



# WORKFORCE DEVELOPMENT PRIORITIES

## KC Global Design Industry

ENGINEERING AND ARCHITECTURE SECTORS

MID-AMERICA REGIONAL COUNCIL

AUGUST 2018

# TALENT-TO-INDUSTRY EXCHANGES

This report provides workforce development priorities for the KC Global Design Talent-to-Industry Exchange (TIE). The TIE concept was introduced in 2016 as a tool to gather real-time information and use it to inform strategies for growing the region’s talent pool, strengthening the talent pipeline, and aligning employer and educational stakeholder interests. TIES are a signature strategy of KC Rising — a broad business and civic partnership working to strengthen the regional economy with focused attention on three economic drivers: trade, people and ideas.



Each industry-specific TIE includes three phases: (1) a detailed economic and labor analysis; (2) identification of workforce development priorities; and (3) implementation and evaluation. The KC Global Design TIE labor analysis was published in May 2018 and is available online at [www.kcworkforce.com/reports.htm](http://www.kcworkforce.com/reports.htm). The workforce development priorities — built on business-led discussions and using both quantitative and qualitative data from the labor analysis — prioritizes two “big ideas” and key recommendations to move forward.

## THE KC GLOBAL DESIGN INDUSTRY

The Kansas City region is home to one of the largest concentrations of leading engineering and architecture firms in the nation. By exporting both design services and a multitude of products that embody cutting-edge design, Kansas City area firms are transforming the way people live, work and play, across the nation and around the world.

The KC Global Design industry comprises firms that sell engineering, architectural and construction services, and firms that use engineering to improve the products they sell. These two distinct groups are categorized as Professional Design Services firms and Product Engineering firms.

The metropolitan area is the national headquarters of several architecture, engineering and construction firms that sell design services around the globe, including Black & Veatch, Burns & McDonnell, Populous, HNTB, Western Forms, JE Dunn and McCownGordon. These firms engage in Design Services and collectively employ 9,400 design professionals locally.

The region also is home to many companies that are powered by engineering and use design technology to improve the products and services they sell. These include Garmin, Honeywell, Cerner, Netsmart Technologies, Fike, Sioux Chief, Ford and GM. These firms engage in Product Engineering and collectively employ 9,600 design professionals locally.

**Professional Design Services** firms sell engineering, architectural and construction services.

**Product Engineering** firms use engineering to improve the products and services they sell.

# WORKFORCE DEVELOPMENT PRIORITIES

The KC Global Design Labor Analysis provided data and insights to help the region gain a better understanding of the KC Global Design industry in the Kansas City region. It helped quantify current and future demand for design professionals in engineering, architecture and related technician occupations; assess the current alignment between educational and employment opportunities; identify gaps in worker supply and demand; and highlight growth areas in the design industry.

The analysis was informed by phone interviews with 20 CEOs, discussions with other business leaders and educators, and a survey of nearly 200 CEOs, human resources directors and division managers. Participants shared valuable insights about workforce trends and shortages.

Through these discussions, two major themes or “big ideas” were identified to inform the workforce development priorities: growing the talent pipeline and workforce preparedness. These two key themes are explored in more detail in the following pages.

## INDUSTRY TRENDS | from business leaders

- **Demand for both licensed and unlicensed professionals** — Most organizations employ both. A degree required more often than a license, but a professional license adds value. It shows a commitment to the profession and builds client trust.
- **Demand for other design professionals** — Employers anticipate growth in technical occupations (technicians, modelers and drafters) and in process/field work occupations (planners, project managers, surveyors and inspectors). Many of these occupations don’t require an engineering or architecture degree, and some don’t require a degree at all.
- **Current talent shortages** — Current shortages by discipline or specialty include electrical engineers, electrical design, mechanical engineers, radio frequency engineers, rail systems engineers, robotics/automation, renovation, technicians and modelers. Current shortages by experience area include software skills (Revit, Luminon), multidisciplinary experience, mid-level management experience and soft skills.
- **Anticipated talent shortages** — Future shortages are expected in design support positions (such as graphic/interior designers), non-licensed technical positions in manufacturing, infrastructure replacement and renovation, and energy (solar, wind and water), as well as strong technology/data science experience and integrated disciplines.

