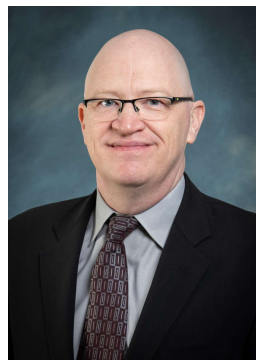




Building the Engineering Workforce of 2035

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Presenter



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Workforce Population Statistics

Millennials are the largest cohort alive in U.S.

Generation	Birth Years	Age Range in 2023	Percentage of Population in 2023
Silent Generation	1928-1945	78 - 95 years old	5%
Baby Boomers	1946-1964	57 - 77 years old	21%
Generation X	1965-1980	43 - 58 years old	20%
Millennials	1981-1996	27 - 42 years old	23%
Generation Z	1997-2012	11 - 26 years old	21%
Generation Alpha	2013 onward	0 - 10 years old	10%

Population demographics do not favor labor workforce in coming decade

U.S. population grew 5.7% between 2013 and 2022 from about 316 million to 334 million individuals.

U.S. Population	2013	2022	Change
18 to 24 years old	31,488,416	30,456,842	-3.3%
45 to 54 years old	43,749,928	40,587,060	-7.2%
55 to 64 years old	39,277,803	42,344,458	7.8%

Despite declining college age population, college enrollments increased 3.7%

Enrolled in 4-year Degree Institutions, Including Graduate Students	2013	2022	Change
Total	13,477,066	13,975,146	3.7%
Ages 24 or younger (est.)	9,164,405	9,503,099	3.7%
Ages 25 or older (est.)	4,312,661	4,472,047	3.7%

Increase is due to three factors:

- Higher enrollment rates among the college age population (ages 18 to 24)
- Increases in enrollment among those ages 25 and older
- Increase in the number of international students

International student enrollment surged by 20.6% over ten-year period

International Student Enrollment	2012-2013	2021-2022	Change
Total	688,221	830,126	20.6%
4-year Degree	355,449	396,939	11.7%
Graduate Degree	332,772	433,187	30.2%

Enrollment in the 2023-2024 school year stood at 957,025, nearly matching the increase in the number of students over the prior ten years.

Student graduations also surged (13.9%), more than enrollments

All Students Graduating	2013	2022	Change
Total	2,721,205	3,099,128	13.9%
Bachelor's Degree	1,796,073	2,015,035	12.2%
Master's Degree	755,462	880,249	16.5%
PhD - Research/Professional/Other	169,670	203,844	20.1%

The reason the increase in the percentage of those graduating grew faster than the percentage enrolled is that a higher percentage of students completed their degree than previously.

Students graduating with engineering degree grew faster (23.3%) than overall, but...

Engineering Student Graduates	2013	2022	Change
Total	164,648	203,004	23.3%
Bachelor's Degree	106,661	141,422	32.6%
Master's Degree	48,862	49,339	1.0%
PhD	9,124	12,243	34.2%

...the number of students graduating with an engineering degree has actually been declining in recent years, even starting before the Covid-19 Pandemic. In 2019, there were nearly 214,000 engineering graduates, about 11,000 more than in 2022.

Even better, students graduating with a “core” ACEC-focused degree increased nearly 27%

Student Graduates with Civil, Mechanical or Electrical Engineering Degree	2013	2022	Change
Total	73,104	92,770	26.9%
Bachelor's Degree	48,087	66,492	38.3%
Master's Degree	20,710	20,867	0.8%
PhD	4,307	5,124	19.0%

However, since 2019, the number has decreased by more than 5,000 indicating a new downward trend.

International students graduating with any engineering degree also increased

International Engineering Student Graduates	2013	2022	Change
Total	37,575	40,606	8.1%
Bachelor's Degree	10,666	11,314	6.1%
Master's Degree	20,522	20,722	1.0%
PhD	6,387	8,570	34.2%

International students graduating with a “core” engineering degree also increased, but...

International Student Graduates with Civil, Mechanical or Electrical Engineering Degree	2013	2022	Change
Total	16,522	17,670	7.0%
Bachelor's Degree	4,809	5,319	10.6%
Master's Degree	8,698	8,764	0.8%
PhD	3,015	3,587	19.0%

...since 2019, the number of international students graduating with any engineering degree has decreased by more than 5,000 and the number graduating with a civil, mechanical or electrical engineering degree has fallen by about 3,000.

