



सत्यमेव जयते

Office of the Principal Scientific Adviser to the
Government of India






Driving the New Normal

Understanding the perceptions of public to the new
normal and the role of science and technology

December 2020

Message

IIT Madras Alumni Association (IITMAA), represents around 50,000 alumni of IIT Madras across the world. Our Association's motto is: **'Reconnect... Engage... Impact'**.

-  Reconnect with our alma mater, with our faculty and friends.
-  Engage through active participation through Chapters, Special Interest Groups, both in-person and online.
-  Impact through giving back to our Country, our Society, our alma mater, and our association.

This is our third edition of Sangam. 'Sangam 2018 - A confluence for Impact' and 'Sangam 2019 - Reimagining India in 2030' were highly successful in creating a platform to host thought-provoking ideas. This year, in order to have meaningful discourse on how to respond to the global pandemic, Sangam 2020 has taken on a timely and ambitious theme: 'Driving the New Normal'.

We aim to bring together our alumni, students and faculty at IIT Madras as well as experts, academics, and corporates around the globe to deliberate, collaborate and implement ideas for driving a new normal in India and the world.

Shuba Kumar
President,
IIT Madras Alumni Association

Krishnan Narayanan
Vice President,
IIT Madras Alumni Association

Preface

We are delighted and honoured to coordinate Sangam 2020. As we brainstormed the theme for Sangam 2020, it was clear that the COVID-19 pandemic and humanity's response to the medical, economic and social crises it has unleashed were central to our deliberations.

We chose to deliberate the theme “**Driving the New Normal**”.

We wanted to understand the perspectives and perceptions of the public in dealing with the new normal and the role of science and technology in that reality. Hence, the IIT Madras Alumni Association conducted a Survey in collaboration with the Office of the Principal Scientific Adviser to the Government of India.

We are deeply indebted to the following people for helping shape the Survey –

- 1) **Kris Gopalakrishnan**, *distinguished alumnus of IIT Madras and co-founder of Infosys*
- 2) **Dr. Sapna Poti**, *Programme Director, Office of the Principal Scientific Adviser, Government of India.*

This report is based on our Survey, which is benchmarked with similar global surveys by the UK Charter for Science and Society, and the European Commission (Special Eurobarometer). We believe that it will provide valuable inputs to the science and technology planning process in India.

Happy reading!

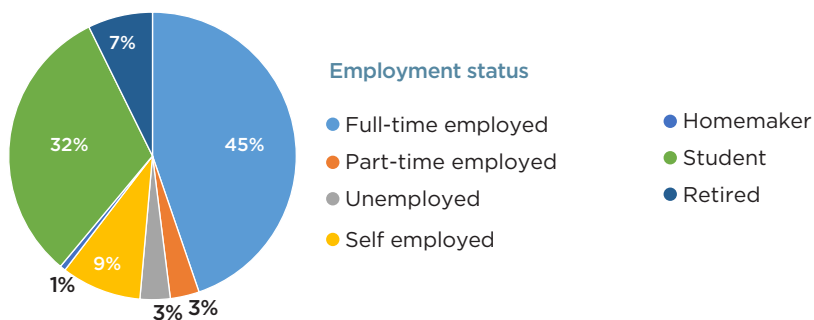
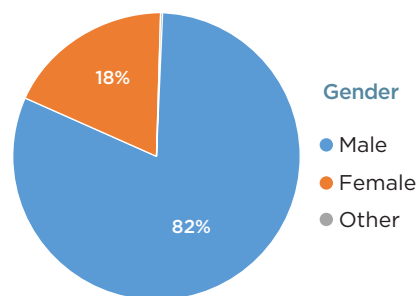
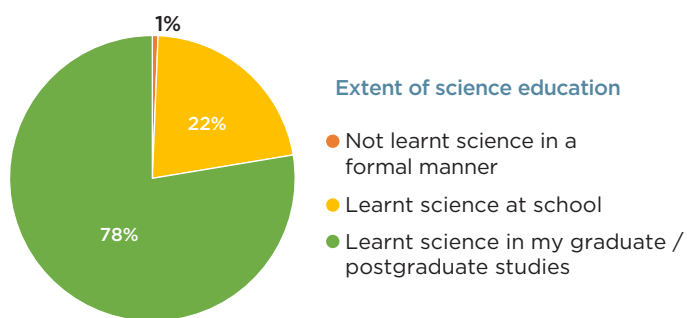
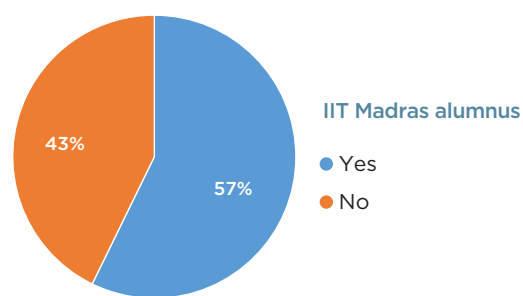
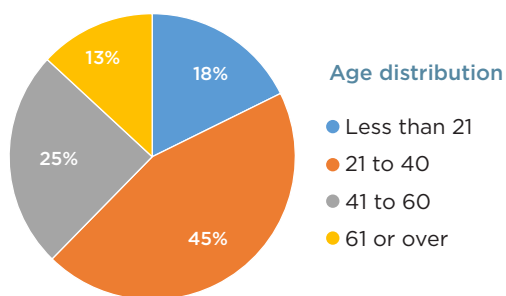
Krishnan Narayanan

*Program Coordinator, IITMAA Sangam
Co-founder and President, itihaasa
Research and Digital*

Prof. Seeram Ramakrishna, FEng

*Program Coordinator, IITMAA Sangam
Chair, Circular Economy Taskforce,
National University of Singapore*


- ✓ 1564 respondents
- ✓ 57% are alumni of IIT Madras
- ✓ 78% with high extent of science education



