COLORADO BUSINESS REVIEW

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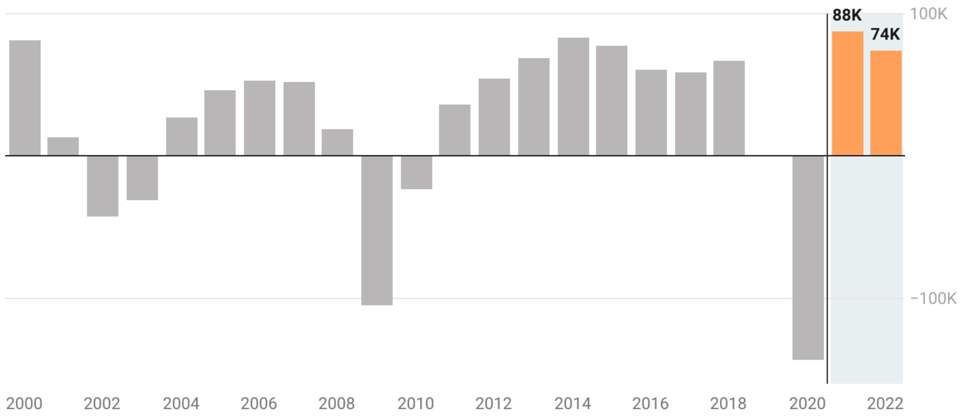
Summary of Forecast

Colorado Employment Will Rebound from the Recession in 2022

Colorado projected to add 73,900 jobs in 2022

Jobs added, Colorado



Source: Colorado Department of Labor and Employment; Colorado Business Economic Outlook Committee • Created with Datawrapper

The following observations summarize the thoughts of the Colorado Business Economic Outlook committee members as of early December 2021.

Employment in Colorado is estimated to have increased 3.3%, or 87,600 jobs in 2021, once data revisions take effect in March 2022, illustrating a strong recovery from the devastating pandemic-induced recession that struck the state last year. Colorado will mark job growth in 2022, increasing another 73,900 (2.7%), effectively recouping total jobs lost due to the pandemic recession. However, the recovery has been uneven across industries and communities.

In 2022, Leisure and Hospitality is projected to add the most jobs, followed by Professional and Business Services. The fastest pace of jobs growth (percentage terms) is projected in Leisure and Hospitality and in Natural Resources and Mining.

Agriculture—High production costs and drought concerns will remain a headwind for the Agriculture sector in 2022. Increased global demand and supply chain issues helped to push prices to highs for wheat and corn in 2021. Colorado farmers are benefiting from the increased demand, with exports on track to exceed 2020 levels by 30%, largely driven by beef, and continued strength is expected next year. Net farm income is estimated to fall by $1.1 billion in 2021 after significant government farm payments in 2020, but then grow $1.3 billion in 2022.

Natural Resources and Mining—Commodity prices, especially natural gas and crude oil, have eclipsed pre-pandemic levels and have helped the industry recover from the significant 2020 downturn. While employment remains down around 30% from 2019 levels and production has fallen, the value of Colorado's natural resources production is expected to increase more than 60% in 2021 year-over-year to $17.5 billion. Valuation is projected to grow further in 2022, largely bolstered by higher commodity prices, with the value of production expected to approach $20 billion or more to eclipse levels reached over the last 10 years. Colorado ranked fifth nationally for crude oil production, seventh in natural gas, and 13th in coal.

Leeds School of Business
UNIVERSITY OF COLORADO **BOULDER**

from the editor

As highlighted at the 57th annual Colorado Business Economic Outlook Forum, the economy was in recovery mode in 2021, with GDP recouping losses from the recession and job gains recorded in most employment sectors. Jobs gains are projected in every industry in 2022, propelling Colorado to new, record employment levels. However, headwinds remain, ranging from inflation to supply chain and workforce issues.

The Forum was hybrid this year. In addition to the economic outlook, panel sessions on the supply chain, real estate, and entrepreneurship were hosted by faculty and staff at the Leeds School of Business on December 6, 2021.

For additional details, visit colorado.edu/business/brd.

Please contact me directly at 303-492-1147 with any comments or questions.

—Richard Wobbekind

Dr. Richard Wobbekind presenting the 2022 Economic Outlook.

Colorado is also a leading producer of renewable energy, including wind, solar, biomass, and hydroelectric energy sources.

Construction—The overall value of construction for residential, nonresidential, and nonbuilding increased an estimated 7% in 2021, largely due to a 19% increase in residential permits. Higher material prices and labor shortages within all construction sectors stand to dampen growth in the sector in the year ahead, but a further 4% increase is projected for 2022. More production is expected in residential projects and infrastructure compared to nonresidential buildings.

Manufacturing—Colorado's mix of manufacturing industries has contributed to the sector outperforming national industry growth. Manufacturing has weathered the pandemic better than most in the state, observing slight growth in 2021. While not expected to return to pre-pandemic employment levels next year, Colorado's manufacturing sector will continue to build upon industry strengths in renewable energy investments, breweries, cannabis products, aerospace, and health care.

Trade, Transportation, and Utilities—The uniqueness of this large sector covering a wide array of companies continues to bolster the industry. Changes in consumer behavior shifting purchasing habits to e-commerce and increased consumer spending have expanded warehousing and delivery needs. The continued strong retail trade sales and return of air travel will strengthen employment in 2022, but worker shortages will remain a headwind.

Information—Societal shifts toward digitization, automation, and data continue to hurt some companies within the industry and help others in the state. Demand for connectivity and infrastructure has increased with the remote workforce, and data processing and hosting continue to be a large growth area for Colorado. Expanding broadband access across the state continues to be an ongoing mission that is important for increasing remote work, online education, and health care. The sector is expected to rebound in the year ahead due to easing of pandemic-related distortions.