**TOP 5 GROWTH OCCUPATIONS**  
in KC Global Design Industries

- 1 Civil engineers
- 2 Mechanical engineers
- 3 Electrical engineers
- 4 Industrial engineers
- 5 Architects

As KC Global Design firms seek talented workers, both to fuel growth and replace those who retire, they have two choices: attract workers to the Kansas City region or grow their own talent here at home. Both of these present challenges and opportunities.

**THE REGION’S LABOR DEMAND OFTEN EXCEEDS THE SUPPLY OF WORKERS WE ARE ABLE TO ATTRACT AND RETAIN**

Over the next 10 years, design occupations are expected to add 1,700 new jobs, led by growth in demand for civil, mechanical, electrical and industrial engineers. However, growth demand alone does not fully measure the total number of additional workers that will be needed. A significant portion of the existing workforce will retire or move to other industries, creating additional demand. This replacement demand is expected to be eight times larger than the growth demand. Total demand — the combination of both growth and replacement demand — provides the best overall measure of the number of people the region’s design industry will need to be educated and trained in the appropriate fields. That number is expected to total nearly 16,000 over the next 10 years.

Demand for these workers is high because of the strong economy, a lost generation of mid-level talent caused by the recession, the retirement of baby boomers, and competition with non-traditional firms. For engineering jobs, a bachelor’s degree is often a minimum requirement, while positions in architecture often require a master’s degree. Moving up the ladder in either field may also require a specialized license.



**WHY IS SUPPLY LOW?**

**STUDENTS**

- Aren’t exposed to the industry
- Perceive the work as too hard, too much math
- Choose tech-based programs instead

**TALENTED WORKERS**

- Often leave the area after graduation
- Can be difficult to attract to and retain in the KC region
- Have lots of options and can be choosy



**WHY IS DEMAND HIGH?**

**COMPANIES**

- Are growing in a strong economy
- Are losing boomers to retirement
- Lack mid-level talent due to ‘lost generation’

**COMPETITION**

- Firms compete with other industries such as consulting, technology, finance
- Engineering degrees have universal value

Hiring difficulty can be measured by the number of advertisements needed for each hire. By this measure, employers find it harder to hire mechanical engineers, electrical engineers and architects in Kansas City than in peer metros, and easier to hire industrial engineers and civil engineers.

It’s not that area schools aren’t producing enough graduates. Rather, the region appears to have difficulty retaining enough of those graduates, and many of those who do stay take jobs in other industries.

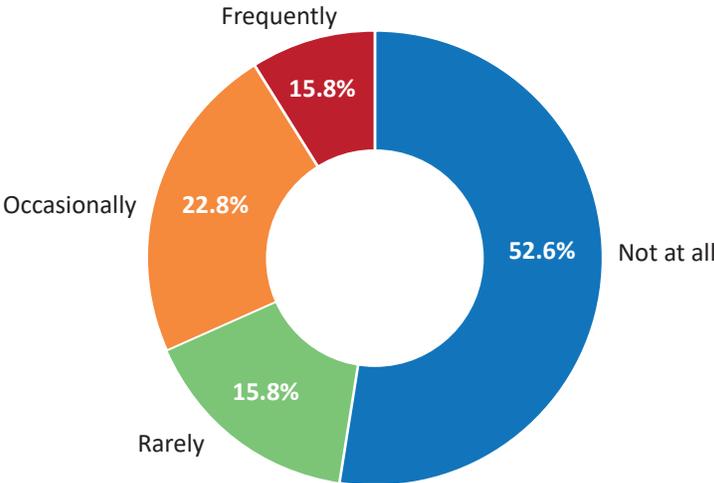
Occupation	Total demand (10 year forecast)	Estimated supply (150-mile radius)
Civil Engineers	2,272	4,490 (bachelor’s and above)
Mechanical Engineers	1,643	7,500 (bachelor’s and above)
Electrical Engineers	1,444	7,530 (bachelor’s and above)
Industrial Engineers	1,126	1,680 (bachelor’s and above)
Architects	978	1,600 (postgraduate degrees)

**THE BEST WAY TO ENSURE A STEADY SUPPLY OF TALENT IS TO GROW IT LOCALLY.**

Employers tend to hire locally. When surveyed, nearly 32 percent of employers stated they recruit entry-level workers from outside of the region occasionally or frequently. Reasons for recruiting from outside the region included the need to find more diverse talent — both ethnically diverse and with diverse experiences and educational backgrounds; the need to fill niche specialties; and insufficient numbers of local applicants to meet demand. Some regional employers also noted that qualified local candidates did not respond to their recruitment efforts.