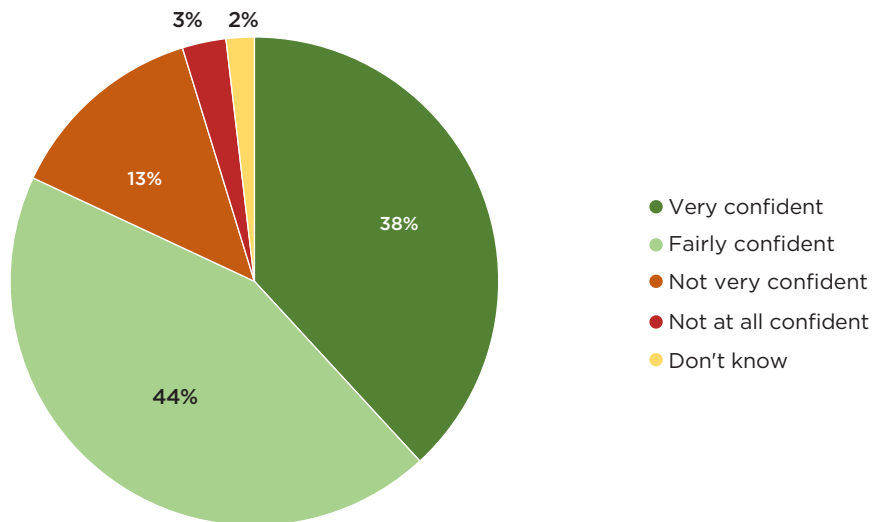


Perceptions about the state of 'New Normal'

Confidence level about thriving in the new normal Priority focus areas and technologies for India



How confident are you that we will drive a thriving, new normal in the next few years?



1. 82% of the respondents are very or fairly confident that we will drive a new normal in the next few years.

2. Among various age groups, respondents aged 41-60 are the most confident.

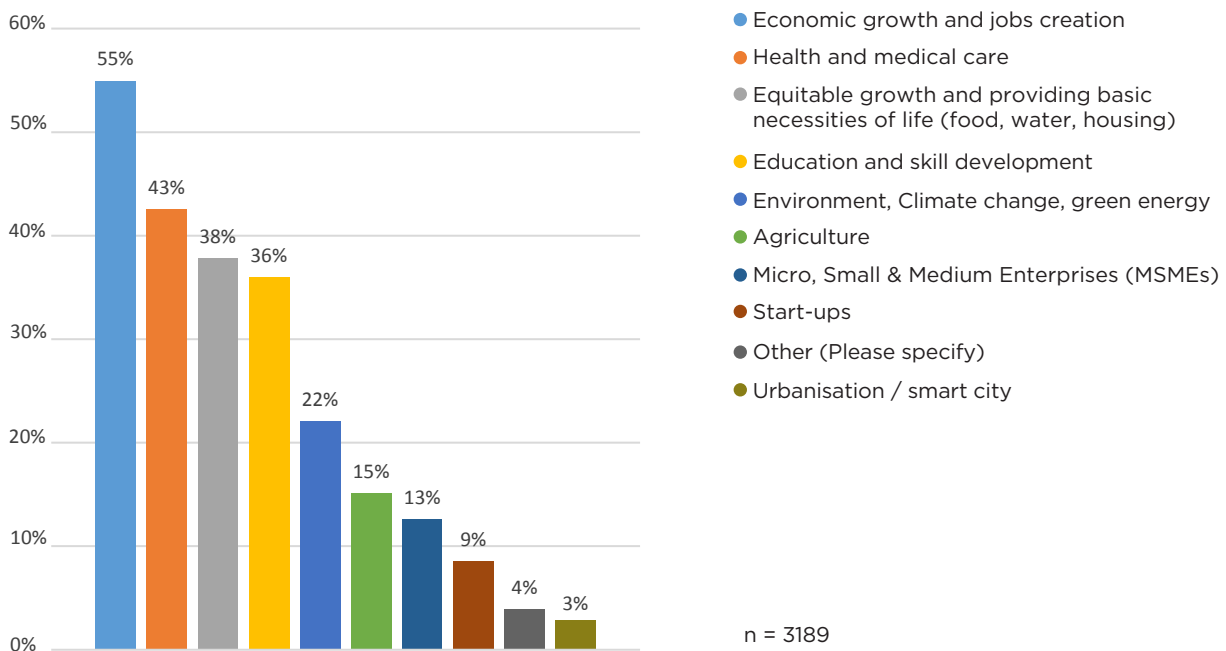
🏠 Net score of 79% for this age group Vs. 67% overall

3. Among various employment status categories, respondents who are fulltime employed are the most confident.

🏠 Net score of 73% for those full-time employed Vs. 66% overall

Net score is sum of positive responses minus sum of negative responses

What are top priorities for India in the new normal?



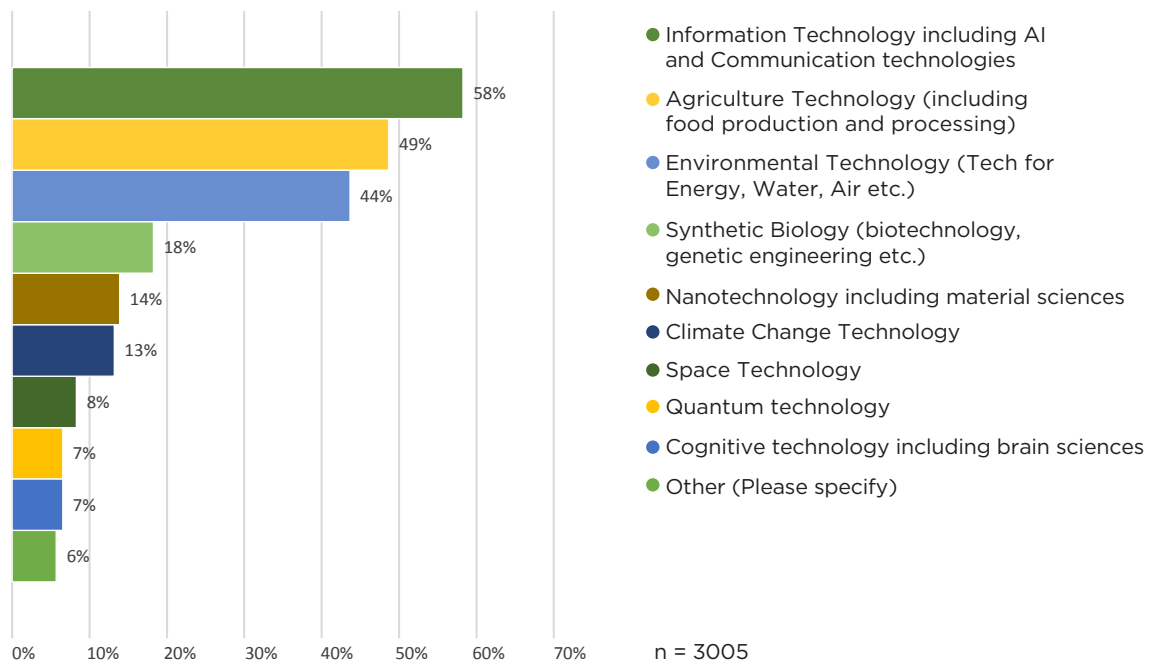
1. Respondents demonstrate both a pragmatic, economic mind and a compassionate heart.

