



# Using Skills

## to Strengthen Regions

A comparison of Minnesota and California suggests a new way to help regions stay competitive in a fast-paced, talent-based labor market.

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 **Emsi**



Using Skills to  
Strengthen Regions

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[economicmodeling.com](http://economicmodeling.com)

**Authors:**

CLARE COFFEY

HANNAH GRIESER

YUSTINA SALEH, PhD

ROB SENTZ

**Design:**

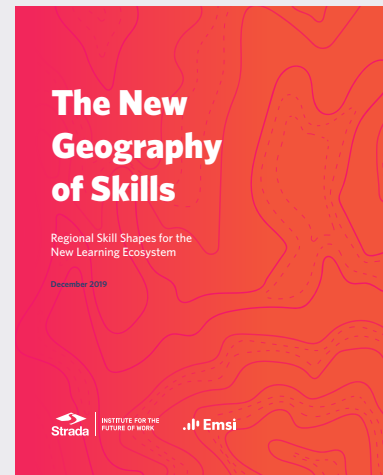
HANNAH GRIESER

DANIEL BOTKIN

For questions or comments:  
[Rob@EconomicModeling.com](mailto:Rob@EconomicModeling.com)

**SPEAKING A COMMON LANGUAGE OF SKILLS** can help regions develop fine-tuned strategies for talent development. In this paper, we will demonstrate this by taking an in-depth look at Minnesota’s high-tech medical manufacturing industries.

**CONTINUING THE RESEARCH** that we first presented in *The New Geography of Skills*, we now explore new ways of bringing together the broad taxonomic data (industries and occupations) from government sources, and the less structured, but more nuanced, skills data, which comes from job postings, resumes, and professional profiles. By joining these two kinds of data, we provide a snapshot of the existing strengths—and the shifting landscape—of a key industry for Minnesota’s “**Medical Alley**,” which could open new opportunities for further investigation at the local level. Our goal here is to provide both a more complete picture of the economy and a better way to address the skills, talent development, and program innovation that can keep a region competitive.



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**Note:** This report is based on Emsi’s labor market data and skills cluster models to provide an informed example of how data can be used to shape local talent strategies.

**EVEN MINNESOTA'S GENERALLY ROBUST ECONOMY** is not immune to the occasional market fluctuations that can have significant impacts on both individual welfare and civic health. For instance, during a period of falling national unemployment, Minnesota, which has typically enjoyed lower jobless rates than the national average, saw its own unemployment numbers **start to rise**. This left the region's leaders scratching their heads. What might account for this change? And what can be done to reverse the trend for Minnesota?

A rise in unemployment might seem like proof that the region doesn't have enough jobs to go around. But many area business leaders know that this simply isn't the case. Minnesota isn't facing any kind of wide scale depression; there are jobs aplenty, but even as job seekers flood the market, a wide range of Minnesota companies can't find the talent they need.

What we have instead is a mismatch between employers and workers—or, more specifically, between the work that needs doing and the capacities of the workforce. The mismatch stems from two major issues: speed and language. Speed is the rate at which industries' needs for specific talent and skills emerges, and the lack of warning with which they change. Language involves our struggle to communicate about these needs between people (who need to acquire said skills), educators and trainers (who need to develop them), and the businesses themselves (who need to pinpoint their specific needs and effectively advertise them).

To ensure the continuing vigor of its economy, Minnesota will need to bring these different actors together.

## Why skills?

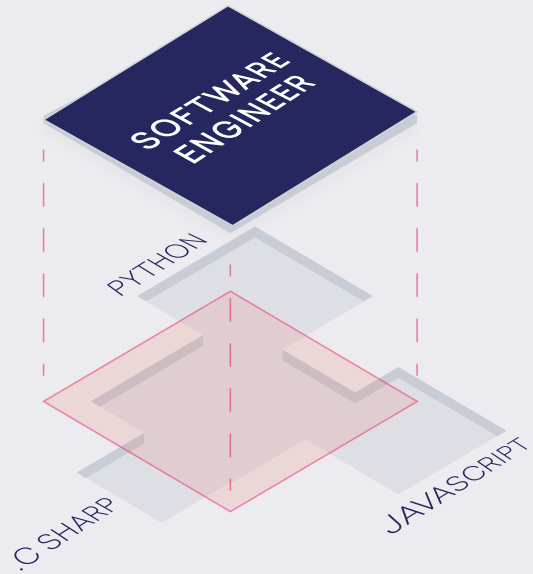
### The DNA of a living labor market

To solve the joint problems of speed and language, we need both agility and precision. In other words, we need skills. Skills are the fundamental unit of the work we accomplish in our day-to-day activities. Thus, skills offer an up-close view of the economic DNA that shapes how people, occupations, companies, industries, and regions function and grow. Just as DNA is a type of universal language that informs every cell and organism, so skills are the universal language that can communicate the details that affect every part of the economy—no matter who, where, what, or how big.

Because skills naturally relate to one another, they tend to **cluster** around particular kinds of work, forming unique skills shapes: groupings of related skills around career paths. If

