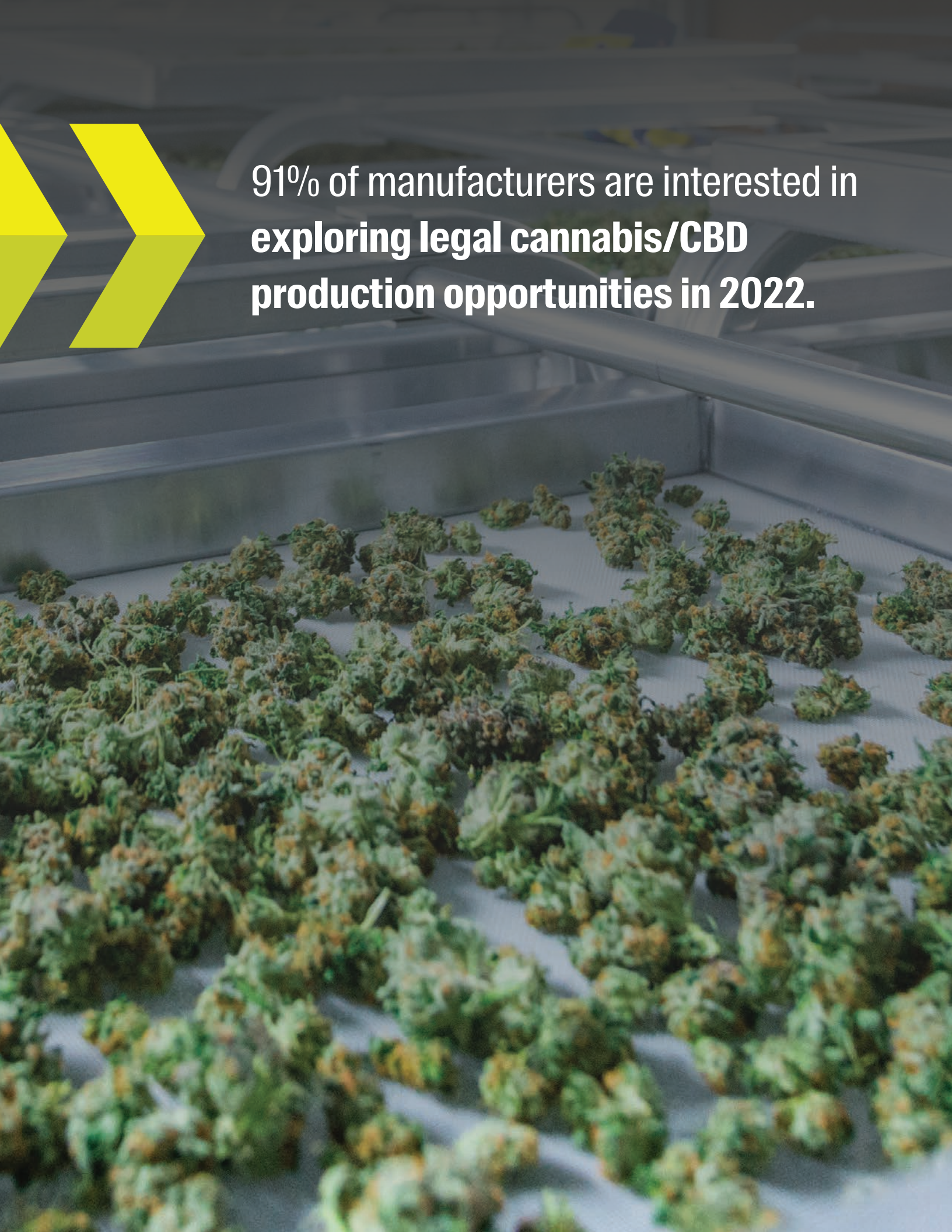


Opportunities for Cannabis and CBD Manufacturers to **Drive Growth in 2022**

Featuring New Industry Research and
Recommended Actions



A large, rectangular metal tray filled with numerous cannabis buds, likely in a grow room. The buds are green with prominent orange and yellow trichomes. The tray is set against a background of industrial shelving and lighting fixtures.