2. The top most priority for India is economic growth and jobs creation.

3. The next three priorities include

- 🏠 Health and medical care
- 🏠 Equitable growth and providing basic necessities of life (food, water, housing)
- 🏠 Education and skill development

What are the priority technology domains for India in this new normal?



1. The top most technology priority for India is Information Technology including AI and Communication technologies.

2. The next two technology priorities include

🏠 Agriculture technology

🏠 Environmental technology (Tech for Energy, Water, Air etc.)

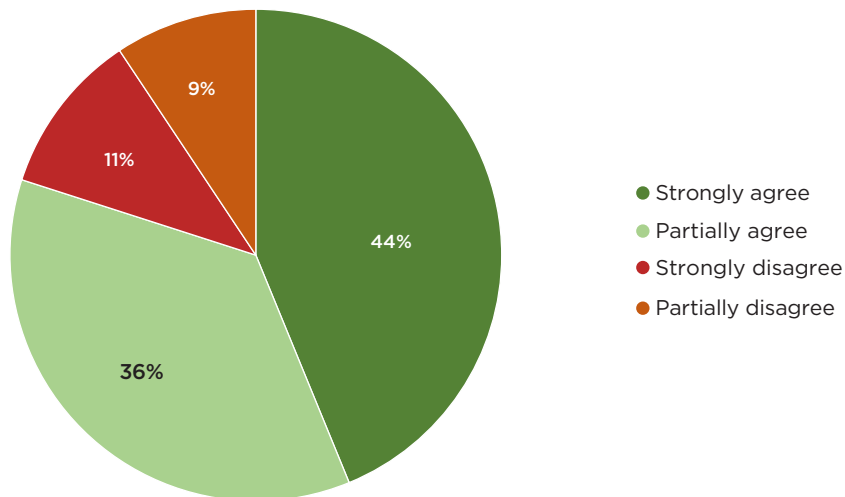


Perceptions about the state of 'New Normal'

Extent of digitisation of business and our lives Priorities at an individual level



Will the current rapid digitisation of our lives become permanent in the new normal?



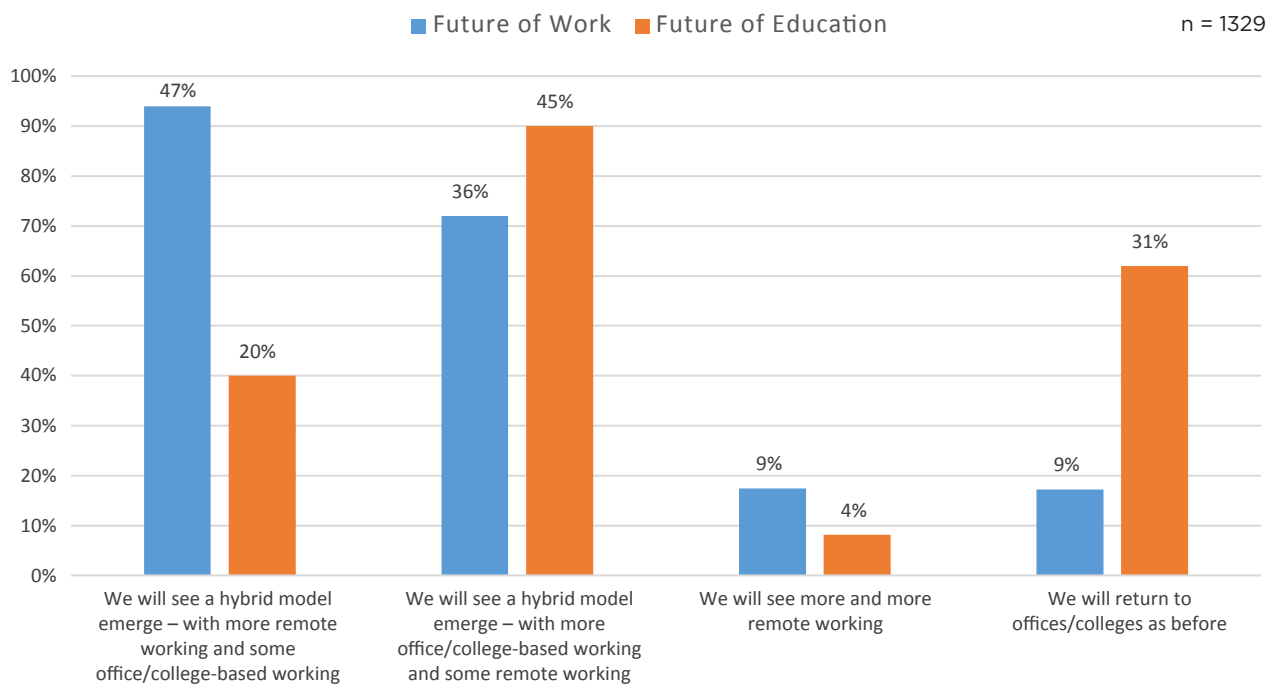
1. 80% of the respondents believe that the current state of rapid digitisation that we are experiencing in our lives will become permanent.

2. Among various age groups, respondents aged 41 -60 and 61+ agree with this the most.

🏠 Net score of 77% for this age group Vs. 71% overall

Net score is sum of positive responses minus sum of negative responses

How will digitization affect the future of work and education?