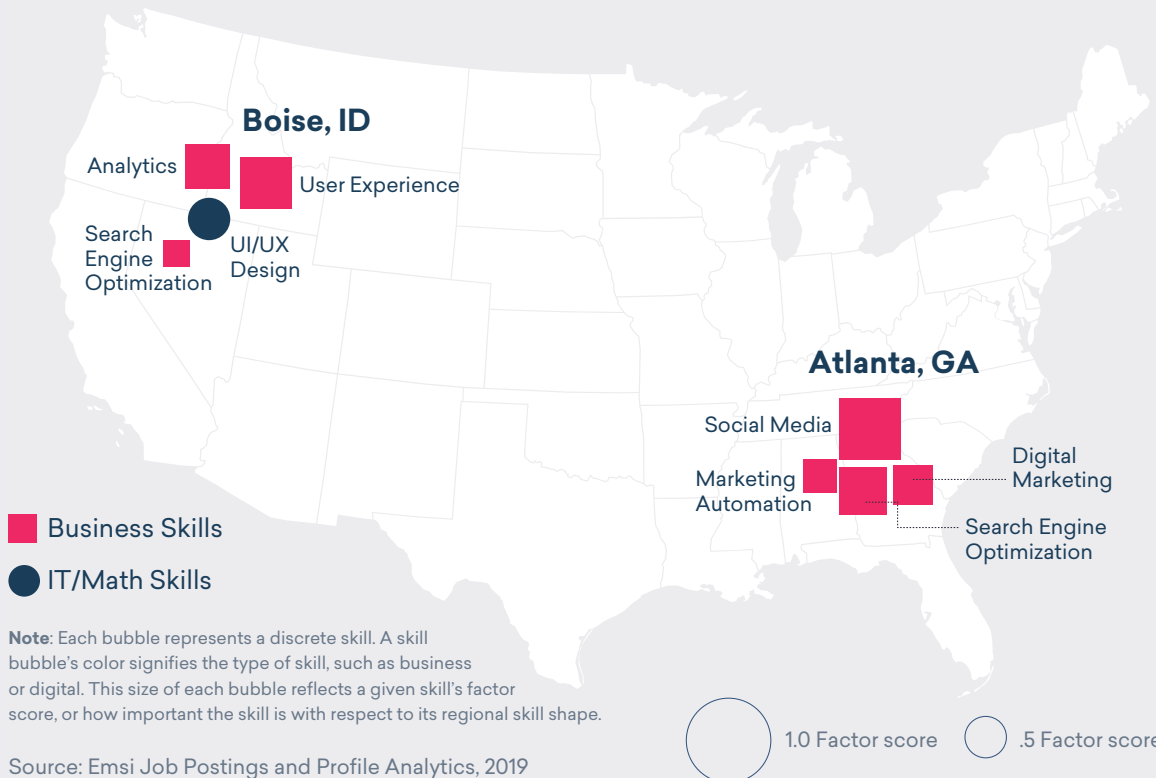
individual skills are the amino acids, then skills shapes are the winding chromosomal strands that turn particles of information into a living organism.

For example, Python is a well-known skill with a clear internal definition: a programming language for developing web applications and organizing data. But Python by itself is rarely what anyone *does*. Rather, Python gains meaning in the labor market from its relationship to other skills. Working synergistically together, different skills create the full scope of a worker's day-to-day activities. In one simplified case, a software engineer might be someone who knows Python in addition to one or two other coding languages. On the other hand, someone who knows Python, SCRUM, and Six Sigma methodology is more likely to spend the bulk of their time managing engineers than writing code.



## DIGITAL MARKETING

### In-demand skills in two US cities





Moreover, just as DNA exists within an organism, skills cluster together around work within a specific and important context—the regional market—to produce skills shapes. For instance, in our recent study *The New Geography of Skills*, we found that digital marketing looks very different in Boise versus Atlanta. While front-end-focused skills like graphic design and user experience are very important to Boise’s digital marketing cluster, Atlanta’s depends largely on analytical skills like search engine optimization. These differences are most likely due in part to variance in the industry composition between the two cities. By observing skills at the individual, cluster, and regional level, we gain both the microscopic precision and real-world nuance we need.

## Putting the data into practice

### Analyzing a vital sector of Minnesota’s economy

**TO UNDERSTAND WHERE PRECISELY** Minnesota may be at risk of falling behind—and consequently where it can invest—we need to take a look at some of the prominent skills for key industries. Skills data can reveal the inner workings of a very complex regional economy and take much of the guesswork out of diagnosing labor market shifts—including ones like the recent jump in unemployment that Minnesota saw during 2018–19.

But before we get into Minnesota’s skills DNA, let’s take a few steps back and begin at the organism level: the regional market.

#### A WIDE-ANGLE VIEW OF THE NORTH STAR STATE

Minneapolis, the primary engine for the state’s economy, is also at the heart of one of the nation’s top industries: **healthcare**. The rapidly advancing fields of medicine and medical technology drive much of Minnesota’s economy and also help meet many of the country’s high-tech healthcare needs. In fact, the surgical and medical equipment manufacturing industry is seven times more concentrated in greater Minneapolis than in the rest of the nation.

Even more noteworthy is healthcare’s high-tech sister industry, **electromedical and electrotherapeutic**

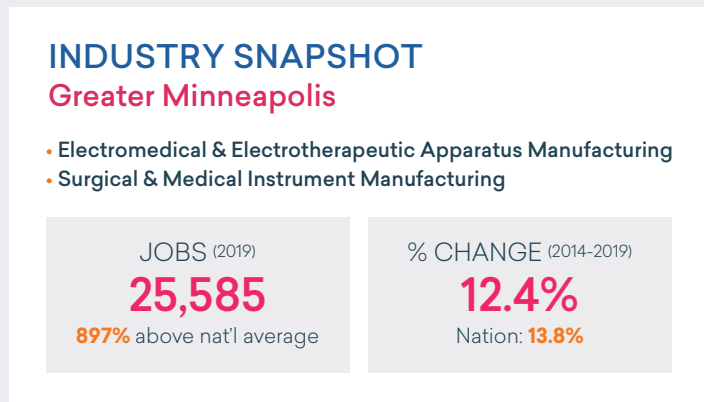
**apparatus manufacturing**, which creates products designed to treat everything from heart arrhythmia to diabetes, and which has *15 times* more jobs per capita in Minneapolis than in the US as a whole.

The unusually high concentration of jobs in these two medical manufacturing industries is worth special attention for understanding the unique strengths that Minnesota can play to, and which it should bolster to ensure long-term economic stability.

## THOUSANDS OF JOBS FOR A RANGE OF SKILL LEVELS

In Greater Minneapolis, these industries have grown steadily over the last five years, at a combined rate of more than 12%. They employ more than 25,000 people in this one metropolitan area alone—close to 900% more than the national average.