**Employer Survey Question:**

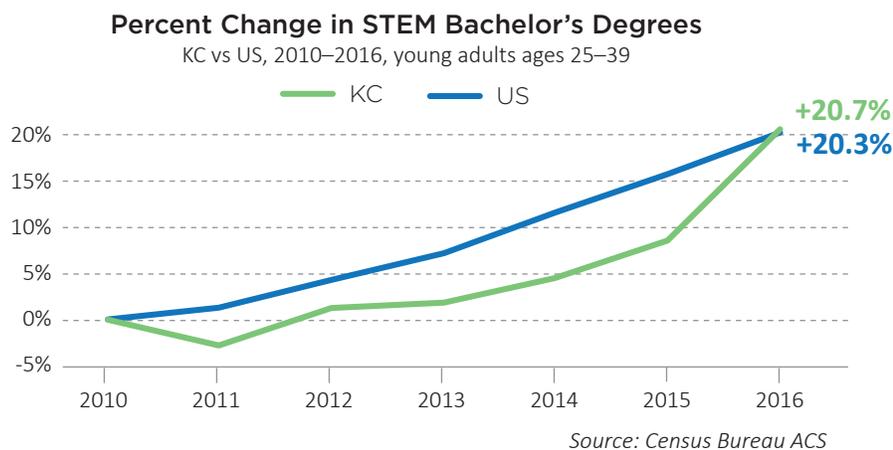
In the last year, how often have you needed to recruit workers for entry-level positions from outside the region?



## A MORE COHESIVE STRATEGY AROUND STEM ATTAINMENT AND ATTRACTION OF STEM GRADUATES IS NECESSARY TO GROW THE REGION'S TALENT PIPELINE.

The current difficulty in attracting students to STEM is not only due to a lack of exposure, but also to the perceived complexity and rigor of required courses. Increasing STEM attainment is essential, but it may not be sufficient to increase the number of engineers and architect if students with quantitative aptitude choose to follow other career paths, such as technology or finance.

Meeting future labor demand will require getting more young adults into science, technology, engineering and math (STEM) fields of study. Rapid digitalization of the national economy is changing the demand for skills, rewarding technologically oriented workers with higher pay. In the Kansas City metro, only 30.3 percent of all bachelor's degrees are in STEM fields, ranking the region 26th among 31 peer metros. For young adults, the region's share is somewhat higher, at 33.7 percent. As a result, the region's ranking on STEM share of bachelor's degrees for young adults rises to 19th among its peers. While a surge in STEM degrees among young adults is encouraging, we still fall short of the goal to rank in the top 10 of peer metros.