Financial Activities—Many economic relief programs were administered by Colorado banks throughout 2020 and

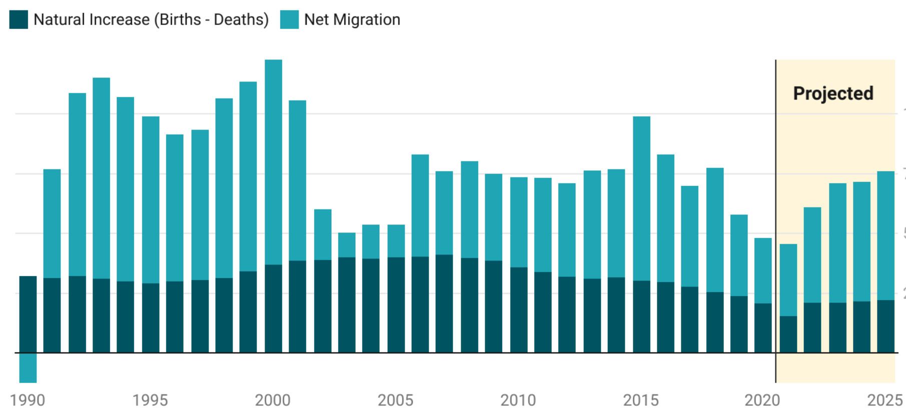
2021 that have helped businesses weather the downturn. Employment growth in Finance and Insurance continued to increase in 2021, and Real Estate and Rental and Leasing employment rebounded healthily from the downturn. Record-low interest rates and high demand will continue to fuel the residential real estate market in the state; however, the changing work environment raises questions about the future commercial real estate market. Economic and geopolitical uncertainty, Federal Reserve actions, unprecedented capital flow, and general consumer behavior will heavily influence the sector's performance in 2022.

Professional and Business Services—The sector continues to be a strength within the Colorado economy—it is the largest private sector with 20% of total employment—and it recovered quickly from the pandemic-induced downturn. The highly skilled and highly educated workforce allowed the sector's employees to quickly adapt to remote work and boosted employment 4.6% in 2021. In 2022, staffing issues and COVID spikes could impact the sector, but Colorado's position as one of the most innovative, educated, and entrepreneurial states bodes well for continued growth in the sector.

Education and Health Services—Employment in Education and Health Services is recovering after the large shock during the pandemic has subsided that forced education institutions to operate online and health care providers to stop performing nonemergency procedures. Growth in private education services in the year ahead will be influenced by the ability of schools to adjust to the changing demands of online learning and closures related to legal and financial difficulties. While health care employment rebounded in 2021, the health sector continues to face headwinds from COVID-19, including shutdowns of medical services due to COVID-19 spikes and worker burnout.

2021 marks the slowest population growth since 1990

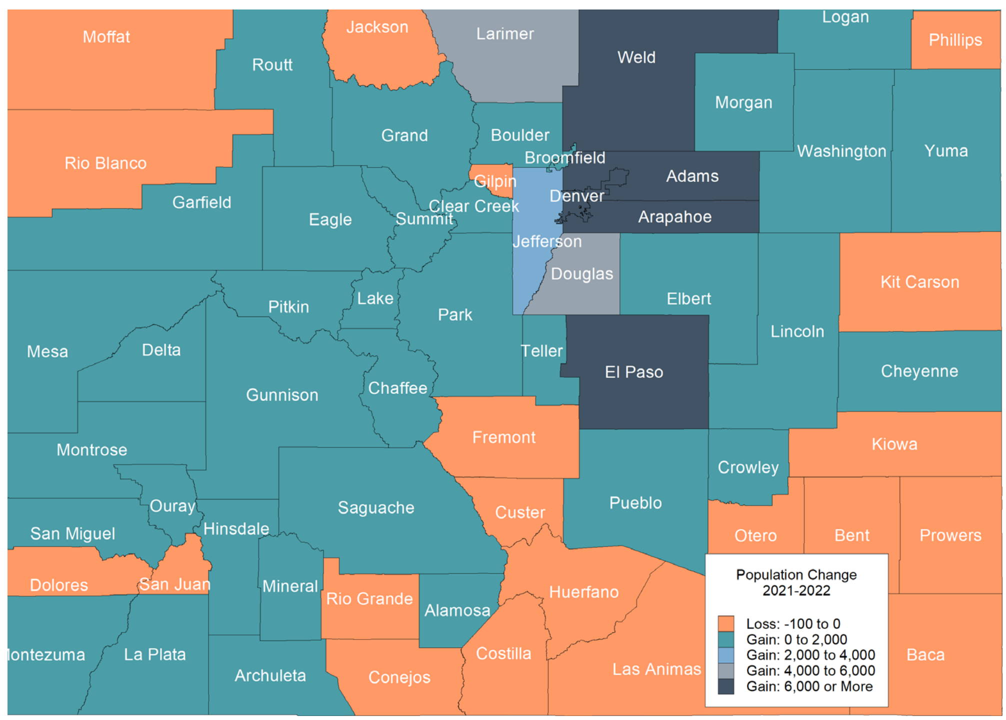
Colorado change in population



Source: Colorado Department of Labor and Employment; Colorado Business Economic Outlook Committee • Created with Datawrapper

Colorado's population projected to grow by 61,000 in 2022

Projected population change by county, 2021 - 2022



Source: Colorado Demography Office • Created with Datawrapper

Leisure and Hospitality—While a strong employment rebound has occurred in this industry from the pandemic lows as service-based businesses were forced to shut down and fear of the virus muted consumer activity, continued strength in the industry faces headwinds. Ongoing health concerns surrounding COVID-19, low wages, and a widespread worker shortage will hinder a return to pre-pandemic employment levels. However, booming retail sales, a return to Colorado travel and tourism, and increased outdoor recreation and skiing are bright spots within the industry. Industry employment is expected to post gains in 2021 and 2022, but Colorado's tourism industry is not expected to

Annual employment change in nonagricultural wage and salary employment sectors, 2012-2022