These industries employ roughly 9,400 production roles (assemblers, machinists, etc.), nearly 1,800 IT workers (software developers and analysts), and more than 4,500 industrial, mechanical, electrical, biomedical, and other engineers.



Medical manufacturing companies in Greater Minneapolis also employ thousands of additional workers with a range of skills and levels of education. Auxiliary roles in medical manufacturing range from management and finance to transportation and maintenance.

However, these industries do more for the Minneapolis labor market than simply provide jobs for tens of thousands of people. Emsi’s **multiplier data** indicates that each job in **electromedical and electrotherapeutic apparatus manufacturing** leads to three additional jobs across the region. This is because the millions of dollars brought by the industry to the Twin Cities also help create additional jobs in schools, restaurants, hospitals, grocery stores, and so on. A strong medical manufacturing industry thus helps promote the health of the Minneapolis labor market as a whole.

## THE NAMES BEHIND THE NUMBERS

Minnesota’s “Medical Alley” comprises a number of key employers in the medical manufacturing sector, including 3M, Boston Scientific, Abbot, Electromed, and Danaher/



Beckman Coulter, but the company with the biggest share of medical manufacturing jobs in the state is Minneapolis-based Medtronic. And even within the broader economic landscape, which is home to such major players as United Health Group, US Bank, and Target, Medtronic is the metro area's seventh largest employer<sup>1</sup>, and has advertised more than 4,000 open positions within the last year.

In addition to Medtronic and other medical manufacturers, dozens of the region's medical centers and laboratories are also helping to push healthcare-related industries to the top of the list. Home to the world-famous Mayo Clinic, Minnesota is a major destination for high-level medical treatment and research, so the centrality of medical industries to the state's economy makes sense. In fact, seven of the state's 10 biggest employers<sup>2</sup> provide medical supplies, equipment, or services.

## The shifting landscape of medtech manufacturing

An economy with an unusually **high concentration** of advanced medical manufacturing industries is a tremendous boon for Minnesota, especially as the average age of the US population rises and the demand for health services and products increases—particularly those that treat conditions common to aging adults, like diabetes and hypertension.

But of course, the other side of a dynamic, innovative, vitally important industry is the rapid rate of change, and the presence of industry players in other regions.

For example, California is a rapidly-growing source for the nation's medical technology and is currently outpacing Minnesota's growth in electromedical and electrotherapeutic apparatus manufacturing by a wide margin—104% growth over the last five years compared to Minnesota's 9%. And growth in California's major cities is even faster than in the state as a whole. Between 2014 and 2019, medtech manufacturing has grown in Los Angeles (77%), San Francisco (130%), and San Diego (444%). In fact, with more than 18,000 jobs and counting, electromedical manufacturing has become California's 15th fastest-growing industry (among industries with more than 200 employees).

None of this necessarily means that California is making Minnesota irrelevant, or that there's

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1 Source: Emsi Labor Market Analytics, 2020

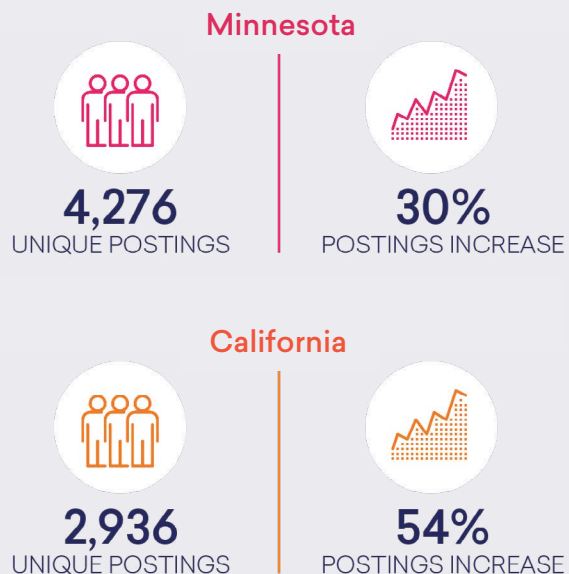
2 Source: Emsi Labor Market Analytics. See also: [greatermsp.org/clientuploads/med\\_tech\\_v2\\_10.2019.pdf](https://greatermsp.org/clientuploads/med_tech_v2_10.2019.pdf)



only room for one state to dominate in medical manufacturing. Actually, California and Minnesota show some key industry differences when you look at what kind of jobs are prevalent in each state.

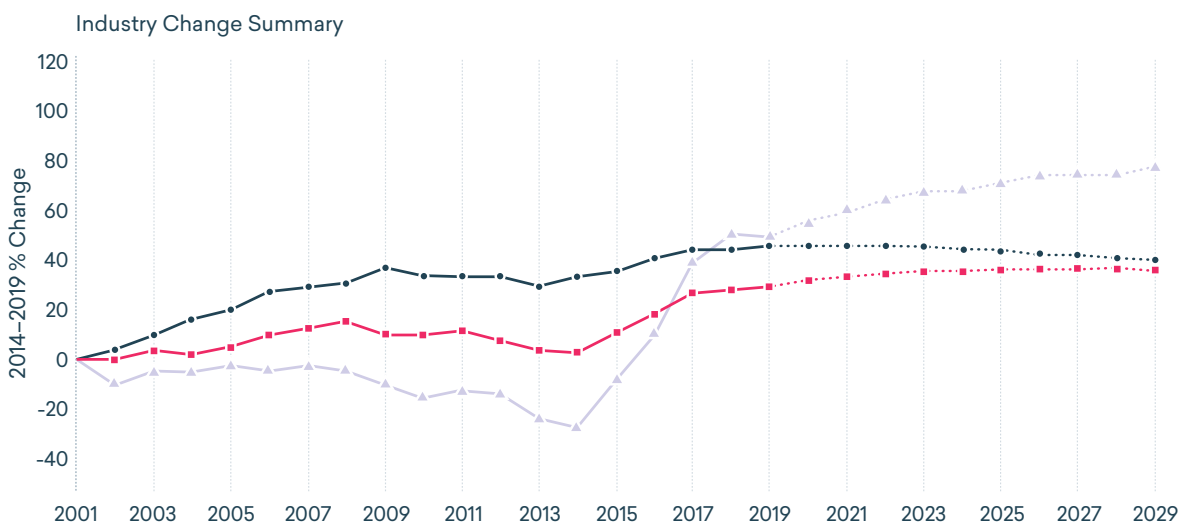
In Minneapolis, industrial engineering ranks first in both job roles *and* job postings. This metropolitan area is home to more than 7,500 industrial engineering jobs—a whopping 107% above than the national average. Meanwhile, although California’s job listings for this industry still include industrial engineering near the top of the list, they show a much higher percentage of software development and electronics