91% of manufacturers are interested in
**exploring legal cannabis/CBD
production opportunities in 2022.**

Cannabis: Capitalizing on a High Growth Opportunity

Cannabis manufacturing is a powerful example of how external circumstances can drive industry expansion. During the pandemic, 9 million people used CBD for the first time, while 46% of long-term users purchased at least one new type of CBD product. And these significant sales increases are sparking new sector interest.

But while increased consumer demand presents business growth opportunities, it can also yield problems. Almost two thirds (63%) of current CBD manufacturers admit they have been unable to effectively meet customer demand during the past 12 months. And with CBD sales forecast to expand by 21.1% CAGR until 2028, keeping pace with market appetite could become an even bigger issue.

These statistics come from brand new research conducted by Aptean in Q4 2021. We spoke to 275 North American manufacturers, including companies in CBD manufacturing, to understand how market forces are impacting their delivery capabilities—and why digital transformation is pivotal to realizing the legal cannabis manufacturing opportunity.

Here are our findings...





Building on the CBD Industry’s Existing Momentum

Optimism is high in the legal cannabis product sector. After strong growth in 2020/21, 89% of CBD manufacturers predict their sales and revenue will increase further in 2022. In fact, CBD is the most confident manufacturing sector we surveyed, along with personal care; another major sales winner in the past 12-18 months.

Percentage of manufacturers predicting sales and revenue growth in 2022

Overall	Discrete Overall	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
275	166	109	38	27	26	17
78%	76%	80%	76%	89%	89%	59%

However, current CBD manufacturers will need a strong business development strategy to keep pace with consumer expectations, as more manufacturing organizations move into the sector. And for many cannabis manufacturers, there are still operational challenges to iron out.

We’ve already mentioned that 63% of CBD manufacturers were unable to fully meet demand in 2021, and this has significantly impacted customer relationships. Many manufacturers were forced to push back delivery deadlines or cancel orders, in order to prioritize their highest value customers.

To help CBD manufacturers improve on-time delivery rates, consistently meet customer expectations and continue driving industry growth, we need to understand what’s impacting their current operational capabilities—and look at how cannabis manufacturing companies can use technology to address these issues.

Material price fluctuation is the #1 supply chain challenge for CBD manufacturers

Supply Chain Disruption in a Turbulent Market

Every sector is experiencing supply chain struggles, as a combination of logistics delays and practical challenges like social distancing have slowed the global movement of raw materials.

What separates CBD manufacturers from many other sectors, however, is the vulnerability and volatility of marijuana plants. The consequences of shipment delays or disruptions are much greater in the cannabis industry than for manufacturing companies dealing less volatile raw materials.

The sensitivity of marijuana plants is underlined by our research findings, which showed that more than half of CBD manufacturers have struggled with material price variances this year as a result of factors like crop yield fluctuation—significantly higher than the industry average.

What have been your primary causes of supply chain disruption?

	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Price fluctuations	42%	32%	52%	41%	53%
Low inventory levels impacting production	30%	21%	37%	33%	35%
Long lead times for raw components / ingredients	34%	39%	33%	33%	24%
Travel, transportation or trade issues	32%	24%	41%	44%	18%
Lack of verified, credible alternative suppliers	28%	32%	19%	30%	35%
Over-reliance on one or more suppliers	31%	34%	33%	30%	24%
Difficult to onboard new suppliers	28%	24%	26%	26%	41%
Cyber attacks	27%	13%	48%	22%	29%
Quality issues (in-house or with suppliers)	30%	26%	37%	37%	18%
Storage and access disruptions	20%	16%	30%	22%	12%
Scheduling and inventory alignment challenges	17%	11%	19%	22%	24%
Lack of visibility over lead times	21%	16%	30%	26%	12%
Natural disasters or emergency situations, e.g. fires floods	25%	11%	44%	26%	24%

Additionally, CBD manufacturing is the only sector in which natural disasters are singled out as a critical supply chain disruption, with 44% of organizations highlighting the issue. This statistic may have been influenced by Hurricane Ida in August 2021, which forced several Louisiana-based CBD manufacturing plants to shut down for several days.