In thousands

Sector	2012	2013	2014	2015	2016	2017	2018	2019	2020[a]	2021[b]	2022[c]
Natural Resources and Mining	2.4	0.3	3.5	-3.4	-7.0	2.1	2.8	0.2	-7.0	-1.9	0.6
Construction	3.3	11.7	14.7	6.6	6.5	8.4	9.5	5.9	-4.2	1.3	4.0
Manufacturing	2.8	1.9	3.8	4.4	1.7	1.6	3.2	3.0	-4.0	0.4	2.6
Trade, Transportation, and Utilities	7.9	10.6	12.6	13.0	8.2	7.4	9.1	7.5	-9.1	17.0	4.9
Information	-1.5	0.1	0.5	0.5	1.2	0.1	3.3	1.5	-2.1	0.4	0.6
Financial Activities	2.8	4.3	2.9	5.1	4.9	4.2	3.5	3.0	-2.2	5.3	5.1
Professional and Business Services	15.3	15.6	13.9	11.8	7.3	7.0	11.2	15.7	-8.7	19.9	8.2
Education and Health Services	8.9	4.1	12.1	15.3	12.5	8.3	6.6	6.9	-10.3	10.4	5.9
Leisure and Hospitality	8.3	9.7	11.0	12.4	10.8	9.6	6.5	5.7	-73.3	33.1	31.7
Other Services	2.3	1.7	3.2	3.3	3.1	1.3	2.3	3.9	-8.5	3.8	3.3
Government	1.9	8.9	4.7	8.6	11.6	8.6	8.9	9.5	-14.1	-2.1	7.0
Total[d]	54.4	68.9	82.9	77.6	60.8	58.6	66.9	62.8	-143.5	87.6	73.9

[a]Revised. [b]Estimated. [c]Forecast. [d]Due to rounding, the sum of the individual sectors may not equal the total.
Sources: Colorado Department of Labor and Employment (CES Data) and Colorado Business Economic Outlook Committees.

Colorado nonagricultural wage and salary employment, 2012-2022

In thousands

Sector	2012	2013	2014	2015	2016	2017	2018	2019	2020[a]	2021[b]	2022[c]
Natural Resources and Mining	30.3	30.6	34.1	30.7	23.7	25.8	28.6	28.8	21.8	19.9	20.5
Construction	115.8	127.5	142.2	148.8	155.3	163.7	173.2	179.1	174.9	176.2	180.2
Manufacturing	130.9	132.8	136.6	141.0	142.7	144.3	147.5	150.5	146.5	146.9	149.5
Trade, Transportation, and Utilities	409.5	420.1	432.7	445.7	453.9	461.3	470.4	477.9	468.8	485.8	490.7
Information	69.9	70.0	70.5	71.0	72.2	72.3	75.6	77.1	75.0	75.4	76.0
Financial Activities	146.7	151.0	153.9	159.0	163.9	168.1	171.6	174.6	172.4	177.7	182.8
Professional and Business Services	356.8	372.4	386.4	398.1	405.4	412.4	423.5	439.2	430.5	450.4	458.6
Education and Health Services	281.8	285.9	298.0	313.3	325.8	334.1	340.7	347.6	337.3	347.7	353.6
Leisure and Hospitality	279.7	289.4	300.4	312.8	323.6	333.2	339.7	345.4	272.1	305.2	336.9
Other Services	96.0	97.7	100.9	104.2	107.3	108.6	110.9	114.8	106.3	110.1	113.4
Government	394.3	403.2	407.9	416.5	428.1	436.7	445.6	455.1	441.0	438.9	445.9
Total[d]	2,311.7	2,380.6	2,463.6	2,541.1	2,601.9	2,660.5	2,727.3	2,790.1	2,646.6	2,734.2	2,808.1

[a]Revised. [b]Estimated. [c]Forecast. [d]Due to rounding, the sum of the individual sectors may not equal the total. Note: Nonagricultural self-employed, unpaid family workers, and domestics are excluded from the total.
Sources: Colorado Department of Labor and Employment (CES Data) and Colorado Business Economic Outlook Committees.

recover for years, and neither will overall leisure and hospitality employment.

Other Services—This industry has rebounded significantly from the pandemic recession as person-to-person interactions are increasing again. Businesses in this sector (e.g., hair and nail care, religious organizations) will continue to benefit from business and life getting back to normal in the year ahead.

Government—Stabilizing tax revenues has helped state and local governments recover from the pandemic in 2021 and this will continue into 2022. The proposed 2022-23 state budget, combined with $6.2 billion in infrastructure funds from the federal government, will bolster government employment in the state, helping it to recover from the pandemic budget shortfalls. However, continued layoffs in public higher education will persist in 2022 as institutions face enrollment uncertainties.

National and International

- With growth of 5.4% in 2021, the U.S. reached new records levels, surpassing the pre-recession level of output by growing at the fastest pace in nearly four decades. U.S. output will continue to record strong growth in 2022, increasing an anticipated 4%—the strongest growth since 2000.
- Personal consumption and investment are expected to post moderate gains as the economy heals, but supply chain issues and inflation pose real risks.
- Colorado goods exports and imports are likely to finish 2021 above their recent 2018 record values, while services—stunted through Q3 2021 from continued restrictions in international travel—will likely finish slightly below.

Colorado

- Colorado will likely fall out of the top 10 states for employment growth in 2021 and 2022 given the service sector impact.
- Employment growth is projected in all 11 industries in 2022.
- Biopharmaceuticals, cannabis manufacturing, warehousing and storage, delivery services, data centers and hosting, aerospace, and others look to be large drivers of growth in the year ahead.
- Changing consumer preferences, from housing to shopping, will continue to have disparate impacts on Colorado communities.

Dean Sharon Matusik delivering opening remarks at the 57th annual Colorado Business Economic Outlook.

- Widespread worker shortages across all industries, inflation, and supply chain issues will continue to be headwinds in the state.
- Work-from-home behaviors will continue to impact commercial real estate, transportation, and workplace dynamics.
- A return to pre-pandemic levels of tourism and travel will help the state.
- A population growth slowdown will continue in 2022 and will return to pre-COVID growth levels by 2024. The state will still add an estimated 61,000 people, with 40,000 coming from net in-migration according to the State Demography Office.

For more information on each industry sector, visit colorado.edu/business/brd.