## JOB POSTINGS FOR ALL JOB TYPES AT MEDTRONIC, INC. IN 2019



## REGIONAL EMPLOYMENT BY INDUSTRY

### Electromedical & Electrotherapeutic Apparatus Manufacturing Across 3 Regions



Region	2014 Jobs	2019 Jobs	Change	% Change	Businesses
● Minnesota	13,238	14,474	1,235	9%	76
■ United States	55,391	69,389	13,998	25%	1,501
▲ California	9,066	18,533	9,467	104%	356

Source:  
Emsi Labor Market  
Analytics, 2020



engineering jobs than we find in Minnesota. This regional difference indicates that California is placing greater emphasis on the research and development for the industry, while Minnesota is more involved with the actual manufacturing.

This focus on R&D in California complements Minnesota's more traditional manufacturing strengths: both are necessary to produce the devices that help patients regain and retain their health.

But a comparison of the two states also contains important lessons. On one hand, Minnesota cannot depend on being the only game in town. Medtronic, with its solid ties to Minnesota and its headquarters in Minneapolis, increased job postings in California by 54% in 2019, compared to only a 30% increase during the same period in Minnesota. On the other hand, medical manufacturing (and, to an extent, manufacturing in general) is an increasingly high-tech, innovation-oriented field. To maintain its stellar track record in a crowded field, Minnesota must ensure that its traditional strengths remain best-in-class, and explore judicious opportunities to diversify those strengths.

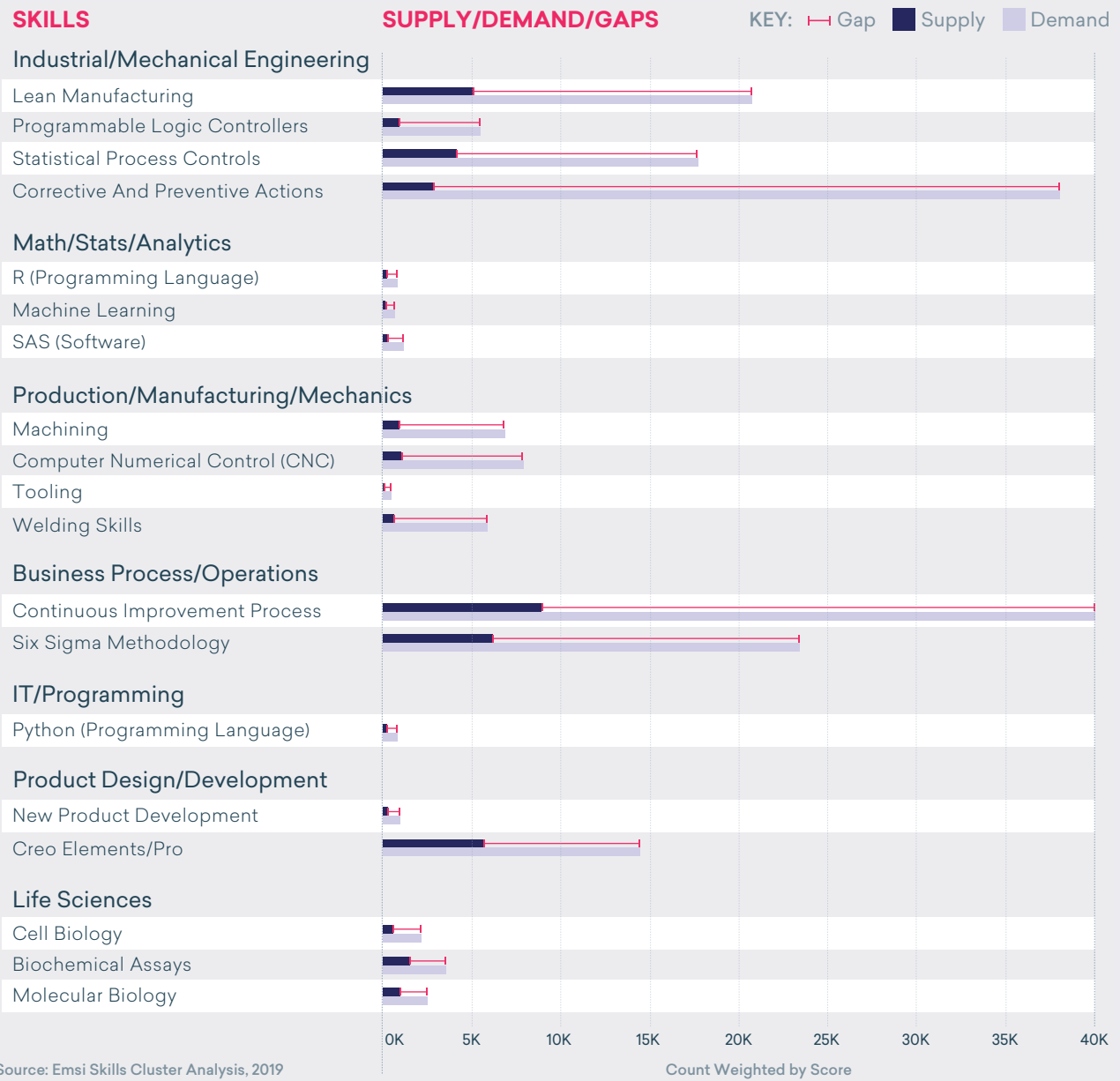
This prescription brings us back to **skills**.