1. Remote working is here to stay in the future of Work (92%) and Education (69%).

2. A Hybrid model (Remote + Onsite) will be the dominant model in the future of Work (83%) and Education (65%)

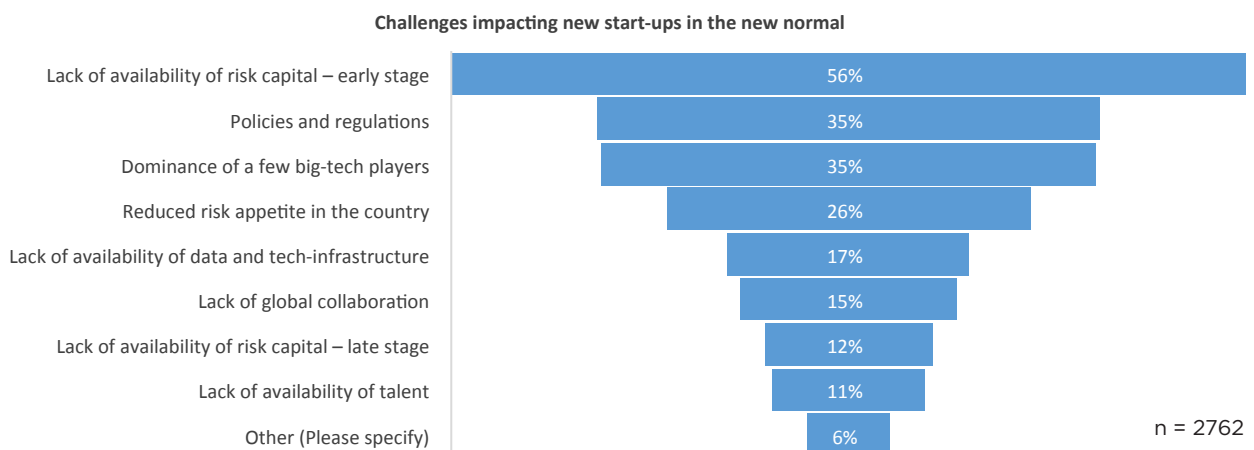
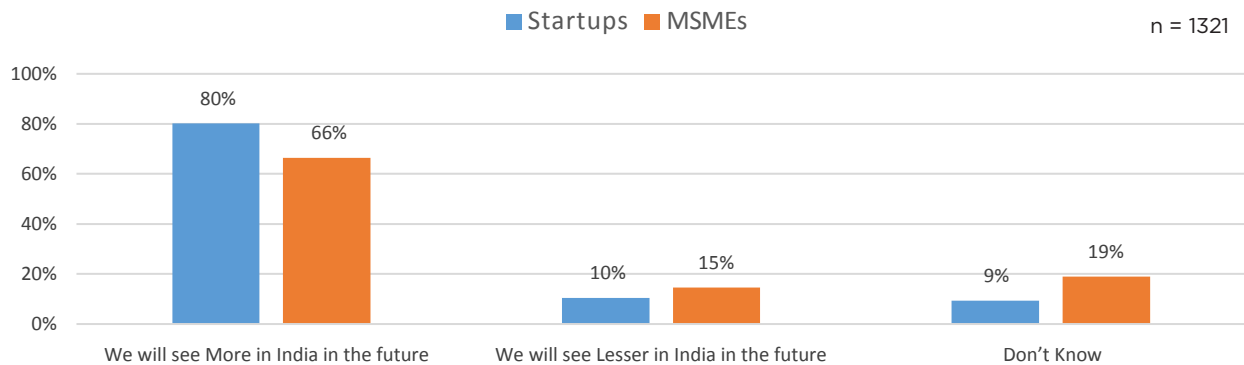
3. Among the respondents who believe that we are likely to return to a situation as before the pandemic, they believe that it is 3.5X more likely to happen in Education than at Work.

4. The younger respondents believe the least that this digitization will be permanent in both Work and Education.

 Net score of those under 21 and 21-40 are just over half that of those in age group 41-60 and 60+.

Net score is sum of positive responses minus sum of negative responses

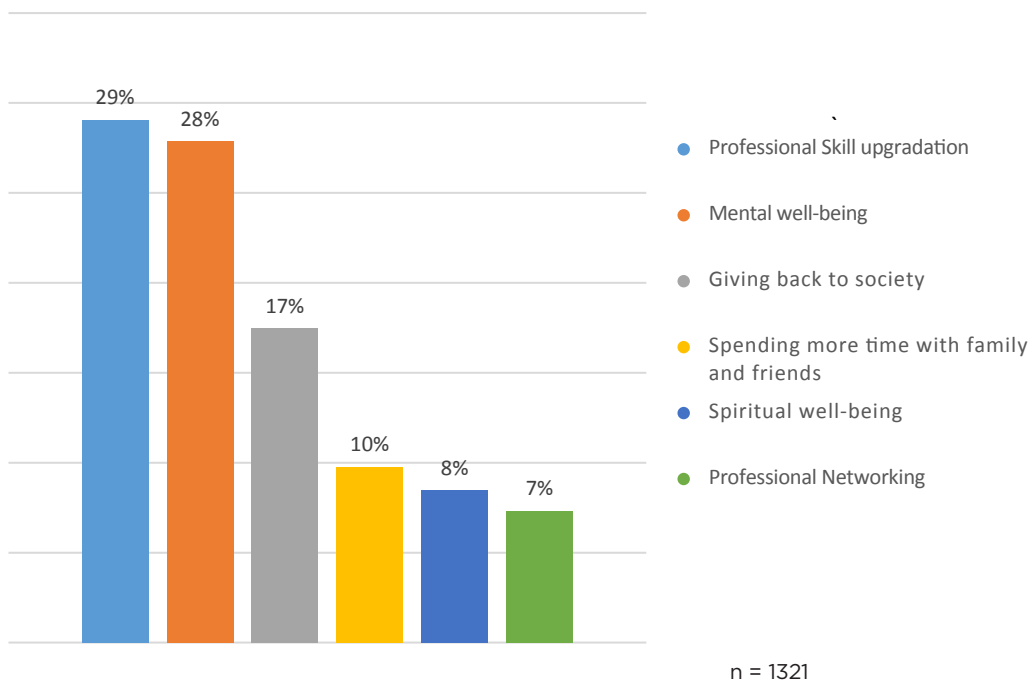
Future of startups and MSMEs in India in the new normal



1. Respondents believe that we will see more Startups (80%) and MSMEs (66%) in India in the new normal.
2. More respondents believe that the new normal will be better for emergence of Startups (Net score 70%) than for MSMEs (Net score 51%)
3. The top two challenges for startups in the new normal include:
 - 🏠 Lack of availability of risk capital in early stage
 - 🏠 Policies and regulations

Net score is sum of positive responses minus sum of negative responses

What are priorities for personal development in the new normal?




1. The top two priorities for personal development are 1) Professional skill upgradation and 2) Mental well-being.
2. A greater proportion of the younger respondents – aged less than 40 (32%) place greater emphasis on mental wellbeing than those aged 41 and above (21%).
3. Those aged 61+ place the greatest emphasis on giving back to society.