67% of CBD manufacturers are investing in technology to increase supply chain visibility



From our findings, we can see that CBD manufacturers need greater visibility and control over the cultivation management process, along with the flexibility to choose alternative providers if they experience supply issues. And technology is enabling them to mitigate risk in their supply networks and improve responsive decision-making, creating a more transparent and agile approach to marijuana cultivation and sourcing.

67% of CBD manufacturers are already using technology to increase supply chain visibility or plan to in the next twelve months, according to our research; a higher percentage than any other manufacturing sector.

How are you innovating / will you innovate supply chain management using technology?

	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Create / improve our supply chain contingency plan	59%	61%	44%	81%	35%
Build up inventory	53%	50%	41%	67%	53%
Improve production scheduling to make smarter use of available inventory	49%	53%	30%	63%	47%
Increase quality checks	51%	47%	48%	56%	53%
Improve traceability	50%	50%	41%	67%	35%
Use technology to drive supply chain visibility	59%	58%	67%	59%	41%
Spread orders across a wider number of suppliers	48%	45%	41%	56%	47%
Increase in manufacturing in-house	49%	45%	52%	52%	47%
Add new suppliers to our portfolio	43%	53%	44%	63%	29%
Improve forecasting capabilities to better predict demand	50%	32%	44%	63%	29%
Conduct a supply chain vulnerability audit	51%	47%	48%	63%	29%
Streamline the supplier onboarding process	44%	34%	48%	52%	35%
Increase use of overseas suppliers	43%	47%	33%	48%	35%

Prioritizing upstream improvements is pivotal to continuing industry growth, as every part of the production process is reliant on a reliable supply of quality raw materials. And our research has revealed that current supply chain challenges are creating bottlenecks in other parts of the CBD manufacturing process as well...

Rising Demand Exacerbating Inventory Mismanagement

Another key challenge that impacted CBD manufacturers' ability to meet consumer expectations in 2021 is managing inventory in a climate of rising demand and ingredient instability.

Our research found that 41% of cannabis manufacturers have struggled to maintain inventory levels over the past 12 months, while a further 41% have been unable to align production schedules with material availability.

44% of CBD manufacturers are struggling to maintain inventory levels

What have been your biggest operational challenges over the past 12 months?

Business Challenges	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Skills shortages	39%	29%	52%	33%	47%
Upstream supply chain disruption	34%	32%	19%	48%	41%
Maintaining inventory levels	39%	32%	41%	37%	53%
Social distancing in the workplace	32%	39%	37%	26%	18%
Staffing / labor shortages	35%	34%	30%	33%	47%
Finding new business / customers	36%	39%	37%	30%	35%
Losing customers	27%	26%	26%	33%	18%
Dealing with cybersecurity threats	34%	37%	26%	30%	47%
Reduced demand from customers	22%	13%	26%	30%	24%
Downstream supply chain disruption	30%	26%	37%	30%	29%
Enabling remote working staff to access data and systems	28%	29%	41%	11%	35%
Increasing capacity to meet demand	28%	29%	33%	26%	18%
Implementing automation	28%	26%	30%	41%	12%
Impact of trade disputes / tariffs	27%	34%	22%	30%	12%
Equipment performance and downtime	30%	32%	26%	37%	24%
Outdated or unintegrated legacy systems / technologies	32%	39%	33%	26%	24%
Updating / aligning production schedules with inventory available	30%	29%	41%	26%	24%
Meeting industry regulations / compliance	33%	37%	41%	26%	24%

Naturally, it's difficult to coordinate scheduling and material requirements if deliveries are being delayed, compromised or cancelled, and we've already touched on how manufacturing organizations are planning to increase supply resilience through technology investment. However, supply chain issues alone cannot explain CBD manufacturers' inventory mismanagement.

Technology is also playing a critical role in enhancing ingredient management. Many CBD manufacturers are scaling rapidly to meet increased consumer demand—and this is putting their current production scheduling and inventory control capabilities under unsustainable pressure. Legacy systems and processes can't always rise to the challenge as operational needs intensify.

85% of CBD manufacturers' say their **business data is too siloed to make comprehensive decisions.**

Looking at the size and maturity of CBD manufacturers, most of the companies that participated in our research weren't start-ups; they have been in business between 6-20 years and are generating \$100-500m in annual revenue.

