

Survey Results ...

To be read in conjunction with this joint IMechE / IET report



Predictions on the future of the manufacturing engineer as foretold in a joint IMechE / IET member survey

Question 1: Are you currently involved in any of the FIVE challenges areas listed below? If not presently, please tell us whether you'd be interested in working in any of these areas in the future?

RESPONSES: 346

TRANSPORT

CURRENTLY INVOLVED: 30.35% (105)
WOULD BE INTERESTED IN THE FUTURE: 27.46% (95)
DON'T KNOW: 4.05% (14)
NO: 38.15% (132)

ENERGY

CURRENTLY INVOLVED: 24.86% (86)
WOULD BE INTERESTED IN THE FUTURE: 37.57% (130)
DON'T KNOW: 4.91% (17)
NO: 32.66% (113)

FOOD

CURRENTLY INVOLVED: 10.40% (36)
WOULD BE INTERESTED IN THE FUTURE: 16.76% (58)
DON'T KNOW: 10.98% (38)
NO: 61.85% (214)

HEALTH

CURRENTLY INVOLVED: 12.14% (42)
WOULD BE INTERESTED IN THE FUTURE: 26.88% (93)
DON'T KNOW: 9.83% (34)
NO: 51.16% (177)

CIRCULAR ECONOMY

CURRENTLY INVOLVED: 13.29% (46)
WOULD BE INTERESTED IN THE FUTURE: 28.32% (98)
DON'T KNOW: 14.74% (51)
NO: 43.64% (151)

Question 2: Taking a guess at the situation, what's your prediction on change? How much will the role and skills required of a manufacturing engineer change in the future?

RESPONSES: 346

WITHIN THE NEXT 5 YEARS

I THINK THEY'LL STAY THE SAME: 10.98% (38)
I THINK CHANGE WILL BE MINOR: 55.49% (192)
I THINK CHANGE WILL BE MAJOR: 31.50% (109)
I DON'T KNOW: 2.02% (7)

WITHIN THE NEXT 5-10 YEARS

I THINK THEY'LL STAY THE SAME: 1.73% (6)
I THINK CHANGE WILL BE MINOR: 27.75% (96)
I THINK CHANGE WILL BE MAJOR: 67.05% (232)
I DON'T KNOW: 3.47% (12)

WITHIN THE NEXT 10-20 YEARS

I THINK THEY'LL STAY THE SAME: 2.31% (8)
I THINK CHANGE WILL BE MINOR: 10.69% (37)
I THINK CHANGE WILL BE MAJOR: 74.28% (257)
I DON'T KNOW: 12.72% (44)

Question 3: Which knowledge and skills do you think will be most important to manufacturing engineers in the next 10 years? (Please tick all that apply)

RESPONSES: 346

ARTIFICIAL INTELLIGENCE: 69.36% (240)
AUTOMATION, ROBOTICS AND MECHATRONICS: 83.53% (289)
BIOMANUFACTURING / BIOTECHNOLOGY: 37.28% (129)
CODING: 34.39% (119)
CONTROL ENGINEERING: 44.51% (154)
DATA SCIENCE: 39.02% (135)
DESIGN FOR MANUFACTURE: 54.91% (190)
DIGITAL MANUFACTURING: 56.94% (197)
ENGINEERING DESIGN: 41.91% (145)
ERGONOMICS / HUMAN FACTORS: 38.15% (132)
HAPTICS: 38.67% (30)
LEAN PRINCIPLES / SUSTAINABLE MANUFACTURING: 65.32% (226)
LIFE CYCLE ANALYSIS: 50.87% (176)
MATERIALS: 50.87% (176)
MECHANICS: 19.65% (68)
PROCESS DESIGN: 42.20% (146)
PRODUCT DESIGN: 37.57% (130)
SIGNAL PROCESSING: 15.61% (54)
SIMULATION AND MODELLING: 55.78% (193)
STRUCTURES: 13.87 (48)
SYSTEM DESIGN: 35.55% (123)
SYSTEMS ENGINEERING: 50.00% (173)
OTHER (PLEASE SPECIFY): 5.78% (20)

ADDITIONAL RESPONSES

16 additional written responses were given.