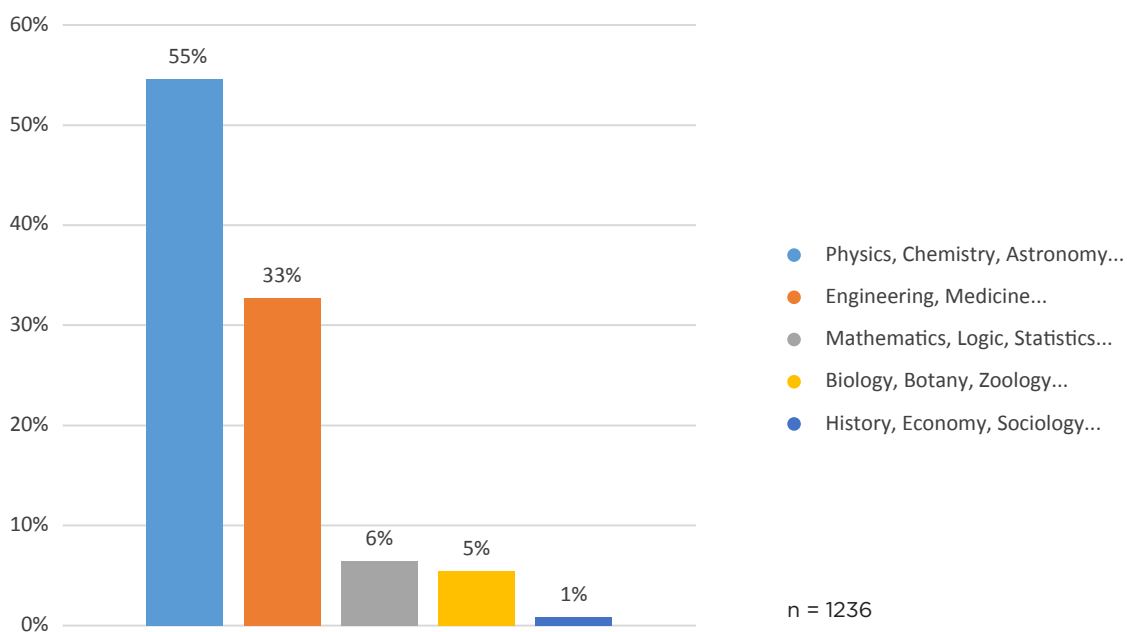


Perceptions about Public Attitude to Science and Technology

How do you see science?
How well-informed are you?
Where do you get your scientific information?
Do you share scientific information?



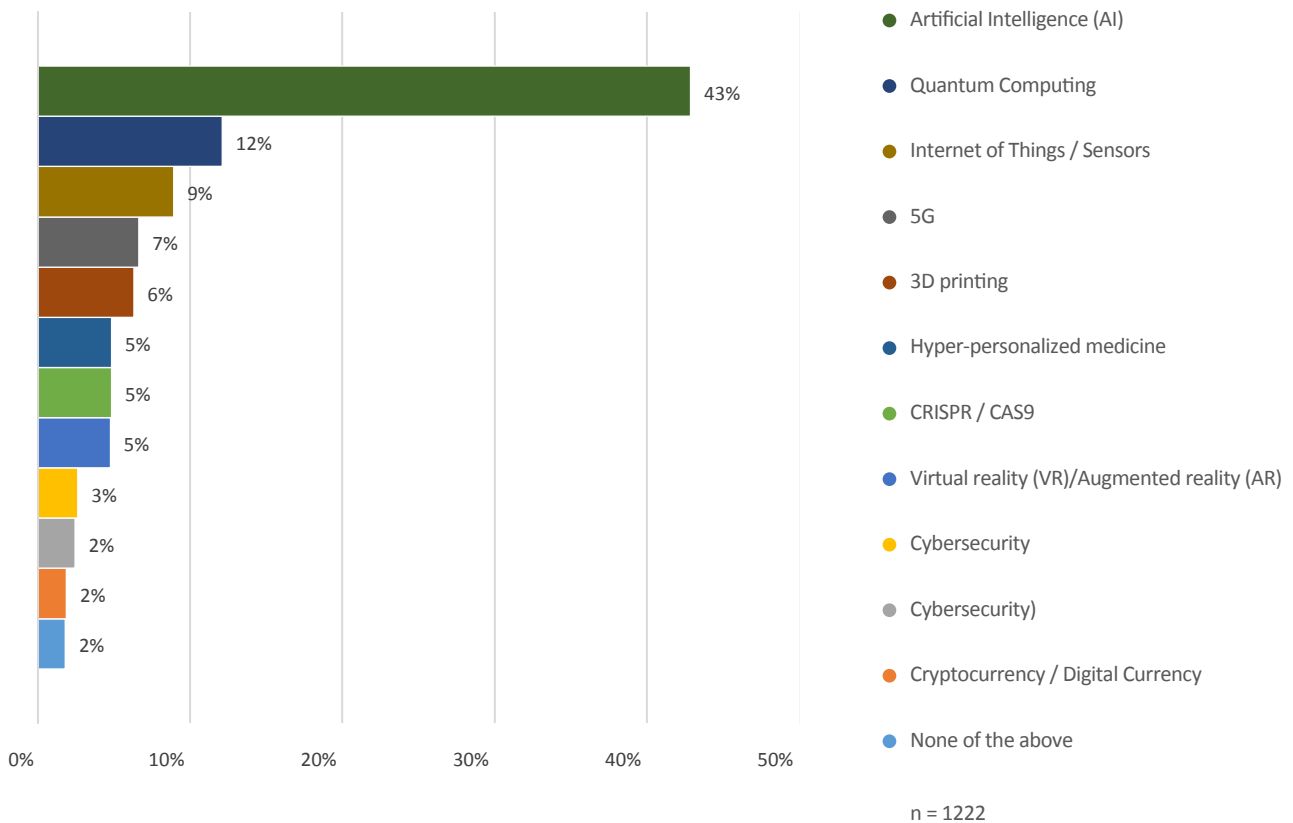
The branch of science that comes to your mind when you hear the word 'science'?



1. The top most science recalled by respondents is Physical Sciences like physics & chemistry (55%), followed by Applied Sciences like engineering & medicine (33%).

2. Formal sciences like mathematics (6%), Life sciences like biology (5%), and Social sciences like sociology (1%) come way below among respondent choices.

When think of ‘emerging technology’, what comes to mind foremost?