Colorado's rank among other states

Metric	1-Year	3-Year	5-Year	10-Year
Real GDP Growth	10	6	5	5
Employment Growth	12	9	6	6
Population Growth	12	9	9	7
Personal Income Growth	4	9	3	3
PCPI Growth	5	18	2	5
PCPI	9	11	15	21
Average Hourly Wage % Growth	39	37	24	33
Average Annual Pay % Growth	27	10	10	10
Average Annual Pay	8	9	11	12
Unemployment Rate	33	5	3	30
Labor Force % Growth	20	6	4	4
LFPR	4	5	11	7
FHFA Home Price Index Growth	12	13	6	6

Source: Bureau of Economic Analysis (2020); Bureau of Labor Statistics (11/21); U.S. Census Bureau (2020); Bureau of Labor Statistics (2021); Federal Housing Finance Agency All Transaction Index (Q3 2021); BRD Calculations. *Unemployment rate for the last month • Created with Datawrapper

A Supply Chain Gold Mine in Real Estate

By Jessie Ryce and Maxfield Olson

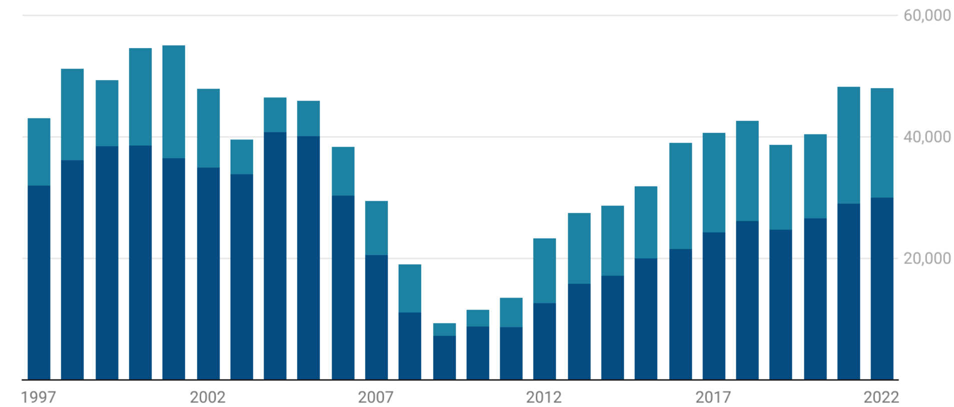
During the 57th annual Colorado Business Economic Outlook Forum held in December, a panel of leaders in the real estate sector discussed their views on how current supply chain issues are impacting real estate markets. Moderated by Mike Kercheval, executive director of the Real Estate Center at the Leeds School of Business, the discussion focused on the current and future state of the Colorado, national, and international real estate markets. Joining Kercheval were Cyndi Thomas, managing director at RCLCO Fund Advisors; Tommy Dirks, senior vice president for Trammel Crow's Denver Business Unit; and Darryl Jones, senior vice president at Coventry Development Corporation.

The real estate sector had been suffering from a labor shortage even before the onset of the pandemic. The situation now has been exacerbated by a shortage in construction, transportation, and warehouse workers; Colorado construction employment remained down 4.3% in November 2021 from January 2020 levels. Dirks was the first to mention labor supply as the biggest challenge currently being faced by the real estate industry. He noted a significant rise in business for general contractors but a lack of construction workers to start and complete new projects. In addition, many real estate companies are struggling to find talented individuals to hire. Jones corroborated the labor issue and asserted that not only is finding workers difficult, retaining them has also become harder, citing that many firms undergo the costly expense of training new employees, only to have them quit a few weeks later.

Thomas noted that a lack of innovation and the reactionary response to COVID-19 have hobbled the industry. Trends that had already begun to shift the industry prior to the pandemic have rapidly accelerated over the past two years. Challenges in brick-and-mortar retailing, the rise in industrial use (particularly last-mile delivery), and the demographic shift away from city centers to suburbs have caused some sectors of real estate pain, especially with the onset of COVID-19. Thomas also cited the low supply of residential housing as a concern with today's aggressive market, contrasting last year's sentiment that there was an oversupply of housing.

Single family and multifamily building permits at 20-year highs

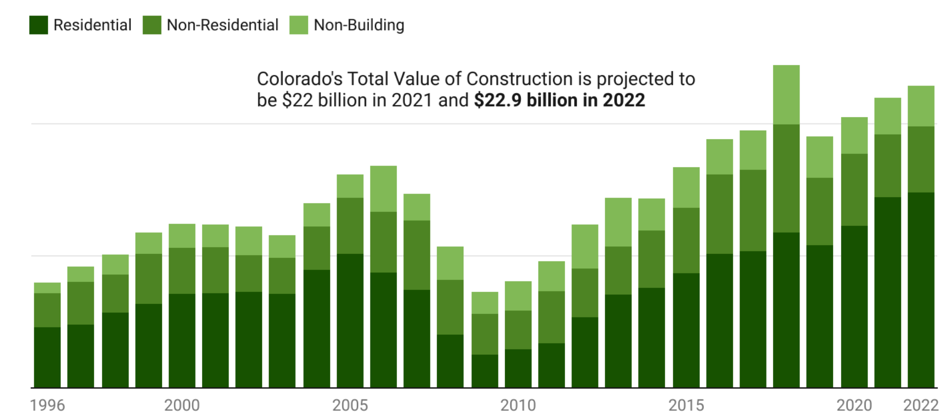
Colorado residential building permits



Source: U.S. Census Bureau; Colorado Business Economic Outlook Committee • Created with Datawrapper

Colorado's total value of construction is being led by a booming residential market

Total value of construction, $ billions



Source: McGraw-Hill Construction Dodge Research and Analytics; Colorado Business Economic Outlook Committee • Created with Datawrapper

The real estate sector is also not immune to the global supply chain troubles seen over the past year. "Our vendors will bid on a project and they'll win the bid for a fixed price. But that price has been escalated by a number of things that we can't control," Jones said. "You need water pipes, sewer pipes, and infrastructure to go into the ground before you see anything come out of the ground." Simple things like fittings for pipes or gate valves are getting increasingly harder to source, which not only raises costs but also causes uncertainty regarding the timelines of projects. Dirks delved further into the issue, drawing from his experience in industrial real estate at Trammell Crow's California office. Inbound shipping containers have historically driven industrial demand, so port congestion is a significant issue. However, Dirks said that even if better port infrastructure was built and the labor problem was solved, there would be virtually nowhere to store imports since industrial vacancy is so low; only 0.7% of Inland Empire industrial space was vacant in Q3 2021, according to CBRE.