Question 4: Thinking about those FIVE challenge areas again, what's your prediction as to the level of contribution that manufacturing engineers could make in the next 10 years, using a scale of 1-5 (1=Minimal, 5=Significant)?

RESPONSES: 346

TRANSPORT

MINIMAL 1: 2.31% (8)
2: 6.07% (21)
3: 15.32% (53)
4: 28.61% (99)

SIGNIFICANT 5: 47.69% (165)

ENERGY

MINIMAL 1: 0.58% (2)
2: 6.36% (22)
3: 14.74% (51)
4: 27.75% (96)
SIGNIFICANT 5: 50.58% (175)

FOOD

MINIMAL 1: 2.60% (9)
2: 12.43% (43)
3: 30.06% (104)
4: 26.59% (92)
SIGNIFICANT 5: 28.32% (98)

HEALTH

MINIMAL 1: 1.45% (5)
2: 8.67% (30)
3: 26.59% (92)
4: 29.77% (103)
SIGNIFICANT 5: 33.53% (116)

CIRCULAR ECONOMY

MINIMAL 1: 3.76% (13)
2: 7.51% (26)
3: 24.86% (86)
4: 29.48% (102)
SIGNIFICANT 5: 34.39% (119)

Question 5: **Which of these competencies will be important to the role of the manufacturing engineers, in the future (1= Low importance, 5= High importance)?**

RESPONSES: 346

BEHAVIOURAL SCIENCE

1 LOW IMPORTANCE: 4.62% (16)
2: 14.16% (49)
3: 30.35% (105)
4: 25.43% (88)
5 HIGH IMPORTANCE: 15.61% (54)
DON'T KNOW: 9.83% (34)

COMMUNICATIONS SKILLS

1 LOW IMPORTANCE: 1.16% (4)
2: 1.45% (5)
3: 12.43% (43)
4: 29.19% (101)
5 HIGH IMPORTANCE: 54.34% (188)
DON'T KNOW: 1.45% (5)

CREATIVITY

1 LOW IMPORTANCE: 0.87% (3)
2: 1.45% (5)
3: 11.85% (41)
4: 30.64% (106)
5 HIGH IMPORTANCE: 54.05% (187)
DON'T KNOW: 1.16% (4)

DESIGN THINKING

1 LOW IMPORTANCE: 0.29% (1)
2: 1.45% (5)
3: 14.16% (49)
4: 35.26% (122)

5 HIGH IMPORTANCE: 46.53% (161)
DON'T KNOW: 2.31% (8)

CHANGE MANAGEMENT

1 LOW IMPORTANCE: 0.29% (1)
2: 4.05% (14)
3: 16.47% (57)
4: 33.24% (115)
5 HIGH IMPORTANCE: 43.35% (150)
DON'T KNOW: 2.60% (9)

ECOLOGY

1 LOW IMPORTANCE: 2.02% (7)
2: 13.01% (45)
3: 28.32% (98)
4: 29.77% (103)
5 HIGH IMPORTANCE: 18.79% (65)
DON'T KNOW: 4.62% (16)

ECONOMICS

1 LOW IMPORTANCE: 1.73% (6)
2: 9.83% (34)
3: 32.66% (113)
4: 32.37% (112)
5 HIGH IMPORTANCE: 18.79% (65)
DON'T KNOW: 4.62% (16)

ENTREPRENEURSHIP

1 LOW IMPORTANCE: 3.18% (11)
2: 14.16% (49)
3: 30.06% (104)
4: 27.17% (94)
5 HIGH IMPORTANCE: 21.97% (76)
DON'T KNOW: 2.89% (10)

FINANCE

1 LOW IMPORTANCE: 1.73% (6)
2: 9.83% (34)
3: 32.66% (113)
4: 32.37% (112)
5 HIGH IMPORTANCE: 18.79% (65)
DON'T KNOW: 4.62% (16)

LEADERSHIP

1 LOW IMPORTANCE: 1.16% (4)
2: 3.47% (12)
3: 17.63% (61)
4: 33.82 (117)
5 HIGH IMPORTANCE: 42.20% (146)
DON'T KNOW: 1.73% (6)

MANAGEMENT

1 LOW IMPORTANCE: 1.73% (6)
2: 6.07% (21)
3: 21.10% (73)
4: 37.28% (129)
5 HIGH IMPORTANCE: 32.37% (112)
DON'T KNOW: 1.45% (5)