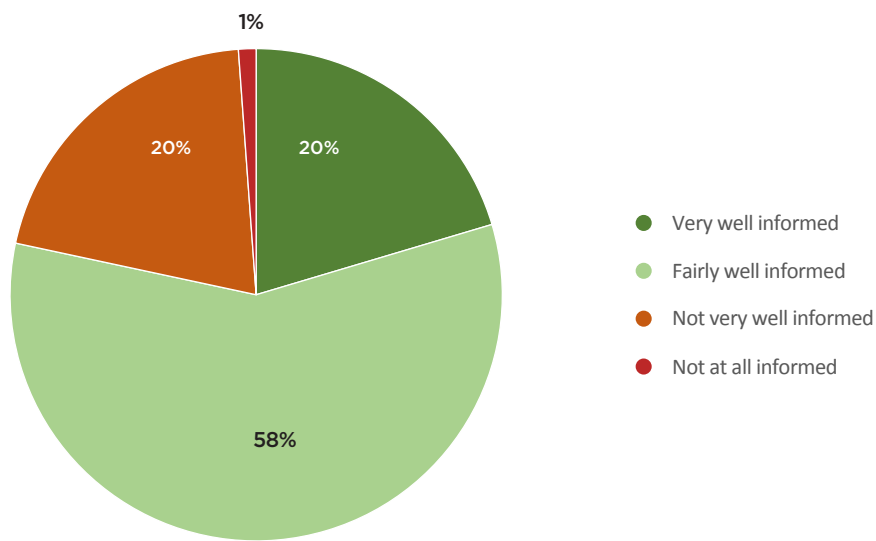
1. The top most ‘emerging technology’ that comes to mind is Artificial Intelligence

👤 43% of respondents pick AI which is as many as the next six emerging technologies put together

2. The other top emerging technologies include:

- Quantum Computing
- Internet of Things / Sensors
- 5G
- 3D printing
- Hyper-personalized medicine
- Virtual reality (VR)/Augmented reality (AR)
- CRISPR / CAS9
- Cybersecurity
- Blockchain
- Cryptocurrency / Digital Currency

How well informed do you feel about scientific and technological research and developments?

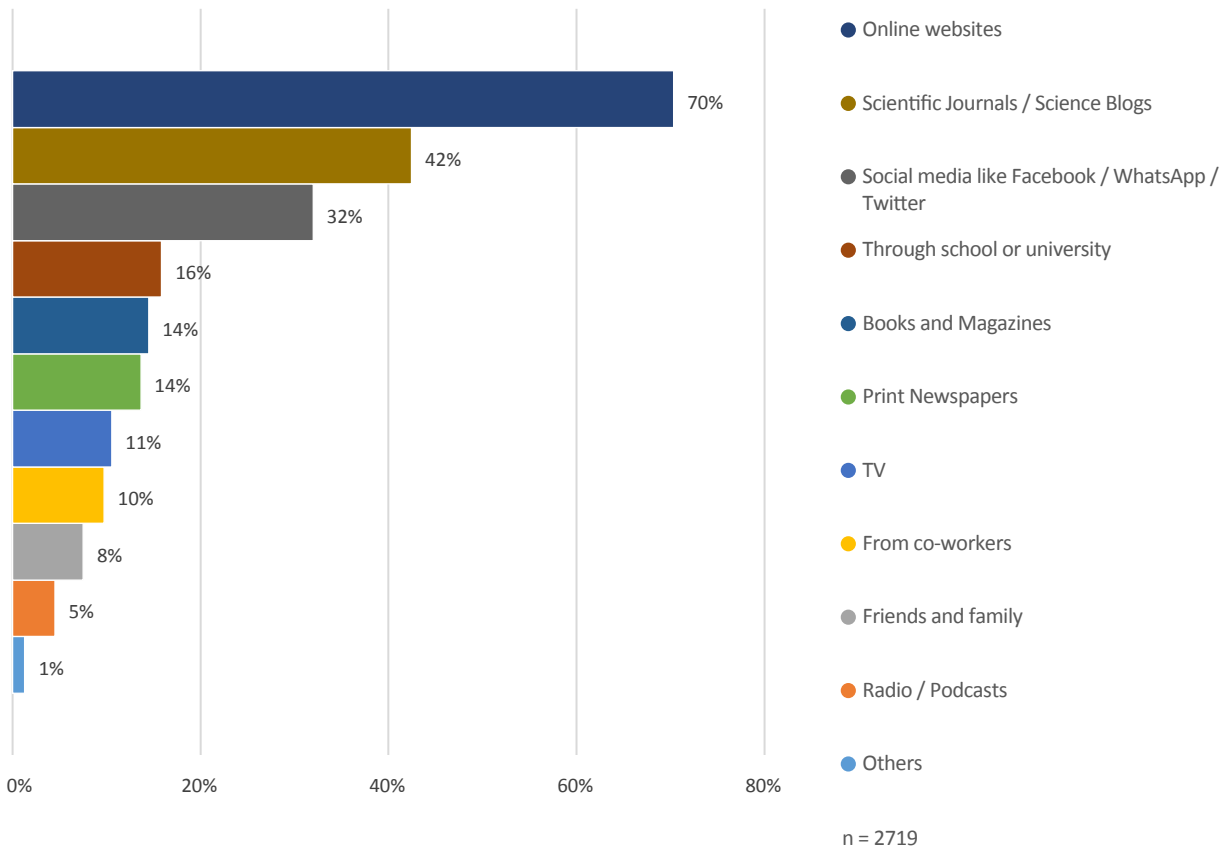


n = 1219

1. 78% of the respondents believe they are either fairly or very well informed about scientific and technological research and development.
2. Those in the age group of less than 21 believe they are relatively lesser informed (Net score of 39%) about the latest scientific developments as compared to overall respondents (Net score of 57%).
3. The respondents who are in full-time employment believe more well informed (Net score 64%) as compared to students (47%), retired (54%), and the self-employed (50%).

Net score is sum of positive responses minus sum of negative responses

Sources of information about the latest science and technology findings?



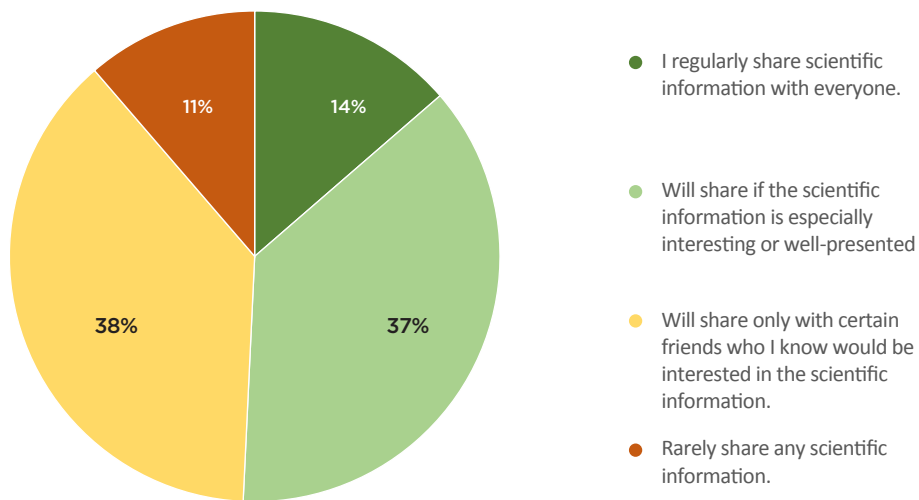
1. The top three sources of scientific information include:

- 🏠 Online Websites (70%)
- 🏠 Scientific Journals (42%)
- 🏠 Social media like Facebook / WhatsApp / Twitter (32%)

2. It is not surprising that more of those aged less than 40 (37%) consider social media as a source of scientific information as compared to those aged greater than 40 (25%).