Only 9% of graduating international students obtain an H-1B visa

In 2022, only 3,825 H-1B visas were issued to international students graduating with any engineering degree leaving about 36,800 of these students without an H-1B work option.

Retirements and separations are significant in the engineering profession

The Bureau of Labor Statistics estimates that each year 4.7 percent of the workforce retires and another 6.4 percent leave their field or “separate” from it.

The result is that in 2022, we estimate that 184,175 engineers retired or left the field, and among those working as a civil, mechanical or electrical engineer, 85,175 retired or left the field.

There are not enough engineers entering the profession to replace those leaving

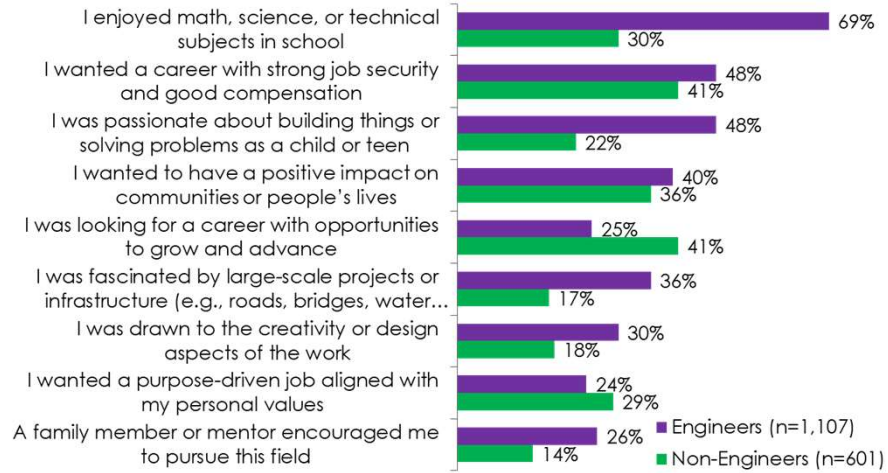
In 2022, the total number of NEW engineering graduates available for work was 166,223 (total students minus international students plus H-1B visa holders).

However, 184,175 engineers retired or left the field resulting in a net **gap of about 18,000 engineers in just one year.**

Performing the same calculations for **civil, mechanical, or electrical engineers**, in 2022 we had 76,764 new available engineers in the workforce and 85,175 who retired or left the field for a net **gap of 8,411 workers.**

Engineers are motivated by STEM, job security, good compensation, building things and solving problems.

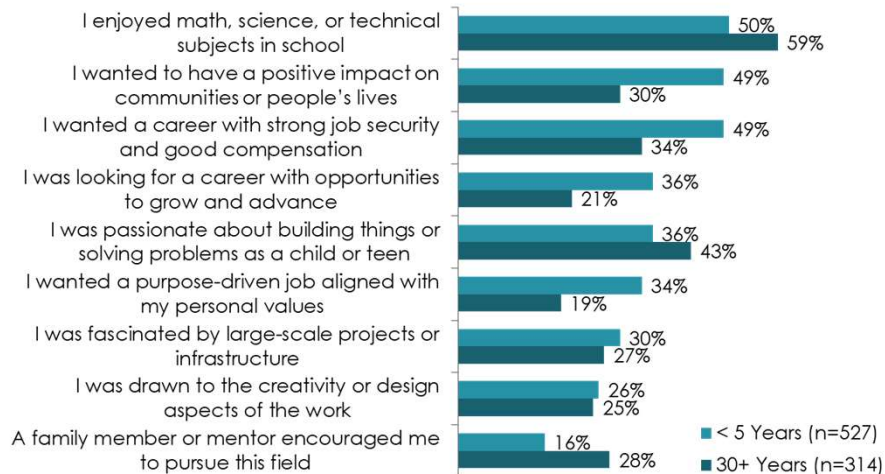
Career Motivations: Engineers vs. Non-Engineers



Q10: What motivated you to pursue your current work field or discipline (e.g., engineering, HR, IT, finance, marketing, etc.)?

While also driven by STEM and job security/compensation, Young Professionals cite community impact and purpose driven work.