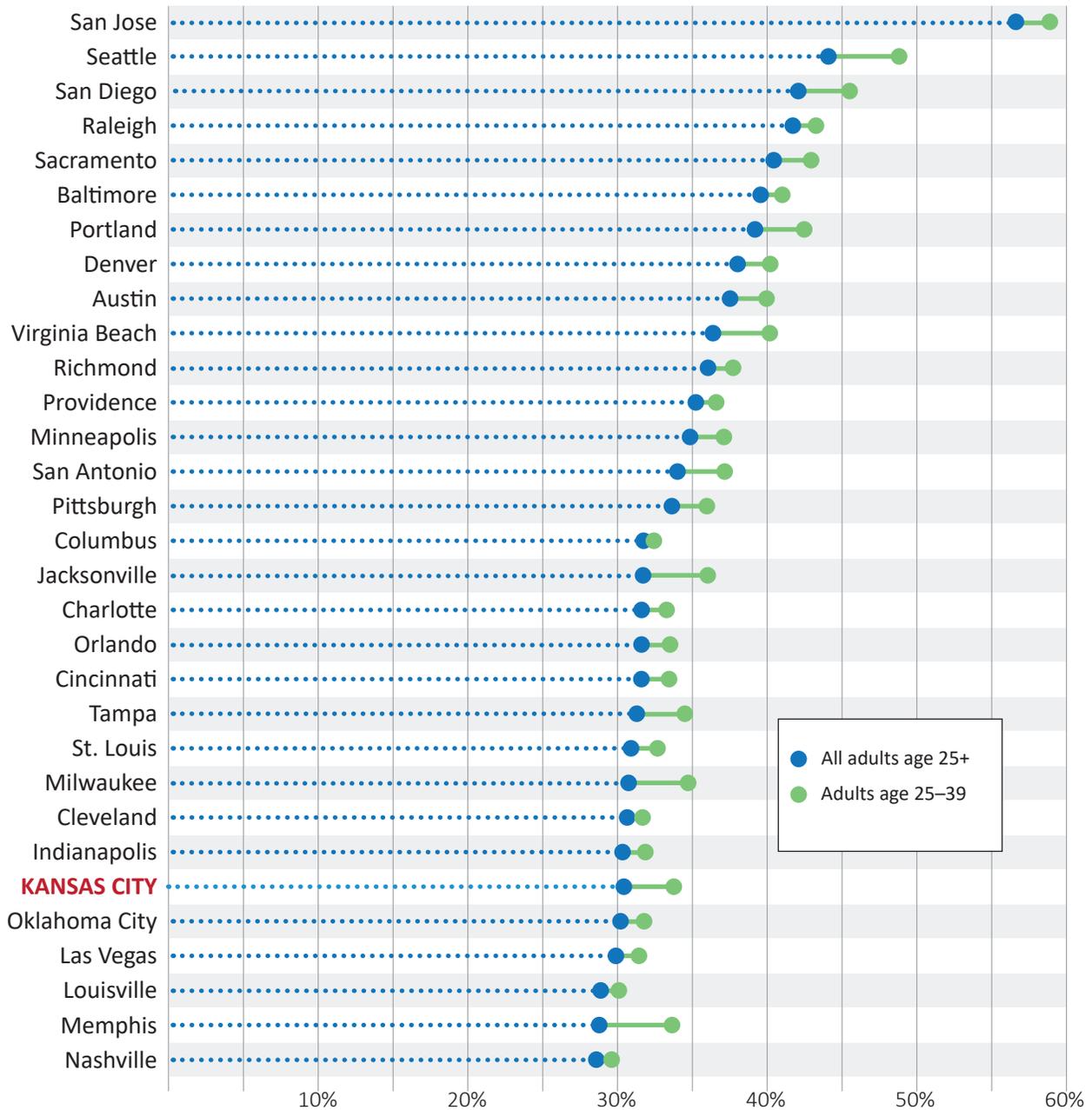


## PART OF THE SOLUTION IS TO GET YOUNG PEOPLE INTERESTED IN STEM IN HIGH SCHOOL, MIDDLE SCHOOL AND EVEN ELEMENTARY SCHOOL.

Currently about one-third of high school students in the region are enrolled in career technical education. Project Lead the Way, a STEM initiative supported by the KC STEM Alliance, has seen a near doubling of participation in middle school and experienced a 10-fold increase in elementary school over the past two years.

## Concentration of STEM Degrees

Bachelor's degrees in STEM fields as a share of all bachelor's degrees, KC Rising peer metros



Source: Census Bureau 2015 ACS 1-year data.

## MORE DIVERSITY IS NEEDED TO INCREASE INNOVATION AND COMPETE IN A WIDER RANGE OF NATIONAL AND INTERNATIONAL MARKETS.

Area firms recognize the need for a more diverse talent pipeline, not just a larger one, given that over 80 percent of their current workforce is white. The percent of women design professionals is 15 percent and has changed only slightly since 2000. Developing strategies and systems that

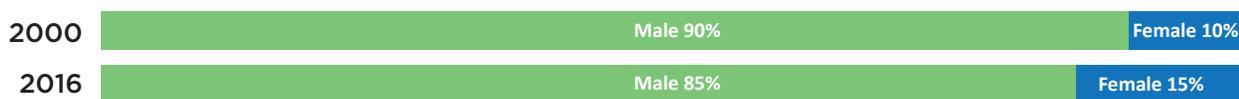
increase the number of women and minorities in the engineering and architecture professions is a significant opportunity for the industry. This is especially true with respect to efforts to retain more of the international students who make up a large portion of current graduates.