Panel moderator Mike Kercheval chimed in with comments from a conversation he had with Todd Guthrie, president of O'Neil construction, who is beginning to see a shift toward "reshoring." Due to port congestion, there's great vulnerability associated with relying on offshore suppliers. As a result, finding manufacturers and producers within the United States has gained traction. Reshoring allows developers to avoid delays in receiving necessary materials and supplies, as well as aids in revitalizing the manufacturing industry in the U.S. One caveat of shifting to reshoring is increased costs for real estate development firms; however, it affords them reliable suppliers. Kercheval also touched on how many developers are changing the materials they use due to increased prices and limited availability. For example, steel prices are currently up 100% year-over-year for construction, so alternate materials such as concrete, plastic, and other domestically produced materials are being considered as alternatives.

Despite the previously mentioned labor shortages, supply chain issues, and aggressive pricing, real estate is continuing to see an inflow of capital. Thomas explained that over the past several years, large institutional investors have steadily increased their allocations toward real estate. Immediately following the onset of the pandemic, no deals were being put on the market and real estate investment dried up—meanwhile, public and private equities surged after an initial crash in early 2020. This led institutional investors to be under allocated toward real estate, which is the reason they have continued to deploy capital in spite of steep prices. In regard to where this capital is flowing, Thomas noted that "Multifamily and industrial still feel like pretty safe bets ... but institutional investors are getting savvier as it relates to more niche strategies." Life science—which contains a range of medical fields including biotechnologies, pharmaceuticals, and biomedical manufacturing—has seen a lot of momentum, as well as purpose-built single-family rentals, self-storage, and senior housing.

The panel wrapped up their conversation by discussing potential opportunities in the real estate industry. Dirks was the first to emphasize that the industrial sector will continue to perform well, especially with the accelerated shift toward e-commerce and two-day shipping encouraging large retailers to invest in Colorado industrial real estate. Jones' outlook on single-family and

Mike Kercheval moderates the real estate panel with Cyndi Thomas, Tommy Dirks, and Darryl Jones.

multi-family was also very positive but underscored again that while demand is extremely strong for both, labor and supply shortages will continue to hold the sectors back. Kercheval brought up the office market to Thomas, who observed that there will be a "flight to quality," indicating that well-located, highly-amenitized office space will do well, but class B and class C space could face struggles going into the future. While the panelists agree that the industry has opportunity to perform well, the threats and limitations to the current supply chain could be problematic in the foreseeable future. The real estate sector has seen a lopsided recovery toward residential and industrial space, and there remain significant challenges that the industry must reconcile, but the panel concluded that there are opportunities to be made from these challenges.

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Rustandy addition at the Leeds School of Business, University of Colorado Boulder.

Supply Chain Management with COVID-19

By Lucas Ericson

Gregg Macaluso moderates a panel with Brad Speer, Kath Vigars, Hillary Dukart, Christy Hynes, and John Klein

At the 57th annual Colorado Business Economic Outlook Forum in December 2021, a panel of business leaders in supply chain discussed the detail behind the far-reaching impact of delays and inflation seen across industries stemming from the COVID-19 pandemic. Moderated by Gregg Macaluso of the Leeds School of Business, the panel discussed past, current, and future challenges facing supply chains across industries. Joining Macaluso were senior leaders from several industries: Brad Speer, head of Procurement JBS Foods, Kath Vigars, VP of Global Procurement and Transportation for Johns Manville Corporation, Christy Hynes, VP of Metal supply for Ball Corporation, and John Klein, CPO for Medtronics. The goal of this panel was to give a ground-level perspective as to what large and small companies are doing to navigate challenges and look at factors that will drive changes. The pandemic upended supply chains around the world, impacting companies and industries to a degree that will not fully recover for at least another five years.

At the start of the panel discussion, Hillary Dukart, Associate Partner for McKinsey-Denver, outlined some of the root causes to today's supply chain challenges:

- The last 30+ years' work has focused on the globalization and subsequent linking of relatively low-cost, geographically disparate supply chain partners. While the net has largely resulted in efficient, productive, reliable supply world-wide, it comes at a price. As supply chains spread globally, they are more suspect to disruption when there is any disruption in the production and flow of goods. COVID-19 provided these "signal" disruptions.
- Second, as COVID-19 began, many producers predicted a similar global slowdown to what was experienced during the global recession of the late 2000s. Many cut capacities and shuttered production producing another wave of disruption to these disparate chains. Many of those supply chains unexpectedly saw substantial growth in demand shortly after the March 2020 initial wave. As a result, many supply chains were caught short or were faced with capacity shortages as employees had to be distanced for safety protocols or were lost to illness for indefinite periods.