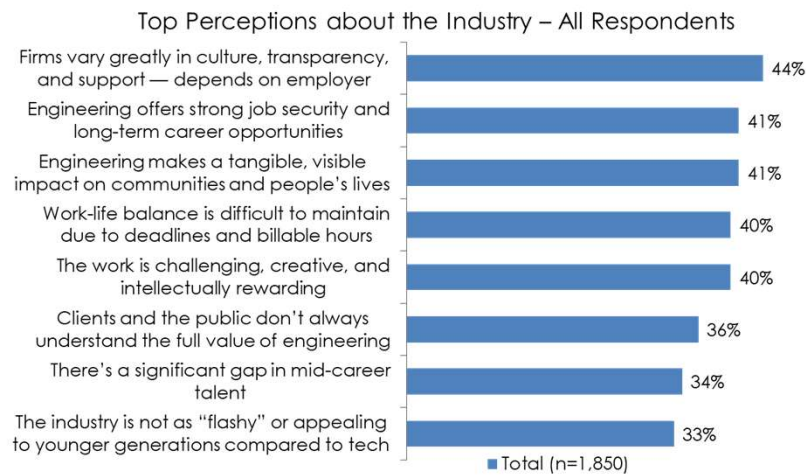
Career Motivations: Young vs. Older Professionals



Q10: What motivated you to pursue your current work field or discipline (e.g., engineering, HR, IT, finance, marketing, etc.)?

Industry Perceptions

Top perceptions about the industry are that firms vary greatly, strong job security and opportunities, and it has a visible impact on communities.

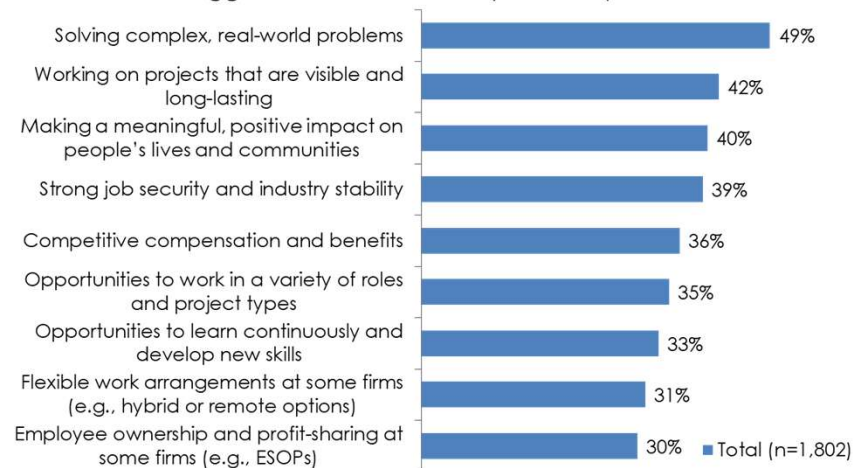


Q17: Overall, when you think about engineering firms, employers, and the industry, what are your perceptions?

Biggest Benefits of Industry

Biggest benefits of working in the industry are broadly the same across all groups

Biggest Benefits of Industry – All Respondents

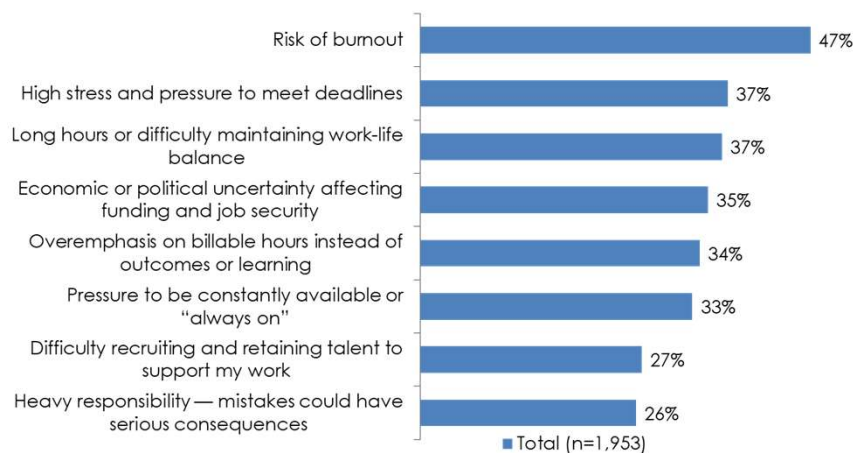


Q18: What do you think are the biggest benefits of a career in the engineering industry?