As we saw in the introduction, Minnesota is suffering from too many open jobs and not enough talent to fill them—a sign that its historic strengths may need investment. To identify these talent gaps, we examined the talent supply and demand in the region.

First, we examined the *demand* by focusing our skills-cluster model on job postings from electromedical device manufacturers in Minneapolis (of which Medtronic is the largest) and isolating the industry's in-demand skills. Then we considered the *supply* by adding data from resumes and profiles to reveal the disparity between the skills being sought and the skills in supply. This analysis pinpoints the region's in-demand skills and reveals specific skills gaps that indicate why Medtronic is likely finding it difficult to hire enough people with the right skills. This new approach reveals a region's talent supply and demand in a more granular, and therefore more actionable, way.

The following chart allows us to see at a glance which industry-specific skills are most prominent in greater Minneapolis. These are the skills for which we see high demand, and which drive Minnesota's unique medical device manufacturing skills shapes. When these prominent skills, such as corrective and preventative actions (CAPA), are in short supply, Minnesota's medtech companies are likely struggling to find people within the region to fill the jobs that require them. Skills with a greater supply, such as continuous process improvements and Six Sigma methodology, may indicate that a higher number of people in the region currently do that work, or that the region already

## SELECT MEDICAL MANUFACTURING SKILLS GAPS For Greater Minneapolis



has some programs that teach such skills—yet still not nearly enough to meet the very high demand.

Finally, we see some skills (mostly associated with math/stats and IT) that are being sought less aggressively. This might indicate that the industry’s employers simply don’t need these skills as much. But it could also indicate that a company like Medtronic doesn’t believe they can find them in the region. Perhaps they previously sought these



skills in Minnesota, were unable to find them, and are now scouting for them elsewhere. Medtronic seems willing to undertake not insignificant effort and expense to buy the talent it needs, from wherever it can be found.

Such talent and skills gaps, combined with widespread technological shifts in medical manufacturing (such as increasing reliance on software development and precision robotics) should be driving leaders in the North Star State to adapt their education and talent strategies.

## Growing a human capital economy

Human capital is a resource like any other. Its presence in the economy is the fruit of cultivation, effort and investment. While individual firms with large enough budgets can often purchase the talent they need, at the regional level there is simply no substitute for increasing the home-grown talent supply to match employer demand.

But a commitment to building the local talent base poses its own set of questions. What type of programs are necessary, what should they teach, and in what context should they occur?

Innovative solutions to this age-old problem require looking beyond the usual occupations, or even the specific job titles, that have typically been used to assess talent development programs.

Knowing that a company intends to hire more industrial and mechanical engineers, for example, is helpful, but matching employers with the talent or the education and training they need requires another level of precision. The demand for specific types of skills within these engineering occupations can vary widely between businesses, industries, and regions, which means the skills gaps for these same occupations can also differ significantly from place to place.

To retain and grow Minnesota's key industries, and to move the state's employment numbers back in the right direction, colleges and universities, government officials, policy makers, and economic development leaders can use this data to diagnose industry needs so that they can agree on very specific tactical responses to talent shortages. By dealing with either real or perceived shortages in a more data-driven, targeted, and granular way—using skills as a common language—regions can do more to spur the growth of Medtronic and other manufacturers, with hard data and real techniques to close the gap.

# Four applications and recommendations

## Using skills to address Minnesota's regional challenges

**MANUFACTURING IS AN INTRICATE WEB** of skilled labor, engineering, sciences, business operations, programming, and analytics (not to mention a long list of human or soft skills), all coming together in a variety of key roles requiring specific sets of skills. Only a look at the actual *skills* required for a job's everyday activities can give us an objective and complete picture of that job's role in the economy and its compatibility with available labor.

This is what a **skills-based** approach provides: a nuanced, real-world picture of what employers like Medtronic actually need—and how hard it is for them to find it. This type of human capital analysis allows a mayor's office, a governor, an economic development team, a company, or a college to:

- A. Understand the needs beyond the typical industry or employer survey,
- B. Translate those needs into talent development strategies, and
- C. Broaden the potential labor pool and thus offer employment to a wider swath of residents.

Skills thus become the common language among a **company** (like Medtronic) looking for talent, a **region** (like Minnesota) looking to develop talent, and **colleges and universities** looking to align their programs with the region's needs. And ultimately, the answer for all three is to invest in the **people** who are eager to pursue the skills that offer the best path towards employment right where they live.

So, how can a state like Minnesota or, more specifically, a metro like Minneapolis-St Paul, use skills to solve the problem and mitigate job loss?

If skills gaps are indeed the root of the problem, a clear answer suggests itself: improve the talent supply with targeted upskilling or re-skilling.

