of 938 active patents. Although smaller food and beverage companies may spend more on research and development activities, larger companies tend to hold more patents. In Chicago, 22 of the 48 companies with active patents have more than 250 employees each, and 10 of those 22 have over 10,000 employees.

Investments in Chicago's food innovation companies with active patents have reached record highs for three years in a row.

Since 2010, Chicago food and beverage companies with active patents have raised just over \$590M in venture capital, with \$123M in early stage and \$469M in late stage venture capital: approximately 80% of investment was late stage. Moreover, **investments in 2021 broke records for the third time by reaching \$420M in venture capital, a 423% growth from 2020 investments.**

Chicago's food innovation companies with active patents outperform other tech ecosystems.

Compared to similar food and beverage companies in top tech ecosystems, Chicago-based companies outperform other top ecosystems, except the San Francisco Bay Area, though investment trends show a clear shift away from that location since 2016. **Venture capital investment in San Francisco Bay Area companies with active patents peaked in 2016 at \$7.2B, and has stayed 50% below that high, while venture capital investments in Chicago-based companies are breaking records.**

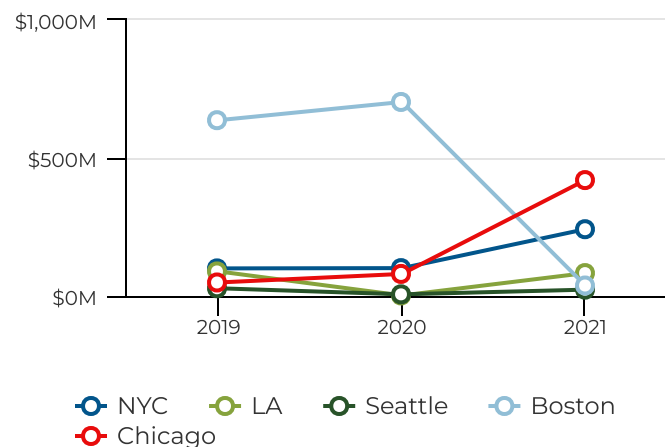
48 food innovation companies in the Chicago area with at least one active patent.

938 active patents, across **53** different CPC classes and **115** different CPC subclasses.

29 food innovation companies have pending patents.

| Ecosystems | Companies with Active Patents | Number of Active Patents |
|------------|-------------------------------|--------------------------|
| SF Bay | 93 | 1,845 |
| Chicago | 48 | 938 |
| NYC | 48 | 599 |
| LA | 36 | 88 |
| Boston | 31 | 531 |
| Seattle | 13 | 124 |

Venture Capital Investment in Food Innovation Companies with Active Patents



Source: PitchBook Data, Inc.

Findings



1. Chicago has a historic food manufacturing industry, which thrives in the presence of the full production value chain. The clustering of food companies and supporting industries encourages innovation.

Chicago's strategic location and historic food manufacturing industry means that we have all the supply chain inputs in or near the region. In addition to reducing operating costs that can be leveraged for innovation, this gives rise to a cluster of food companies and talent. Close proximity of players in Chicago's food ecosystem encourages collaboration and innovative ideas.

2. Innovation in Chicago's food industry is substantial and growing.

As evidenced by the facts that:

- Food innovation in Chicago is one of its fastest growing verticals, boasting a **508% increase in venture capital investment since 2019**. Chicago's food companies have more venture capital investment than other top ecosystems, like Boston and Seattle.
- Investments in Chicago's food innovation companies with active patents are at an all time high, while the trend for top tech ecosystems — especially the Bay Area — shows a decline.
- The number of investors participating in food-related venture capital deals increased 21% between 2020 and 2021. Chicago has incredible community of local investors: in 2021, a quarter of investors were local, which is on par with top venture capital ecosystems.

3. Innovation in Chicago's food innovation ecosystem looks different than in other industries.

Specifically:

- Food companies in Chicago are more likely to acquire or be acquired. This suggests that **larger food manufacturers are finding advantages to acquiring innovation rather than creating it**.
- In the food industry, **small businesses spend more on research and development** than larger corporations. Furthermore, food companies investing in R&D spend more on materials and supplies than companies in other industries.

4. There are specific opportunities for supporting increased innovation.

The Research Center presents at least three areas for growth within the food innovation ecosystem:

- Capturing more early-stage venture capital, as venture capital is currently stratified between pre-venture and later-stage deals.
- Doubling down on incubators that cater to food-focused startups, like the Hatchery, to develop and commoditize innovation. This would support the growth of startups that can mature or exit through acquisition.
- Supporting small businesses investing in R&D. Policy interventions, like sales tax exemptions for research and development materials, could provide additional support for innovation.



About

World Business Chicago is Chicago's public-private economic development agency. Our mission is to drive inclusive economic growth and job creation, support businesses, and promote Chicago as a leading global city. Our vision is to ensure that all Chicagoans prosper.

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