MEDIA TRAINING

1 LOW IMPORTANCE: 11.27% (39)
2: 26.88% (93)
3: 30.35% (105)

4: 19.65% (68)
5 HIGH IMPORTANCE: 7.23% (25)
DON'T KNOW: 4.62% (16)

NEGOTIATION SKILLS

1 LOW IMPORTANCE: 2.02% (7)
2: 8.96% (31)
3: 26.30% (91)
4: 39.88% (138)
5 HIGH IMPORTANCE: 19.94% (69)
DON'T KNOW: 2.89% (10)

PROJECT MANAGEMENT

1 LOW IMPORTANCE: 0.58% (2)
2: 2.89% (10)
3: 11.85% (41)
4: 39.60% (137)
5 HIGH IMPORTANCE: 43.35% (150)
DON'T KNOW: 1.73% (6)

TEAM BUILDING

1 LOW IMPORTANCE: 1.16% (4)
2: 2.31% (8)
3: 15.03% (52)
4: 33.55% (123)
5 HIGH IMPORTANCE: 44.51% (154)
DON'T KNOW: 1.45% (5)

COMMENTS

- A total of 9 additional responses were given.

Question 6: Do you have any further thoughts on how we can best help the next generation of manufacturing engineers to forge a successful, sustainable, and prosperous future for themselves, their careers, their firms, and industries?

- A total of 86 written responses were received.

Question 7: Finally, please tell us a little more about yourself. Which of these categories best describes the sector your firm or organisation works in?

RESPONSES: 282

TRANSPORT

AEROSPACE: 32.54% (55)
AUTOMOTIVE: 36.69% (62)
MARINE: 7.69% (13)
SPACE: 1.18% (2)
OTHER: 21.89% (37)
TOTAL: 169

ENERGY

ELECTRICITY: 25.00% (31)
NUCLEAR: 15.32% (19)
OIL AND GAS: 22.58% (28)
RENEWABLES: 17.74% (22)
OTHER: 21.89% (37)
TOTAL: 124

FOOD

AGRI-TECH: 11.11% (7)
BREWING: 4.76% (3)
FARMING: 6.35% (4)
FMCG: 17.46% (11)
MANUFACTURING: 33.33% (21)

OTHER: 17.74% (22)
TOTAL: 124

HEALTH

BIOTECHNOLOGY: 9.09% (7)
MED-TECH: 28.57% (22)
PHARMA: 25.97% (20)
OTHER: 26.98% (17)
TOTAL: 63

CIRCULAR ECONOMY

LEAN / RESOURCES: 20.27% (15)
PACKAGING: 2.70% (2)
SUSTAINABILITY: 43.24% (32)
WASTE: 9.46% (7)
WATER: 8.11% (6)
OTHER: 16.22% (12)
TOTAL: 74

OTHER

CIVIL ENGINEERING: 3.16 (3)
CONSULTANCY: 41.05% (39)
DISTRIBUTION: 1.05% (1)
EDUCATION: 20.00% (19)
PLANT MACHINERY: 15.79% (15)
PROCESS INDUSTRY: 18.95% (18)
TOTAL: 95

OTHER RESPONSES

A total of 40 other responses were given.

Question 8: Which of these options best describes you?

RESPONSES: 334

APPRENTICE: 0% (0)
UNDER-GRADUATE STUDENT: 5.69% (19)
POST-GRADUATE STUDENT: 10.78% (36)
RESEARCHER: 4.19% (14)
JUNIOR ENGINEER: 5.39% (18)
SENIOR ENGINEER: 31.14% (104)
CONSULTANT: 18.56% (62)
SENIOR EXECUTIVE: 2.10% (7)
SENIOR MANAGEMENT: 11.08% (37)
BUSINESS OWNER / DIRECTOR: 11.08% (37)

Question 9: Which of these age brackets are you in?

RESPONSES: 334

UNDER 18: 0 (0%)
18-24: 14.97% (50)
25-34: 14.37% (48)
35-44: 10.78% (36)
45-54: 22.46% (75)
55-64: 18.86% (63)
65-74: 10.78% (36)
75+: 5.69% (19)
PREFER NOT TO SAY: 2.10% (7)

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