Dukart highlighted the shift in consumer spending during the pandemic from services to goods, which persisted throughout 2021 amid ongoing increasing demand. This increased demand, along

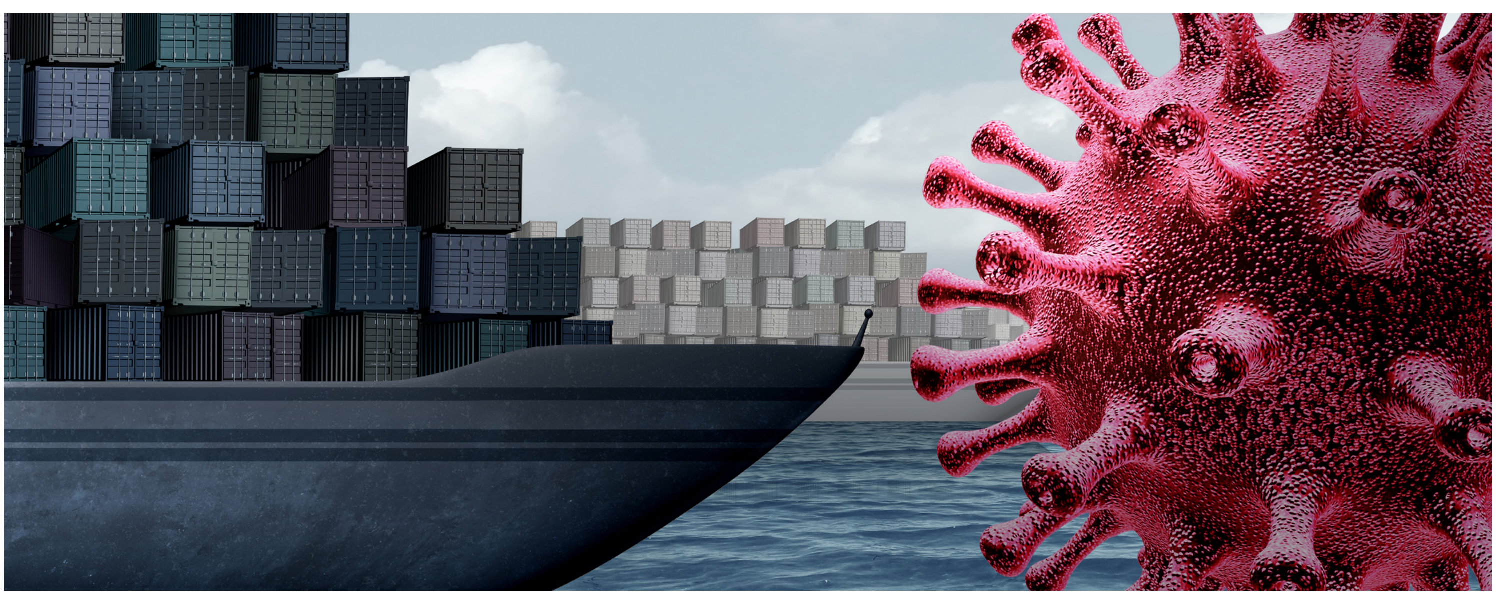
with worker shortages and lack of storage space, created congestion at ports, which saw a steady daily increase of 13% for months and significantly impacted the movement and supply of goods around the globe.

When asked what they had seen on the front lines, each member of the panel posed a different issue they had experienced because of the pandemic. Klein stated that in late 2020 (during the demand resurgence after the peak of the shutdowns where the public began buying a substantial amount of goods) Medtronic witnessed demand levels in just a couple months equal to numbers the companies were used to seeing in five to 10 years. With half of the world being shut down, getting materials from other countries to produce what was being demanded was extremely difficult. Adding additional salt to the wound was the Suez Canal blockage in March 2021, which resulted in worldwide setbacks that erased all the progress made after the initial lockdowns. All the companies on the panel reiterated the fact that it is expensive to keep extra inventory on hand but would have benefited from such during this elevated period of consumer spending. Because of this, building resilience has become an increasing priority among supply chain executives, and Dukart provided that 44% had said they would increase resilience at the expense of short-term efficiency.

Christy Hynes of Ball Corporation echoed Klein's remarks, explaining how Ball (the largest producer of aluminum cans in the world) had seen a surge in the demand of cans, in part, as people moved away from plastic bottles. With bars and restaurants closing, people went to the liquor stores to get their alcohol, which meant a huge increase in demand in cans, and thus for raw materials. Ball imports its raw materials from other countries because supply in North American is not substantial enough to meet demand. Countries such as China and Saudi Arabia are key suppliers for Ball but were completely shut down when this spike in the demand for aluminum cans occurred, leaving Ball unable to meet demand and facing severe losses in revenue.

A lack of magnesium—a critical input for producing aluminum cans— also caused issues for Ball Corporation. Approximately 85% of the world's magnesium comes from China, and with China being one of the first countries to initiate a lockdown, it was impossible to get the supply needed, contributing to soaring magnesium prices. This also quickly led to hundreds of legal issues with contracts with thousands of companies.

John Klein reiterated the fact that the supply chain is fragile enough as is, and with an extreme variable like COVID-19



Inflation rose 6.9% in November - the fastest rate in 40 years

Consumer Price Index, percent change year-over-year, not seasonally adjusted

	All Items	Core Inflation	Shelter	Food at Home	Energy
Jan '20	2.5%	2.3%	3.3%	0.8%	6.2%
Feb '20	2.3%	2.4%	3.3%	0.8%	2.7%
Mar '20	1.5%	2.1%	3.0%	1.0%	−5.8%
Apr '20	0.3%	1.4%	2.6%	4.0%	−17.6%
May '20	0.2%	1.2%	2.6%	4.8%	−18.3%
Jun '20	0.7%	1.2%	2.4%	5.6%	−12.3%
Jul '20	1.0%	1.6%	2.3%	4.6%	−10.9%
Aug '20	1.3%	1.7%	2.3%	4.6%	−8.9%
Sep '20	1.4%	1.7%	2.0%	4.1%	−7.6%
Oct '20	1.2%	1.6%	2.0%	4.0%	−9.2%
Nov '20	1.1%	1.7%	1.9%	3.6%	−9.6%
Dec '20	1.3%	1.6%	1.8%	4.0%	−7.3%
Jan '21	1.4%	1.4%	1.6%	3.7%	−3.8%
Feb '21	1.7%	1.3%	1.5%	3.6%	2.3%
Mar '21	2.6%	1.6%	1.7%	3.3%	13.2%
Apr '21	4.2%	3.0%	2.1%	1.2%	25.0%
May '21	4.9%	3.8%	2.2%	0.7%	27.8%
Jun '21	5.3%	4.5%	2.6%	0.9%	24.2%
Jul '21	5.3%	4.2%	2.8%	2.6%	23.6%
Aug '21	5.2%	4.0%	2.8%	3.0%	24.9%
Sep '21	5.4%	4.0%	3.2%	4.5%	24.8%
Oct '21	6.2%	4.6%	3.5%	5.4%	30.0%
Nov '21	6.9%	5.0%	3.9%	6.4%	33.5%