3. And perhaps surprisingly, more of those aged less than 40 (45%) consider scientific journals as a source of scientific information as compared to those aged greater than 40 (39%).

Which of these scenarios of online sharing of scientific information do you relate to the most?



n = 1210

1. 89% of the respondents share online scientific information they receive.

2. Factors like attractively presenting scientific information and the presence of a friends-network come out as important ones that facilitate online sharing of scientific information.

Net score is sum of positive responses minus sum of negative responses

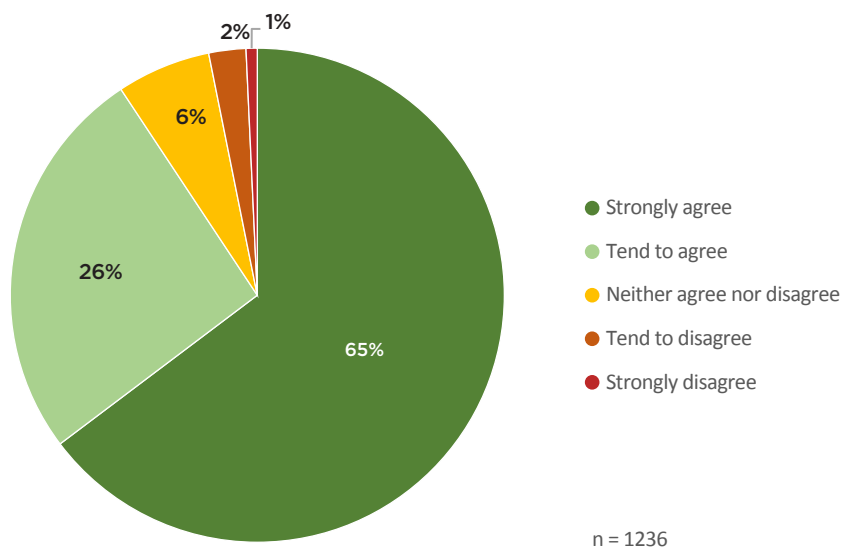


Perceptions about Public Attitude to Science and Technology

What are your hopes, concerns, and levels of trust about science?
What is your assessment of the benefits Vs risks for emerging technologies?

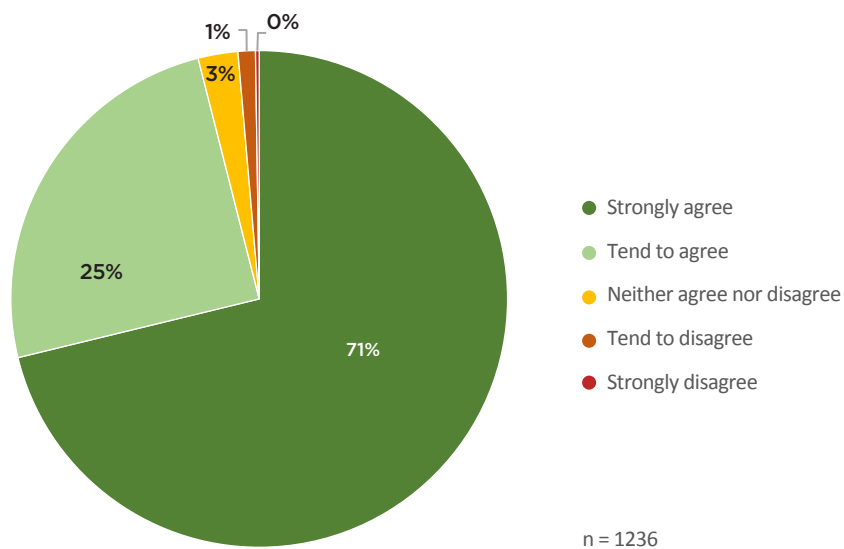


On the whole, science and technology will make our lives better?



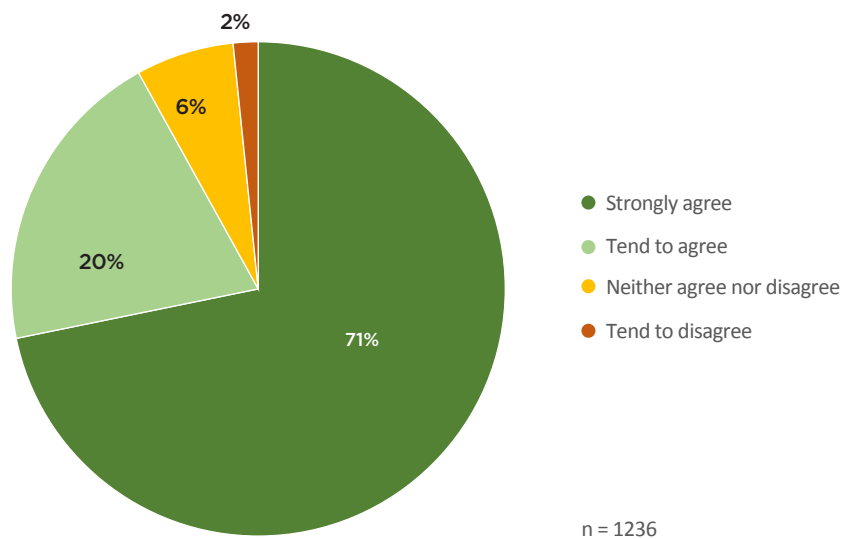
91% of the respondents believe that science and technology make our lives better.

Science and technology make a direct contribution to economic growth of the country?



96% of the respondents believe that science and technology make a direct contribution to economic growth of the country.