Biggest Concerns about Career

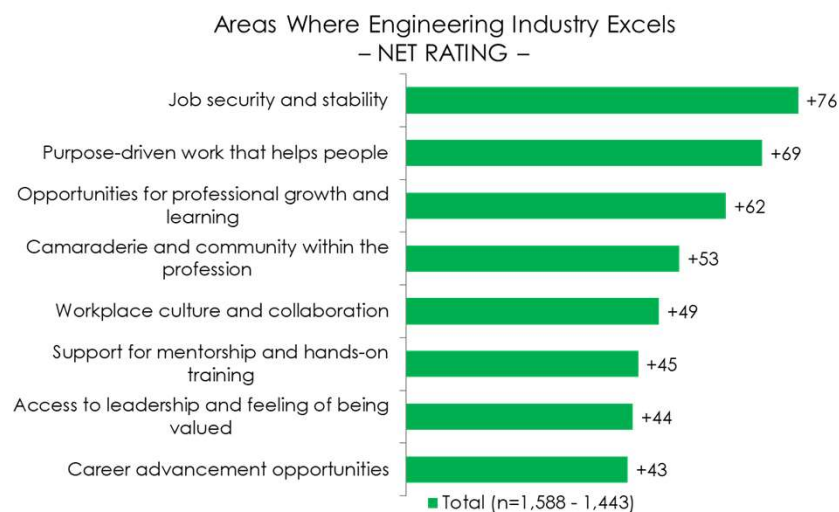
While burnout and stress lead the list of concerns, the issues vary by job and age

Biggest Concerns About Career – All Respondents



Engineering Industry vs. Other Industries

The industry is anchored in reliable demand, meaningful impact, and skill development



The industry has an edge over others in innovation and creativity but could do better on adaptability and recognition.

Ratings of Engineering Industry in Other Areas
– NET RATING –

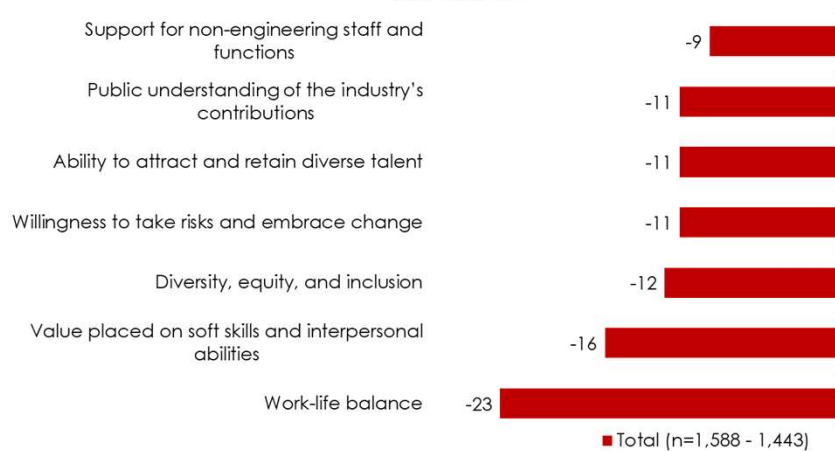


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Q20/Q21: How do you think the engineering industry compares to other industries with respect to the following?
"Not Sure" responses omitted.

The industry lags in areas like work-life balance and value placed on soft skills, among others

Areas Where Engineering Industry Lags
– NET RATING –



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Q20/Q21: How do you think the engineering industry compares to other industries with respect to the following?
"Not Sure" responses omitted.

Key Differences

Students perceive engineering as **more innovative and creative (+84)**, **more likely to use cutting-edge technology** and tools including AI (+80), and **more adaptive** and open to change (+45) than those working in the industry report.