Source: U.S. Bureau of Labor Statistics • Created with Datawrapper

in the mix, it severely exposes the weakest parts of the chain. His company, Medtronic, provides medical devices and services around the globe. Demand in hospitals was at unforeseen levels, and Medtronic noted a sharp increase in demand for life-saving items such as pacemakers. But due to supply chain issues, they had difficulty accessing needed supplies from other countries. Klein talked about how they would have almost all of the materials to build certain goods needed in hospitals but would be missing one or two small parts that were essential for the completion of each item. The issue was those small components usually came from a country that had its borders closed during the pandemic, which led to Medtronic scrambling to find replacements since the company had no extra inventory. Exposing the weakest parts of the supply chain was eye-opening for Klein and Medtronic, and they have been working to make things more efficient and reliable in the future.

Brad Speer discussed how his company, JBS foods, which accounts for nearly 20% of meat production in the world, endured multiple hardships from COVID-19, starting with labor strikes and employee layoffs. To make their company run properly, they need numerous employees doing hands-on work, but when COVID-19 shut down the country, they were faced with employees that were not comfortable working in factory conditions. Much like with other companies, this resulted in the inability to keep up with the sudden surge in demand for food across the globe.

Hillary Dukart of McKinsey-Denver displayed alarming statistics that directly correlated with the struggles of JBS. As of the beginning of December, up to 40% of people say they are considering leaving their jobs in the next six months, and 85% have reported that their wellbeing has declined since the beginning of the pandemic. In addition to employee issues, the cost of transportation and warehousing labor has increased two to four times the levels witnessed pre-pandemic. Without being at work in person, communication and collaboration can be extremely poor, especially with companies encompassing thousands of moving parts, Dukart noted. As a result of this lack of communication, she explained how there is an extreme disconnect between why employees are leaving their jobs and why employers think they are leaving, which has caused severe issues for a large number of companies.

Approaching two years since the original outbreak of the virus, supply chains are slowly starting to recover. Shipping data has showed more signs of goods coming in and recovery for the future. As the virus and public has started to become more predictable, supply chain managers are finally able to organize moving parts further in advance to combat planning errors that were witnessed during the past year. The entire panel agreed that these issues will not be resolved any time soon since these are fundamental long-term issues that will need to be fixed over the course of the next few years. Once the sector finally recovers, there will be a better understanding of weak links in the system and what needs to be improved upon. A large-scale and complex operation such as the supply chain will likely take many years to fix but will most definitely be more efficient once fully recovered.

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Entrepreneurship panel David Brown, Bonnie Watson, and Janet Berkowitz pictured with moderator Eric Mueller on right.

Entrepreneurship, Startups, and Economic Drivers in Colorado

By Trevor Hall

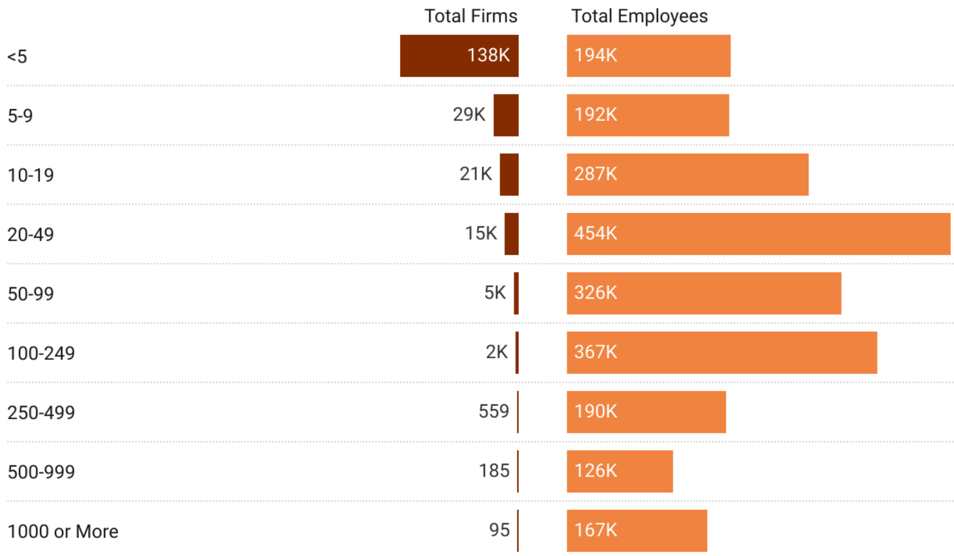
The entrepreneurship panel at the 2022 Colorado Business Economic Outlook Forum consisted of four individuals with diverse entrepreneurial backgrounds. Erick Mueller, executive director at the University of Colorado's Deming Center for Entrepreneurship, introduced the panel with foundational statistics relating to Colorado's entrepreneurial standing. Though new businesses as a percentage of total businesses have declined over recent years, it is key to note a 56% resurgence amidst the pandemic, continuing the placement of Colorado's metro environments among the top 10 best places for entrepreneurship, according to the Kauffman Foundation. The key question posed related to the ties between entrepreneurship and economic development.

Janet Bercovitz, professor, Leeds School of Business, provided insights about the scaling process and how to address a clear knowledge gap in this area. Though only small percentages reach scale-up or high-growth venture status, fast-growing small businesses create roughly 10% of jobs annually and contribute 13-14 times more patents than larger corporations. Colorado continues to excel in fostering these businesses, with Boulder leading the nation in High-Growth Inc. 5000 companies per million residents (367), and Denver ranking at number 10 nationally (181). Bercovitz cites data which indicates this is likely due in part to Colorado's status as a pioneering location for disruptive technologies and entrepreneurial recycling. Questions posed related closely to the efforts necessary to expand opportunities outside of Colorado's pioneering areas and to continue to foster entrepreneurial recycling activities.