And while our data is just a small sample, it does provide a snapshot of how maturing organizations need to re-evaluate the infrastructure on which their operations are built.

To grow at speed, CBD manufacturers should invest in technologies that allow them to connect end-to-end (or seed-to-sale) production. With complete operational integration, production scheduling insights can fuel inventory planning, which drives supplier management, and vice versa. Yet there's significant room for improvement in cannabis manufacturing companies' current data capabilities.

85% of the CBD manufacturers we spoke to admit their business data is currently too fragmented or siloed to make comprehensive decisions; a higher percentage than any other process manufacturing sector we surveyed. And 63% don't trust their company data.

What are your current data insight challenges?

	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Our business data is too fragmented / siloed in different systems	76%	68%	85%	74%	82%
We have significant gaps in our business data (i.e. issues with completeness)	72%	68%	81%	70%	71%
We do not have enough trust in the accuracy of our business data	64%	61%	63%	70%	65%
Our business data is not kept up-to-date	64%	58%	74%	67%	59%

Some of these gaps and siloes may come from using multiple systems or manual processes to manage production. And by transitioning to a single manufacturing software solution, CBD companies will be able to consolidate data and understand their operations holistically.

Skills Shortages in an Innovative Industry

In the fast-growing legal cannabis sector, it's not just material and operational pressures that CBD manufacturers face. Organizations are also struggling to recruit and retain the skilled workforce needed to maximize their production capabilities.

Generally, the manufacturing industry is in a state of change, as a combination of experienced manufacturing workers 'ageing out' and the continued roll-out of smart technologies changes the required size and skillset of the modern workforce.

In an innovative, legislatively complex sector like CBD, this issue is even more acute. And our research showed that skills shortages are the number one issue affecting CBD manufacturing expansion at the moment.

Half of CBD manufacturers rate skills shortages as their current biggest business challenge

What have been your biggest operational challenges over the past 12 months?

Business Challenges	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Skills shortages	39%	29%	52%	33%	47%
Upstream supply chain disruption	34%	32%	19%	48%	41%
Maintaining inventory levels	39%	32%	41%	37%	53%
Social distancing in the workplace	32%	39%	37%	26%	18%
Staffing / labor shortages	35%	34%	30%	33%	47%
Finding new business / customers	36%	39%	37%	30%	35%
Losing customers	27%	26%	26%	33%	18%
Dealing with cybersecurity threats	34%	37%	26%	30%	47%
Reduced demand from customers	22%	13%	26%	30%	24%
Downstream supply chain disruption	30%	26%	37%	30%	29%
Enabling remote working staff to access data and systems	28%	29%	41%	11%	35%
Increasing capacity to meet demand	28%	29%	33%	26%	18%
Implementing automation	28%	26%	30%	41%	12%
Impact of trade disputes / tariffs	27%	34%	22%	30%	12%
Equipment performance and downtime	30%	32%	26%	37%	24%
Outdated or unintegrated legacy systems / technologies	32%	39%	33%	26%	24%
Updating / aligning production schedules with inventory available	30%	29%	41%	26%	24%
Meeting industry regulations / compliance	33%	37%	41%	26%	24%

It's also interesting to note that CBD manufacturers have struggled with helping their employees make the transition to remote working more than any sector, which we know from our sample can't be due to early-stage inexperience. It's more likely that these teething problems are related to the need for process improvement and better quality management programs.

Given how quickly the CBD industry is evolving from a product development perspective, it makes sense that cannabis manufacturers are also looking at forward-thinking solutions to enhance the employee experience over the next 12 months.

100% of the manufacturers we spoke to said technology is important for enhancing their employee retention rates, so they can minimize skills attrition—but at the same time, they're open minded to how software can take over certain responsibilities.

For example: when we asked manufacturers about their attitude to robotics, the CBD sector was more focused on an automated future than any other sector, with 56% of organizations saying they were interested in replacing people with robots.

Are you interested in using robotics?