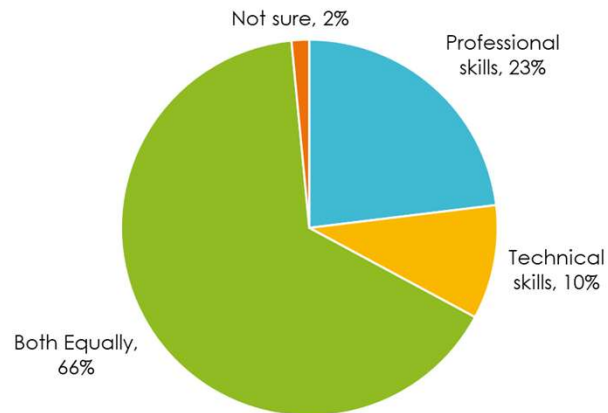
At the same time, Students are **less likely** to feel the industry **provides support for early-career professionals (+12)** or delivers on **belonging (+39)**. In short, they idealize the tech/innovation arc but doubt early-career support and a sense of community.

Executives invert the student pattern. The very areas Students rate as strengths are precisely where executives **see the industry lagging: use of cutting-edge technology (-2)** and **integration of new tools and AI (-8)**, **adaptability** and openness to change (-21).

Skills Needed to Succeed

The consensus is that both professional and technical skills are equally important

Importance of Professional Skills vs. Technical Skills
(n=1,652)



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Q22: Which is more important to the future success of younger individuals in the engineering industry, regardless of their specific role in the firm?

The engine of success is the ability to analyze, solve, adapt, communicate and work with others

Skills Needed for Young Professionals to Succeed in the Future
– Average Category Importance –



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Q23: How important do you think each of the following skills will be to the future success of younger individuals in their chosen career field within the engineering industry? "Not Sure" responses omitted.

The most important skills are nearly uniform across all groups...

Skills Needed for Young Professionals to Succeed in the Future – Most Important Specific Skills –

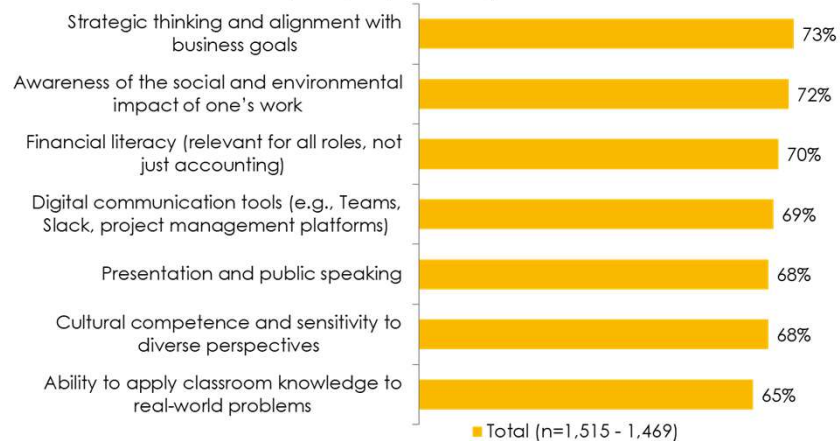


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Q23. How important do you think each of the following skills will be to the future success of younger individuals in their chosen career field within the engineering industry? "Not Sure" responses omitted.

...as are the least important skills

Skills Needed for Young Professionals to Succeed in the Future – Least Important Specific Skills –

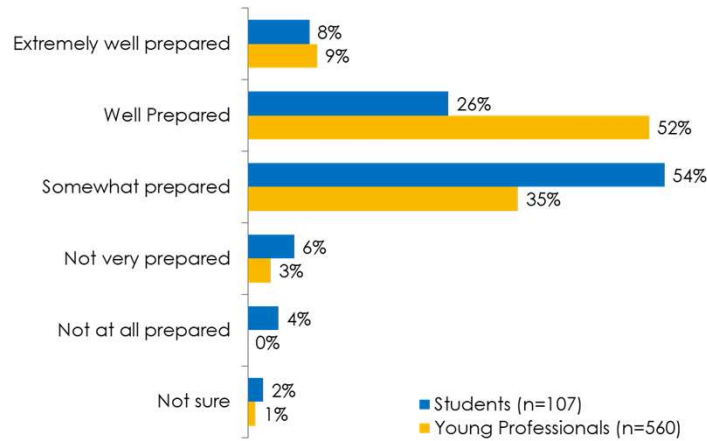


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Q23. How important do you think each of the following skills will be to the future success of younger individuals in their chosen career field within the engineering industry? "Not Sure" responses omitted.

Engineering Students feel less well prepared than Young Professionals, but...