With particular relevance to rural areas, Bonnie Watson, managing director, Telluride Venture Network, emphasized the potential for startup growth outside of Colorado's typical pioneering areas. With the surge of urban flight and immigration toward rural areas during the pandemic,

89% of firms have fewer than 20 employees, but these firms only represent 29% of the labor force

Colorado total firms and total employees by employment size class, Q1 2020



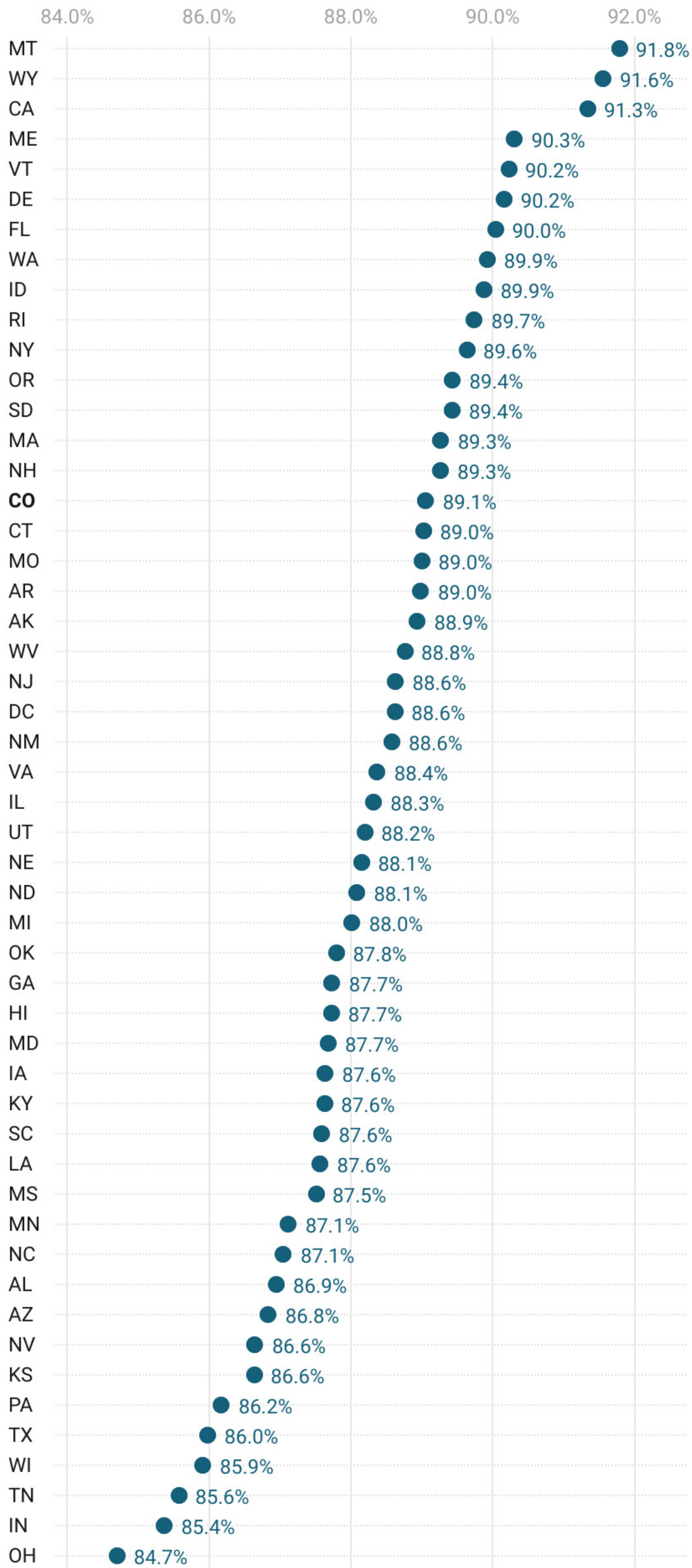
Source: U.S. Bureau of Labor Statistics QCEW (Q1 2020) • Created with Datawrapper

these populations are seeing an influx of employees working from home and entrepreneurs from other backgrounds. Watson mentioned that it is possible for startups to exist and flourish in rural areas and insisted that collaboration and capital sharing between the eastern and western slopes are key to this growth. David Brown, co-founder of Techstars, echoed many of these points, emphasizing that the normalization of online work and virtual communication give rural populations a great opportunity to communicate with their urban counterparts.

Professor Bercovitz continued the discourse by adding that to continue to support startups and small businesses, integrating diversity into the workplace continues to be a challenge for the

89.1% of firms in Colorado have less than 20 employees - ranking the state 16th

Share of firms with <20 employees



Source: U.S. Bureau of Labor Statistics QCEW (Q1 2020) • Created with Datawrapper

community. She emphasized that in order to expand our capabilities in the entrepreneurial landscape, it is critical to integrate diverse perspectives. Managing Director Watson considers a safe company culture imperative to fostering diversity, and that evaluating external-facing interactions—such as job applications—and incorporating diversity, equity, and inclusion training are great places for businesses to start. Brown also emphasized that by being forward about the company's diversity efforts and talents and focusing on diverse role models, Colorado businesses can continue to better support diversity in the startup space.

Panelists emphasized that startup jobs are great jobs and that entrepreneurs have excellent opportunities to familiarize themselves with the business landscape in which they exist. With that, panelists asserted that there are misconceptions around the entrepreneurship and that it is frequently less daunting than portrayed. Though entrepreneurs frequently have a team working behind them to alleviate the stereotypically heavy workloads, not all startups have to take the conventional path of large raises. In fact, companies that scale properly without being equity-backed are attractive options, according to Watson. Bercovitz and Brown also argued that though failure is a part of entrepreneurship, opportunities continue to present themselves if done graciously. Brown added that there is always a place for a Colorado entrepreneur who is excited to exist in such an environment.

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Aerial photo of the Rustandy building bridge on the CU Boulder campus. Photo by Glenn Asakawa/ University of Colorado.

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