**Design Professionals by Race/Ethnicity\*** | KC vs. US, 2016



\*White, Black, Asian and Other categories exclude those of Hispanic ethnicity as they are counted in the Hispanic category.  
 Source: IPUMS-USA, University of Minnesota, www.ipums.org, based on 2016 ACS, 5-year data.

**Design Professionals by Gender** | KC Metro, 2000 vs. 2016



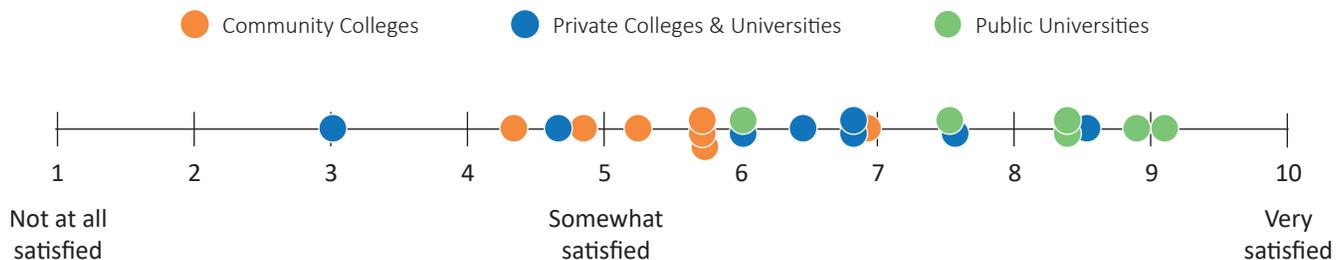
Source: IPUMS-USA, University of Minnesota, www.ipums.org, based on the 2000 Census and 2016 ACS, 5-year data.

**BIG IDEA #2 WORKFORCE PREPAREDNESS**

**DESIGN FIRMS ARE SEEKING WORKERS WITH STRONG SOFT SKILLS AS WELL AS TECHNICAL SKILLS.**

Employers are mostly satisfied with the technical skills of new graduates from area educational institutions, although there is frustration they must recruit nationally to fill some highly specialized positions. However, firms are less satisfied with recent graduates’ soft skills – core competencies such as the ability to communicate with clients, collaborate in interdisciplinary teams and understand the business side of the firm’s operations.