Preparedness with the Most Important Skills
– Among Students/Young Professionals Only –

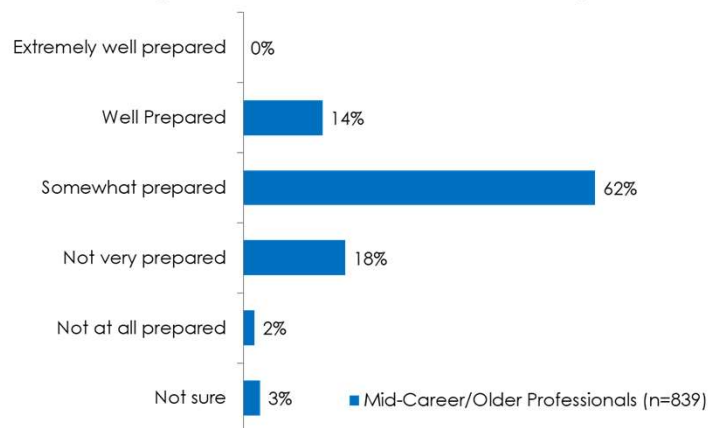


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Q30: Overall, how well prepared are you with respect to the most important skills needed for future success in your career field?

...only 14% of Mid-Career and Older Professionals think YPs are well prepared

Preparedness of Young Professionals with the Most Important Skills
– Among Mid-Career/Older Professionals Only –



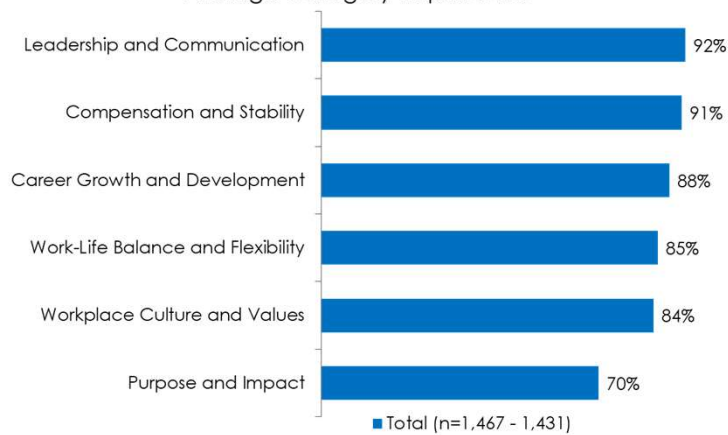
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Q31: Overall, how well prepared are young professionals with respect to the most important skills needed for future success in your career field?

The Ideal Employer

People want employers that set clear expectations, support performance, compensate fairly, and lead with integrity.

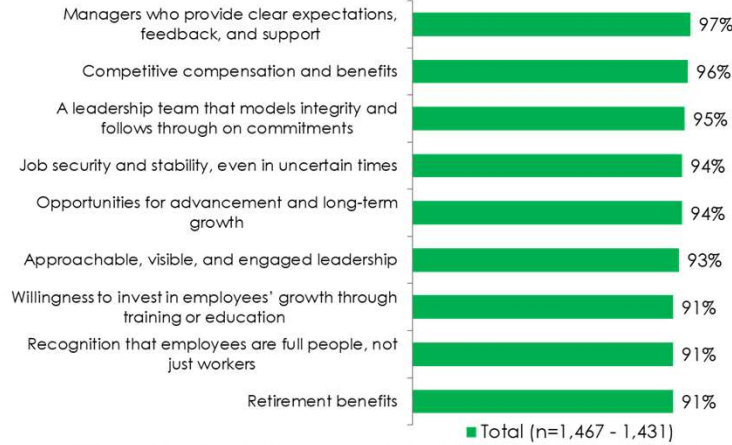
Characteristics of the Ideal Employer
– Average Category Importance –



Q29: Overall, how important to you are each of the following characteristics of the ideal employer?
"Not Sure" responses omitted.

The core employer value proposition is manager quality, fair pay, and trusted leadership. These are near-universal “must-haves,” not differentiators.