	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
We are interested in using robots for dangerous / high risk tasks	54%	58%	52%	44%	65%
We are interested in using robots for low value / repetitive tasks	31%	26%	33%	41%	24%
We are interested in robots collaborating with our people to improve output	28%	29%	30%	30%	18%
We are interested in replacing certain people / roles with robots	31%	18%	56%	30%	24%
None of the above – we are not interested in using robotics	7%	8%	7%	7%	6%

While this interest in automation may seem to contradict CBD manufacturers' belief about technology supporting employee retention, it actually reflects how ambitious companies are being with their digital transformation goals.

Cannabis manufacturers can see a future in which people's productivity increases by allowing technology to take repetitive, high volume tasks off their hands, so a skilled workforce can handle operational anomalies and add greater value. And it's this combination of human creativity and technology efficiency that is underpinning CBD manufacturers' digital transformation strategies for 2022.

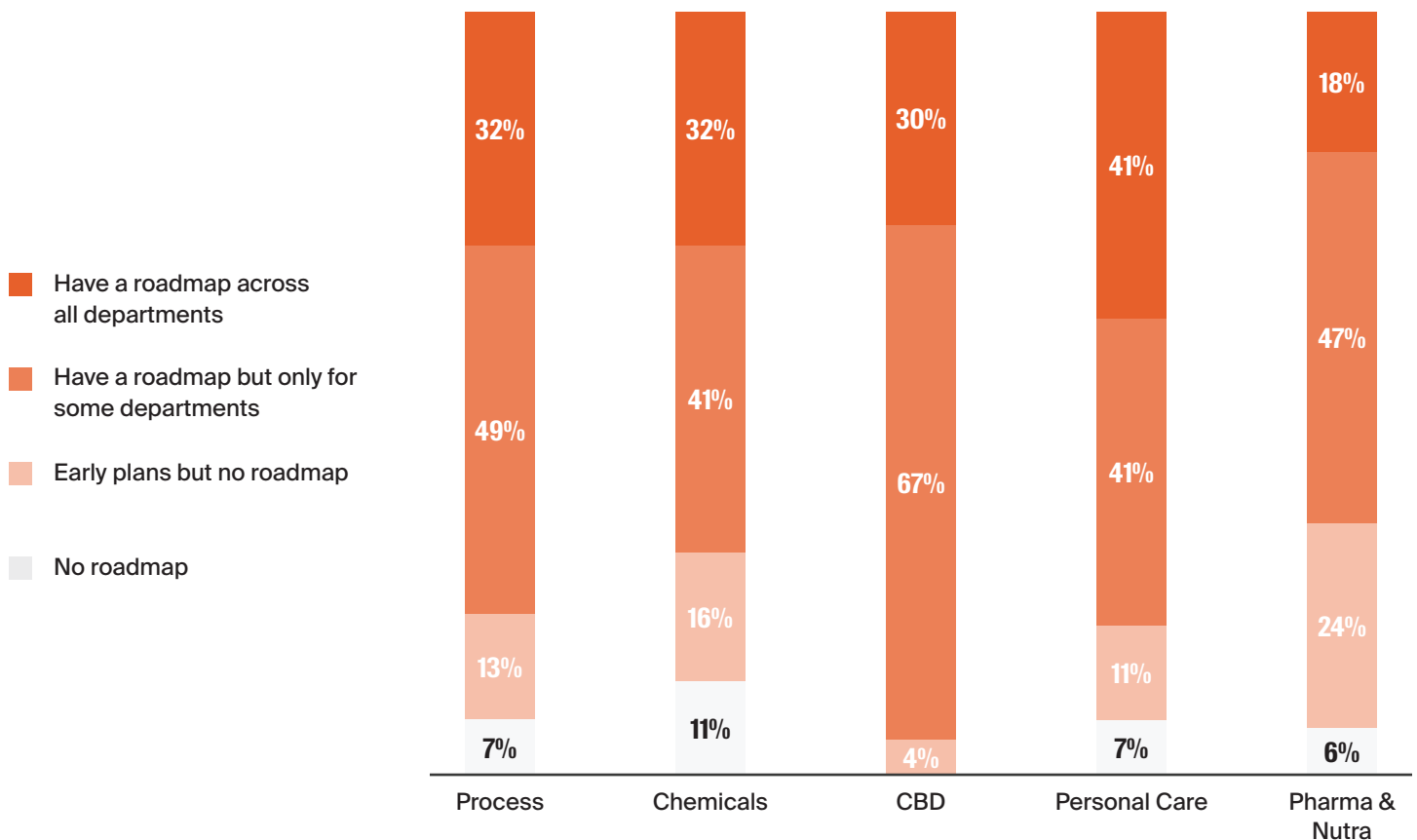
97% of CBD manufacturers have a digital transformation roadmap in place