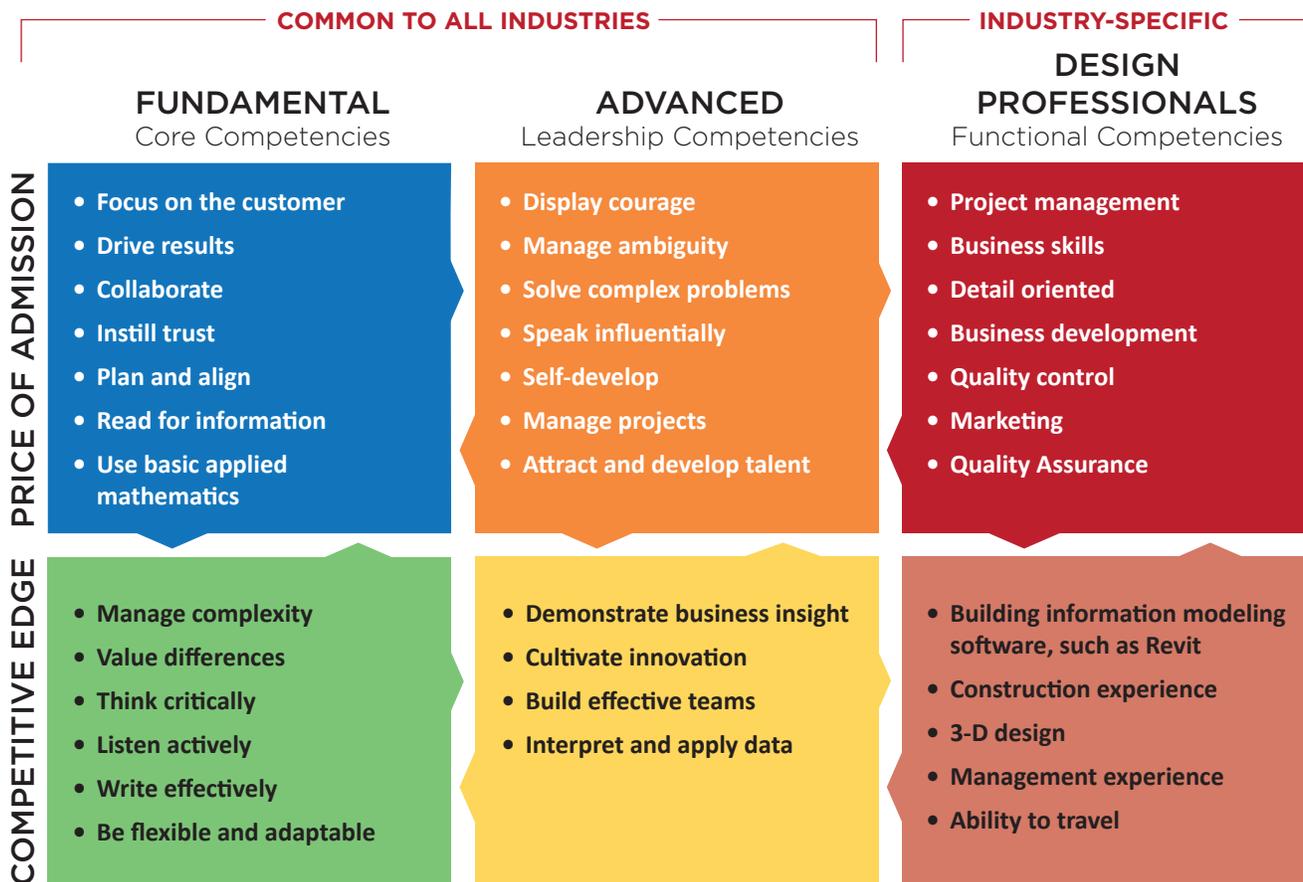
**Satisfaction with Graduates of Regional Institutions**



Source: MARC Industry Leader Survey

The KC Rising Human Capital Common Sector Competencies Task Force developed the model below to illustrate the progression in competencies that leads to a more skilled workforce. Common sector competencies (in the left and middle columns) are the key strengths and essential qualifications for employee performance across critical industries and sectors in the Kansas City region. Specific competencies for design professionals are shown in the right column. In addition, competencies are grouped by “price of admission” in the top row — skills that are easier to find or train for — and “competitive edge” in the bottom row — skills that are less intuitive, more difficult to develop, and often in short supply. These lists were created using established collections of competencies, job postings, and surveys of hiring managers and industry leaders about their competency needs.

### Core Competencies Model

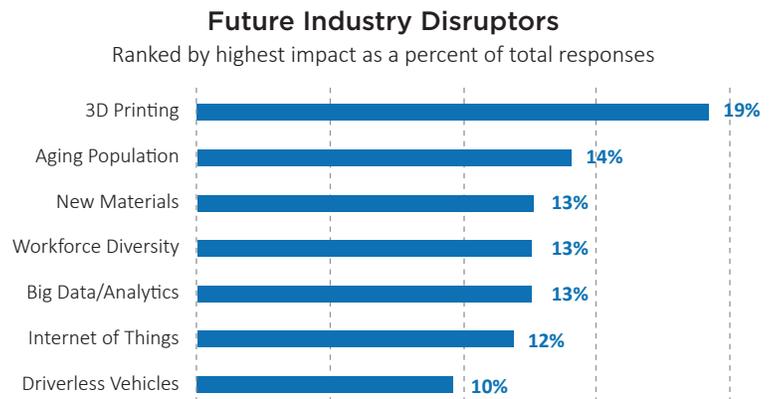


### EXPERIENTIAL LEARNING HAS BECOME INCREASINGLY IMPORTANT.

Internship opportunities can help students who aren't from the Midwest establish roots and remain in the region after graduation. More generally, experiential learning – not just internships but group projects, guest lecturers from industry and design contests – is a way to align expectations among firms and recent graduates and produce greater levels of satisfaction for both. Working on strategies to expand experiential learning is another key opportunity for Kansas City's global design industry.