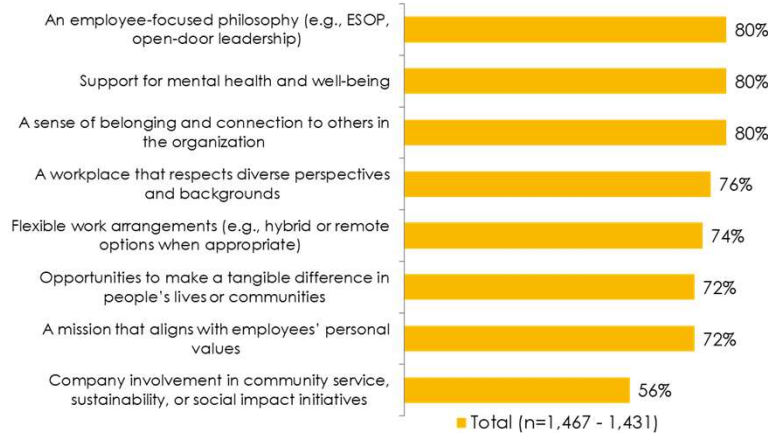
Characteristics of the Ideal Employer
 – Most Important Characteristics –



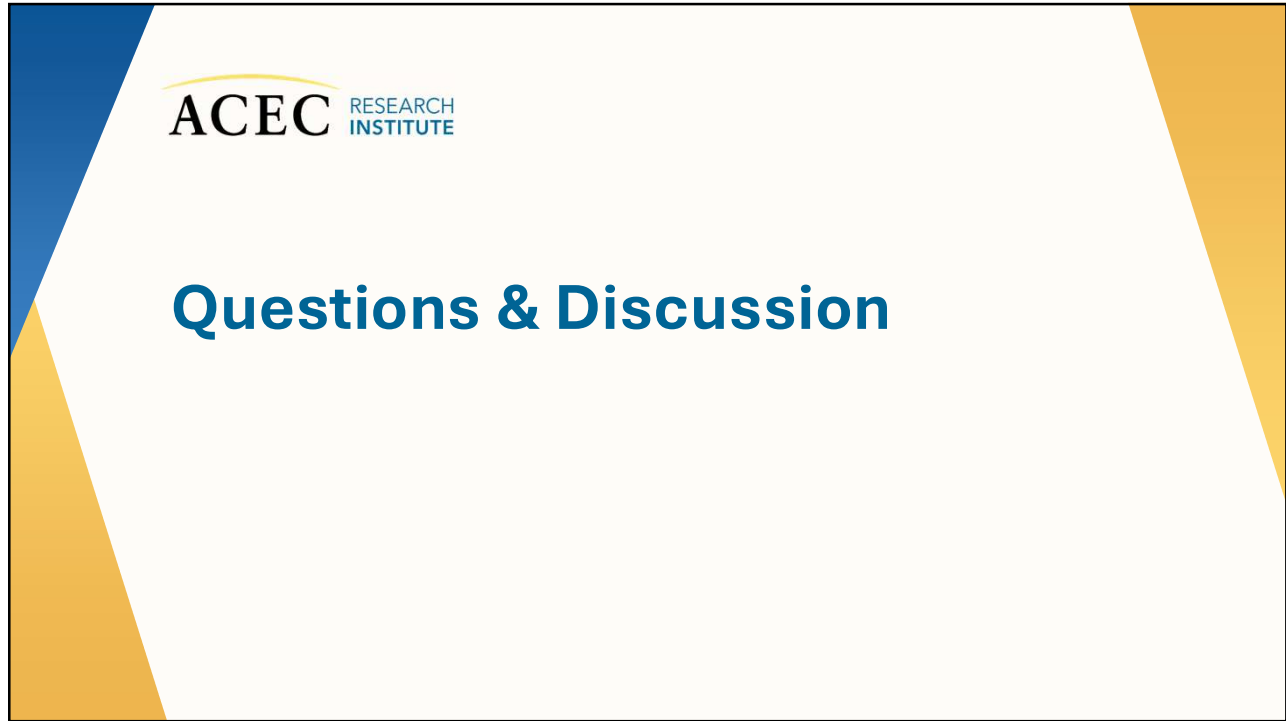
Q29: Overall, how important to you are each of the following characteristics of the ideal employer? "Not Sure" responses omitted.

Even “least important” items enjoy substantial support: external community activities and personal mission alignment are secondary to other characteristics

Characteristics of the Ideal Employer
 – Least Important Characteristics –



Q29: Overall, how important to you are each of the following characteristics of the ideal employer? "Not Sure" responses omitted.



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The Workforce of the Future