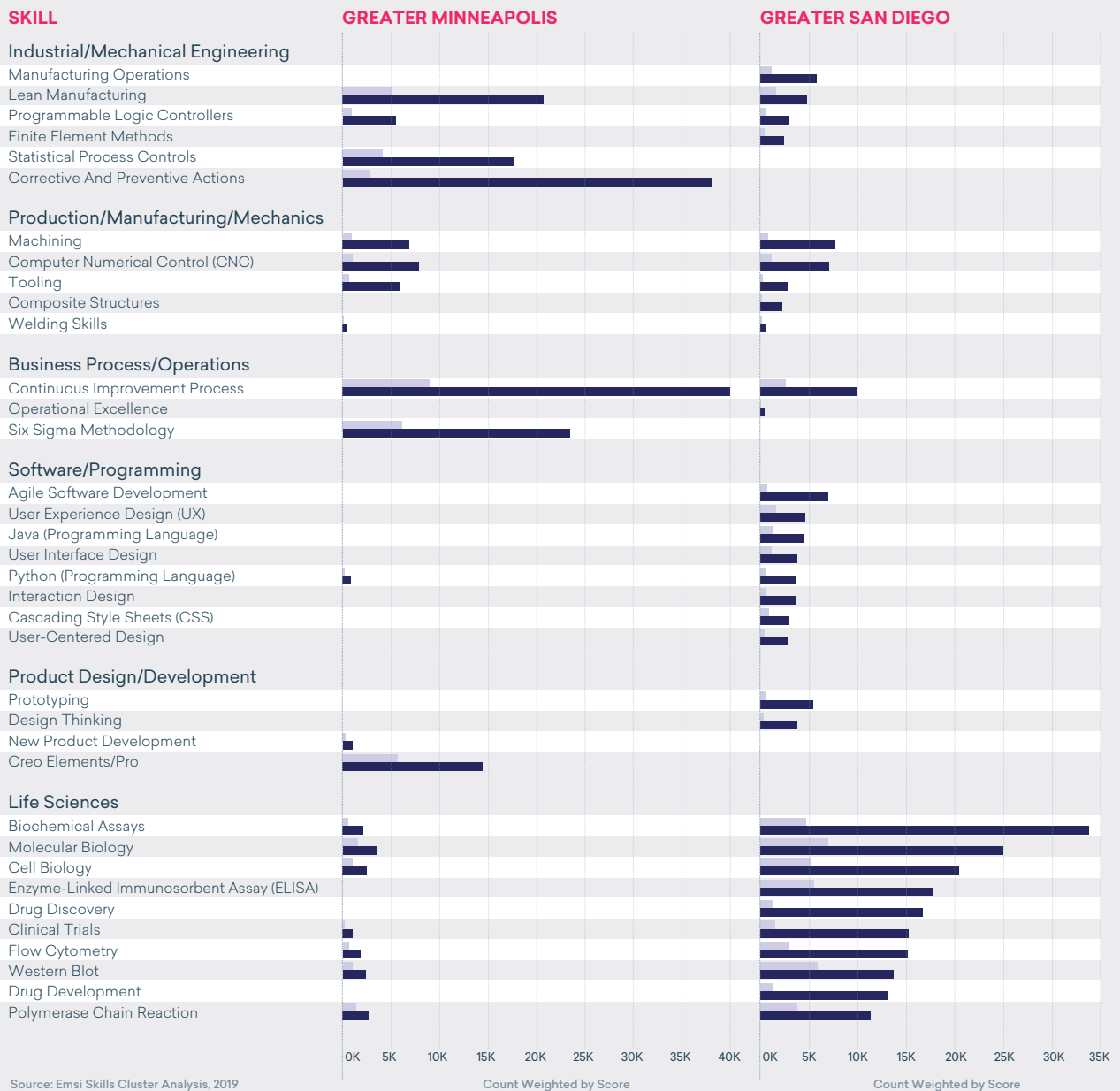


# STEP 1 KNOW YOUR STRENGTHS, AND LOOK TO DIVERSIFY

One powerful application of the skills-based approach is to assemble a detailed inventory of what skills are and aren't important to a particular regional industry. Many of us might assume that medical device manufacturing is generally the same everywhere. But when we start using skills to view the unique regional DNA of the industry, we spot dramatic differences.

## MEDICAL DEVICE MANUFACTURING SKILLS GAPS For Minneapolis & San Diego

KEY: Supply Demand



Source: Emsi Skills Cluster Analysis, 2019

Count Weighted by Score

Count Weighted by Score

The skills-gap analysis for Minneapolis we saw earlier uncovers the unique skills shape of Minnesota from a supply-and-demand perspective. And even more revealing is a look at this same analysis next to that of a California city with a similarly fast-growing medtech manufacturing presence: San Diego. By comparing the skills shapes of the two cities, we can identify stark differences between their in-demand skills and skills gaps.

We can see that Minnesota's prominent skills revolve much less around science and research than California's, and much more around manufacturing, product development, and industrial engineering.

This specialization could prove to be both a strength and a weakness for Minnesota. Some types of skills (corrective and preventative actions or Six Sigma methodology, for example) are very prominent in Minneapolis and not in San Diego, meaning Minnesota may still have a corner on the production side of medical device manufacturing. But specialization requires dominance in your market niche—making the size of the gaps in key skills like CAPA and Six Sigma especially concerning.

Meanwhile, we see that both the supply of and demand for software/programming skills and life science skills are much stronger in San Diego, which likely indicates a heavier emphasis on research and development.

Seen another way, if Minnesota wants to strengthen and support this already strong industry, it might consider drawing more of the R&D-related work to the state. Bringing in another high-demand subset of the med-tech industry might ease some of the pressures of specialization. But this can happen only if Minnesota diversifies and begins to supply more of the skills needed to support R&D jobs.

## **STEP 2** IDENTIFY COMPETITIVE UPSKILLING OPPORTUNITIES

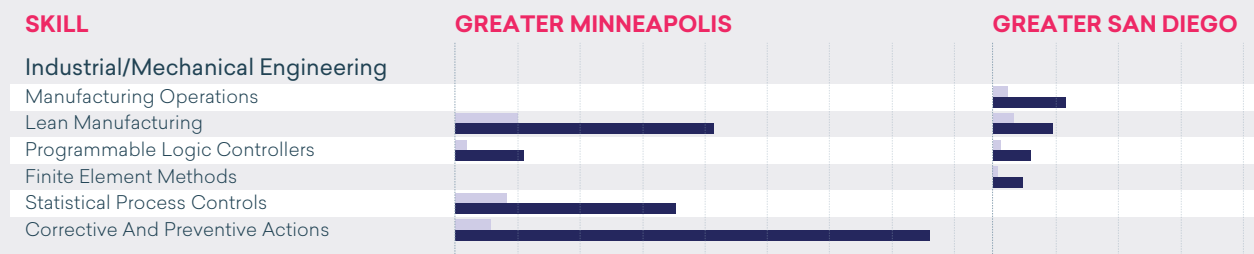
Another advantage of a comparative skills assessment is the ability to see which skills gaps are specific to your region, and which ones are multi-regional—or even national—problems. Besides diversifying its skill base to include a wider range of key skills such as programming, Minnesota could also gain an edge by eliminating common skills shortages. In many cases, the skills gaps we've seen in the charts above are not unique to the North Star State. While Minnesota suffers from them, so do cities like San Diego. This is bad news for the companies looking to hire people with those hard-to-find skills. But a skills gap that plagues large swaths of an industry could also present an opportunity for one region to surge ahead. To be one of the only regions *without* a certain skills gap would be a noticeable feat.