## INDUSTRY DISRUPTORS WILL PUT A GREATER PREMIUM ON DEVELOPING, ATTRACTING AND RETAINING TOP TECHNICAL TALENT.

Architecture and engineering firms continue to value the ability to use cutting edge technologies such as building information modeling and 3-D and 4-D design. New technologies, such as 3-D printing and additive manufacturing, advanced materials, “Big Data” and data analytics, and the Internet of Things are expected to bring dramatic changes to the architecture and engineering industry.



Source: MARC Industry Leader Survey

## NEXT STEPS

## POTENTIAL ACTIONS AND STRATEGIES

Through the TIE process, industry leaders identified five key opportunity areas for growing the talent pipeline and preparing workers for KC Global Design careers:

### 1: Develop a more cohesive strategy around the STEM talent pipeline.

- Cooperatively market KC companies, open positions and assets to students in university programs throughout the Midwest.
- Develop industry-specific marketing plans for specialized and hard-to-fill positions, especially in technical and engineering disciplines and including manufacturing firms.
- Work with KCADC to take advantage of its Team KC experience in marketing the region to top talent and helping students who complete internships here “stick.”
- Develop ongoing partnerships with local chapters of key industry associations such as the Society for Hispanic Engineers and the National Association of Black Engineers, and help connect area college students with these organizations.
- Create a central database of open positions in engineering and architecture to attract more applicants and draw more attention to the depth of career opportunities.

### 2: Create clear entry points and career pathways for non-degreed workers.

- Support a regional, community-engaged effort to redesign high school so that students graduate with market-value assets such as college credit, industry recognized credentials, and career and entrepreneurial experiences.

### 3: Create a system to improve job access for female, minority and international students.

- Strengthen peer and mentor professional networks for young, diverse professionals. Coordinate efforts within individual companies and civic organizations to identify

ambassadors and link leaders as part of a regional effort to attract and retain top talent and trailing spouses.

- Support the local chapter of the American Institute of Architects in design and implementation of a Kansas City-area “Equity by Design” program following a national model to increase diversity among design professionals that started in San Francisco. A similar effort could be launched by local engineering associations.

#### **4: Create a better balance between technical skills and core competencies, both in and out of the classroom.**

- Pilot curriculum projects related to interdisciplinary education, industry disruptors and integration of core competencies, with a special focus on how emerging technologies and materials integrate with engineering and design functions.

#### **5: Expand experiential learning opportunities, inside and outside of the classroom, to provide maximum exposure and align expectations.**

- Develop a college-attraction program to identify promising STEM students in high school and connect them to area colleges and further experiential learning and civic opportunities
- Work with KC Scholars’ network of student support service providers and near-peer college advisers to engage high school students and help them navigate college application and admission processes.
- Implement bridge programs at higher education institutions across the region to connect promising high school students with peer mentors, faculty and opportunities to earn college credit.
- Establish a central access point to broker work-based experiences such as internships, externships and problem-based learning across the region.
- Work with employers to coordinate professional development opportunities related to emerging technologies, offer skill refreshers for professionals currently in the industry, and engage educators.

## **NEXT STEPS**

## **PRIORITY RECOMMENDATIONS**

From the potential action steps described previously, the global design workforce team has adopted three high-level recommendations for immediate focus:

- 1** Market the Kansas City area and its employers to regional university students, targeted national universities and experienced professionals (5-10 years of experience).
- 2** Strengthen efforts to attract and retain a diverse workforce.
- 3** Encourage young people to consider professions in the KC Global Design industry.

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# Honeywell



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DST	Populous
EC Manufacturing	SFS Architecture
Garver	Taliaferro & Browne
Gould Evans	Terracon
JE Dunn Construction	Thornton Tomasetti
Henderson Engineers	TranSystems
HG Consult	TreanorHL
HNTB	TREKK Design
HOK	

## EDUCATORS & CIVIC ORGANIZATIONS

American Council of Engineering Companies of Kansas  
American Council of Engineering Companies of Missouri  
American Institute of Architects–Kansas City Chapter  
Full Employment Council  
Johnson County Community College  
Kansas State University  
KC STEM Alliance  
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