Solving CBD Manufacturing Challenges Through Digital Transformation

In a competitive dynamic industry like legal cannabis, manufacturers are rapidly realizing they cannot afford to settle for ‘good enough’ systems and processes. Our research findings have created a clear customer experience case for solving CBD manufacturing’s most urgent challenges—and market-leading organizations are looking at how they can use technology to solve diverse operational challenges in a cohesive way.

97% of CBD manufacturers already have a digital transformation roadmap in place for some or all departments, which shows the innovative energy driving growth in this industry.

How advanced is your digital transformation strategy?



However, if we contrast this roadmap with where CBD manufacturers have currently invested in technology and automation, there appears to be a lag between strategy and execution.

While CBD manufacturers are ahead of the curve in the development of their digital transformation roadmap, they are behind other process manufacturing sectors when it comes to deploying digital solutions to automate key business areas.

Which operational tasks have you already automated in your business?

	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Creating bill of materials / calculating formula or recipe	57%	57%	59%	63%	47%
Tracing product components / ingredients	56%	55%	48%	67%	53%
Quoting and estimating	54%	43%	48%	74%	53%
Managing production processes and volumes	52%	50%	41%	56%	71%
Analyzing and managing profit margin	57%	46%	52%	70%	69%
Managing machinery performance and servicing	50%	42%	52%	67%	35%
Managing supply chains and suppliers	50%	47%	48%	63%	41%
Ensuring compliance with standards and regulations	44%	43%	48%	41%	47%
Managing employee skills, staff retention and talent acquisition	44%	42%	37%	52%	47%

A third of CBD manufacturers say **complex integrations** could hold back their digital transformation strategy

For example: only 41% of CBD manufacturers are using technology to automate production management, compared to the process industry average of 52%. And CBD manufacturers are also less likely to have automated product tracing, managing employee skills, and analyzing profit margin than other process manufacturing sectors.

We also surveyed manufacturers on their biggest day-to-day barriers to digital transformation, and the CBD sector's response was insightful. A third (33%) of legal cannabis manufacturers said complex integrations were their major concern—which underlines the importance of investing in seed-to-sale software that supports cohesive business-wide change, to ensure that technical restrictions don't hold back business growth.

How Will CBD Manufacturers Drive Sector Growth in 2022?

On the subject of business growth, we rounded out our research project by asking cannabis manufacturers about their strategic goals for the year ahead, to see how their wider objectives mapped to their digital transformation strategy.

CBD manufacturers' number one priority for 2022 is to improve customer satisfaction (48%), with acquiring more customers (33%) also high on the agenda—showing an ambitious desire to both improve performance and grow market share.

What are your top 3 business priorities for 2022?


Business Strategies	Process Overall	Chemicals	CBD	Personal Care	Pharma & Nutra
Improve customer satisfaction	37%	32%	48%	44%	18%
Acquire more new customers	29%	32%	33%	30%	18%
Improve operational efficiency and integration	30%	34%	30%	30%	24%
Improve our supply chain resilience	36%	34%	48%	37%	18%
Expand into new markets, sectors	33%	39%	22%	30%	41%
Reduce waste	20%	16%	26%	19%	24%
Focus on innovation / R&D, product development	28%	24%	26%	26%	47%
Increase customer value	18%	11%	22%	26%	18%
Optimize product / service pricing	32%	37%	22%	33%	35%
Improve and maintain workplace safety	24%	21%	26%	22%	29%
Meet environmental / sustainability targets	25%	24%	33%	22%	18%
Improve employee retention	22%	37%	22%	11%	6%
Improve speed / accuracy of business data	23%	24%	15%	26%	29%
Attract talent to build strong teams	22%	13%	41%	15%	24%
Streamline core business processes	25%	26%	19%	26%	29%
Move from proactive to predictive maintenance	20%	18%	11%	22%	35%
Reduce error rates	26%	16%	30%	26%	41%

■ Top priority
 ■ 2nd priority
 ■ 3rd priority

Given the continual growth of CBD sales it will be possible to achieve both these objectives. However, cannabis manufacturers will need to understand where their biggest opportunities to impress current customers and attract new business lie, and digital transformation will be key to achieving this.