To see how we might identify this kind of multi-regional skills gap, let's zoom in on a skill category like industrial and mechanical engineering. In the graph of engineering skills needed in medical manufacturing, we see that lean manufacturing is in demand in both Minneapolis and San Diego, and both metro areas are facing shortages. Essentially, there are not enough professionals with lean manufacturing skills in either place.

## MEDICAL DEVICE MANUFACTURING SKILLS GAPS

### For Minneapolis & San Diego

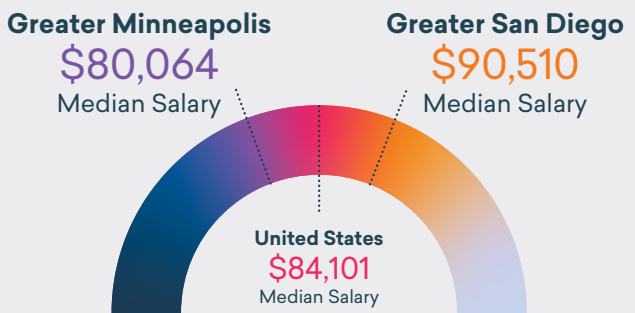


This is both a problem for the industry *and* a clear upskilling opportunity for whatever region is ready to take action. By developing skill-centered curricula, job training, and adult learning programs related to lean manufacturing and other in-demand competencies (for example, programmable logic controllers, finite elements methods, statistical process controls, and CAPA), Minnesota's leaders can help keep and expand key engineering advantages for the region.

This data helps to clarify which programs would create such advantages. And if Minnesota invests in a strategy for developing these high-demand skills while other regions do not, it stands to reason that Minnesota will come out ahead, from a talent and skills point of view. Such upskilling initiatives may even attract new companies requiring the skills that Minnesota's workforce will be uniquely equipped to offer—thus providing a complement to the state's existing business-friendly attributes, such as a relatively low cost of labor.

## MEDIAN COMPENSATION

### For Mechanical & Industrial Engineers



Source: Emsi Labor Market Analytics, 2020



## STEP 3 STRENGTHEN THE LOCAL TALENT PIPELINE

Here again, Minnesota has an opportunity to play to its unique strengths. Minneapolis boasts **the highest professional talent retention rate** of any major US city. But in terms of education, it struggles to outproduce a juggernaut like California. One of the more critical problems that Minnesota faces is the comparative lack of postsecondary providers to create the vast talent supply that the industry needs.

California is home to dozens of large colleges and universities with well-developed STEM programs that add high-demand IT and engineering grads into the labor market each year. Furthermore, the huge array of other California-based tech companies only increases the potential supply of talent with the skill-sets Medtronic and other high-tech medical manufacturers need.

In Minnesota, the University of Minnesota, Twin Cities, is the major supplier of STEM talent for companies like Medtronic, accounting for a full 31% of the employees with college degrees in the industry. This means that Minnesota's medtech companies have few other sources of graduates with the skills to fill critical job openings. In California, the industry can tap into many more schools—in other words, they have a wealth of options to choose from.

So, what can Minnesota do to increase and diversify the supply of talent? Short of adding an abundance of new colleges and universities, what steps can the state take to shore up the gaps?

The first step is aligning existing programs with skill demand. At institutions like the University of Minnesota, educational leaders can begin the process of translating their

### TOP SCHOOLS

Attended by California employees in electromedical manufacturing

#### SCHOOL

San Jose State University	297	4%
University of California, Los Angeles	296	4%
University of California, Irvine	293	4%
University of Southern California	288	4%
California Polytechnic State University	257	3%
California State University, Northridge	254	3%
University of Phoenix	241	3%
University of California, San Diego	231	3%
University of California, Berkeley	211	3%
California State University, Fullerton	210	3%

Source: Emsi Profile Analytics, 2020

### TOP SCHOOLS

Attended by Minnesota employees in electromedical manufacturing

#### SCHOOL

University of Minnesota, Twin Cities	2,111	31%
University of Saint Thomas	608	9%
Saint Cloud State University	392	6%
University of Wisconsin at Madison	225	3%

Source: Emsi Profile Analytics, 2020



curricula into a skills-based language, in order to better understand how well their programs meet industry needs.

The results may allow them to communicate areas where they are providing untapped skills reserves. Companies like Medtronic might not yet realize that some of the skills they need are actually present, coming out of unexpected programs. On the other hand, university professionals could discover real gaps in what they teach when they evaluate their curricula in this way, and redesign courses accordingly. Either way, **mapping the skills** that come from their programs to see how they translate into the real-world jobs would be an instructive process.

A good place to start exploring the possibilities of skills-aligned learning is **Emsi's Open Skills Library**, where colleges and universities can evaluate their own curricula to see how they translates into the skills-based language that companies tend to use when looking for talent.

The next step is increasing the volume of existing upskilling programs that are doubtless helping to fill the current skills gaps. Minnesota cities like Minneapolis could further solidify their retention rates by investing in and training existing employees rather than focusing primarily on new graduates.

For example, **The Minnesota Jobs Skills Partnership** (MJSP) is one organization working to bring the region's educators, businesses, non-profits, and other economic stakeholders together in order to provide training for new, prospective, and existing employees. MJSP grants have successfully helped keep thousands of jobs in Minnesota, and the organization's already impressive track record can only increase with the clarity that skills data can offer.

But our skills gap analysis suggests that the MJSP and its peers are not, by themselves, sufficient to the problem at hand. Supplementary programs are necessary to create a pipeline that not only delivers qualified graduates, but continually augments their skill sets to meet changing demand. To increase and optimize current upskilling efforts, the region can use the data in this report to dial in on the microcredentials the industry needs to be successful.



## **STEP 4** DEVELOP IN-DEMAND MICROCREDENTIALS

For Minnesota, microcredentials offer a valuable complement—and perhaps even a strategic advantage—in the state’s quest to quickly develop skills that Medtronic needs. Minnesota already has a wealth of experienced workers in the medical manufacturing industry. Helping incumbent workers gain specific, hard-to-find skills allows the employees to find a more secure footing in the labor market and closes talent gaps for the company (also sparing the employer the significant expense of recruiting a new person for every unfilled or underfilled role). Moreover, it further stabilizes the region by helping the company to thrive because it has a plan to locally develop the talent that it needs.

Microcredentials’ brevity and relative inexpensiveness make them especially manageable investments for both employees trying to upskill, and businesses investing in their existing workforce. Secondly, their highly targeted, stackable nature makes them ideal for navigating a rapidly changing landscape, where a suddenly in-demand skill may not fit well into a comprehensive program.

But what should Medtronic and other companies focus on? And how can other training organizations help? Based on our skills gap analysis, Minnesota could bolster its medical manufacturing base by upskilling its production workforce with the hybrid IT and business skills we increasingly see in advanced manufacturing environments. Three sets of microcredentials in particular, organized around Minnesota’s major manufacturing challenges, would go a long way towards ensuring that the North Star State remains competitive in the years to come:

## MANUFACTURING MATH AND TECHNOLOGY

- **Statistical process controls**
- **Programmable logic controllers**
- **Creo Elements design**

These microcredentials would address some of the most technical skills gaps Minnesota is currently experiencing. Statistical process controls is a type of applied statistics that allows for quality control by predicting where and what type of variation is likely to occur. Programmable logic controllers are industrial computers that, in essence, tell assembly line machines what to do—a great skill for workers who are already familiar with the demands of the shop floor. Creo Elements is a solid modeling and engineering drawing program, allowing workers familiar with it to wade into industrial design.

## QUALITY ASSURANCE

- **Corrective and preventative actions**
- **Regulatory requirements**
- **Quality management systems**

Quality assurance and quality management are skills that ensure a product not only works, but works consistently. In an industry like medical manufacturing, it's an especially crucial guarantee. Both skills could be through engineering schools, or as microcredentials targeted at current or prospective industrial managers. And bundling these skills with a regulatory requirements microcredential would ensure that quality control applies not only to product design, but to state and federal mandates.

## LEAN MANUFACTURING

- **Lean manufacturing**
- **Manufacturing operations**
- **Continuous improvement process**
- **Six Sigma methodology**

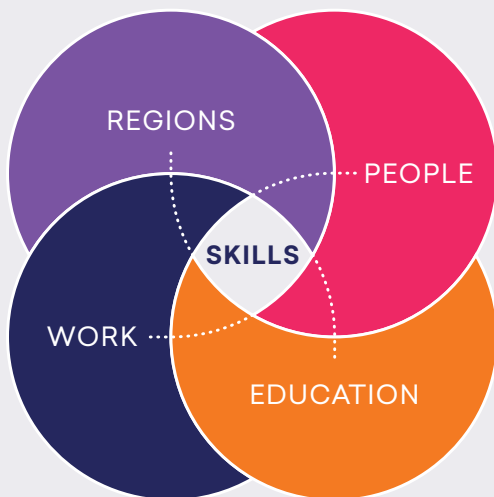
Throughout the country, manufacturing is becoming a hybrid role, with business skills complementing more traditional production. Minnesota is no exception. The keystone skill here is lean manufacturing, a method of minimizing waste and maximizing productivity in an industrial context. Similarly, continuous improvement process works to continually improve both the quality of goods, and the processes used to produce them. Along with Six Sigma methodology and manufacturing operations (the first a specific type of process improvement, the second a comprehensive course in operating a facility), this suite of microcredentials could help workers take more responsibility for and ownership of the manufacturing process, and potentially become extremely valuable assets to a given medtech firm.

# Conclusion

**WITH ITS HIGH QUALITY OF LIFE**, limited regulations, educated workforce, excellent employee retention, history of low unemployment, and generally more cost-effective environment, Minnesota has already set itself apart as a **Forbes Top 10** state for business. And within that business-friendly setting, Minneapolis has built high-tech medical manufacturing into a booming industry. But the state's jobless rates are rising even while thousands of jobs remain unfilled, and places like California are quickly gaining a foothold in the medtech industry and could overtake Minnesota's position as the preeminent state for this sector. At the same time, skills gaps in the Minnesota talent base threaten to weaken the region's key industries.

To ensure a healthy economic future for the state, diagnosing these potential threats is an important first step. But it's not enough. Businesses, local governments, and regional colleges and universities must all work together to identify and administer a cure. And to do that, they need to work at the DNA-level, using a common language—the language of *skills*, which has enough nuance and precision to communicate the real-world intricacies of talent supply and demand.

## A COMMON SKILLS LANGUAGE IS A NET WIN FOR:



- **THE PEOPLE** who can likely leverage these high-demand skills into better-paying, more in-demand jobs
- **THE COMPANIES** who need to fill critical roles
- **THE COLLEGES** or other training providers because they will be producing valued curriculum
- **THE REGION** itself that wants to retain talent and companies at the same time

Microcredentialing initiatives and continuing program review built around labor-market and skills-cluster data from Emsi could be just the shot in the arm that Minnesota needs to keep the heart of its advanced medical industries beating, and to ensure the region's economic health for years to come.



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