88% of CBD manufacturers believe technology will improve their overall operational efficiency, while 81% want to use it to manage their profit margin better. Investing in seed-to-sale software can address both these objectives, by providing a digital infrastructure for strong customer service at the same time as increasing operational efficiency, liberating more human resources to focus on new business development.

However, to make sure these benefits are delivered through scalable software investment, cannabis manufacturers need to work with an experienced technology partner who understands the complexities and compliance requirements of CBD manufacturing and has used that knowledge to develop industry-specific ERP software.

A close-up photograph of a cannabis bud, which is green with orange-brown trichomes, resting on a surface. In the foreground, a portion of a dark grey pen is visible. The background is a blurred molecular diagram with various colored dots (red, green, blue) connected by lines, suggesting a scientific or technological theme.

Recommended Actions for Cannabis Manufacturing Executives

- Develop your digital transformation roadmap to implement manufacturing technology solutions that enable your business to grow and scale efficiently in line with sector opportunities
- Prioritize digital strategies that improve customer satisfaction, such as increasing product consistency and accelerating order fulfilment; with CBD manufacturing becoming even more competitive, frustrated customers will take their business elsewhere
- Ensure digital transformation is an organization-wide initiative to minimize employee resistance to change and accelerate ROI on your manufacturing software implementation
- Invest in holistic manufacturing solutions like enterprise resource planning software that offer end-to-end optimization and integrated data insights, to ensure that new technology yields immediate AND long-term value – setting KPIs and tracking progress to measure performance and value
- Partner with an experienced technology vendor like Aptean that knows the complexities of CBD and legal cannabis production and has developed industry-specific Cannabis Manufacturing ERP software to solve sector challenges

Aptean Cannabis Manufacturing ERP: Seed-to-Sale Optimization

Aptean Cannabis Manufacturing ERP gets CBD manufacturers future-ready. Our software is developed specifically for the legal cannabis industry to help you optimize performance from seed-to-sale:

- › Gain complete visibility across the business to capture and use critical data
- › Enhance demand planning, scheduling and maintenance to optimize production
- › Increase supply chain flexibility to ensure material availability never stops work
- › Analyze cultivation conditions and process efficiency to increase profit margins
- › Deliver relevant, real-time, 360-degree insights through a central dashboard
- › Enable complete traceability and quality control for legal compliance in every territory

Book your free Aptean Cannabis Manufacturing ERP demo at www.aptean.com




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In the world of enterprise resource planning software, we are the experts.

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As by-your-side partners, we provide the critical support you need, every step of the way. That's why over 5,000 highly specialized organizations from over 20 industries and 54 countries rely on us to help them streamline, save and scale.



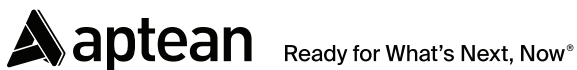
Ready for What's Next, Now[®]

We'd love to show you how to grow your business with Apteian Cannabis ERP.

Contact us at info@apteian.com or visit www.apteian.com.

Apteian and B2B International surveyed 275 North American discrete and process manufacturers in October 2021, 10% of which were cannabis/CBD manufacturers.

B2B International is a global, full-service market research firm, specializing in researching B2B markets. Helping clients achieve their business goals by making smarter decisions driven by insights.



About Apteian

Apteian is one of the world's leading providers of purpose-built, industry-specific software that helps manufacturers and distributors effectively run and grow their businesses. With both cloud and on-premise deployment options, Apteian's products, services and unmatched expertise help businesses of all sizes to be Ready for What's Next, Now[®]. Apteian is headquartered in Alpharetta, Georgia and has offices in North America, Europe and Asia-Pacific.

To learn more about Apteian and the markets we serve, visit www.apteian.com.