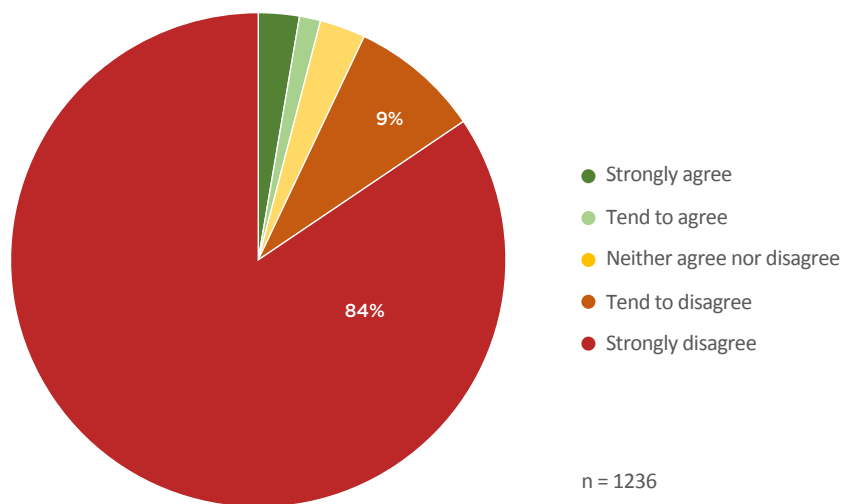
Scientists and technologists should discuss more the social and ethical implications of their work?



91% of the respondents believe that scientists and technologists should discuss more with the public the social and ethical implications of their work.

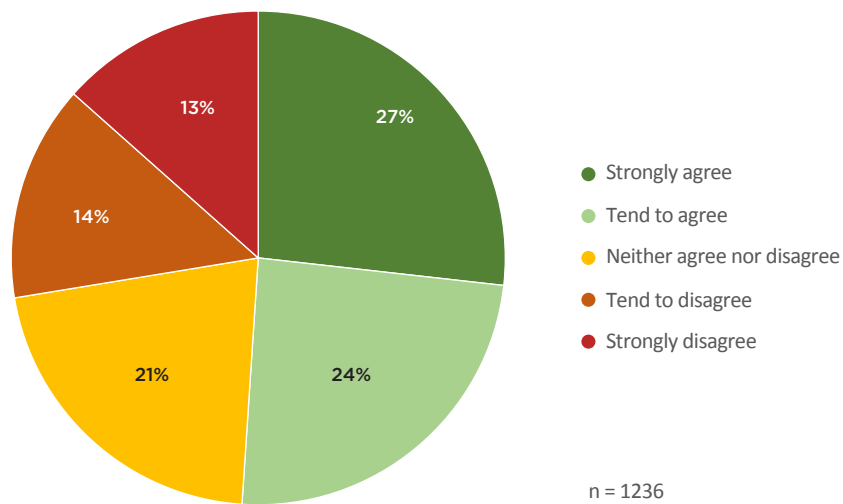
Science and technology careers for a woman

Question - Science and technology careers are not suitable for a woman?



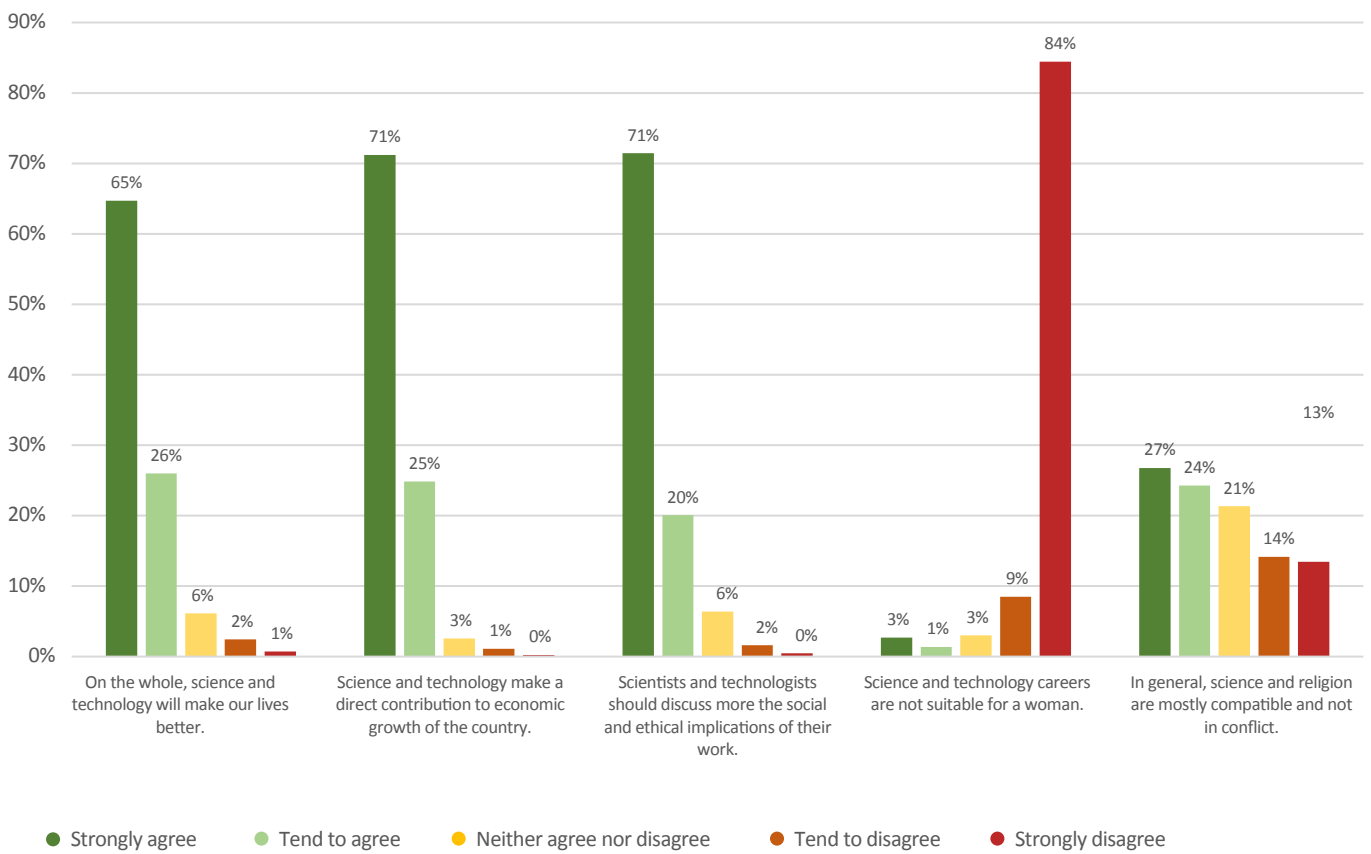
93% of the respondents disagree with the view that science and technology careers are not suitable for women.

Science and religion are mostly compatible and not in conflict?

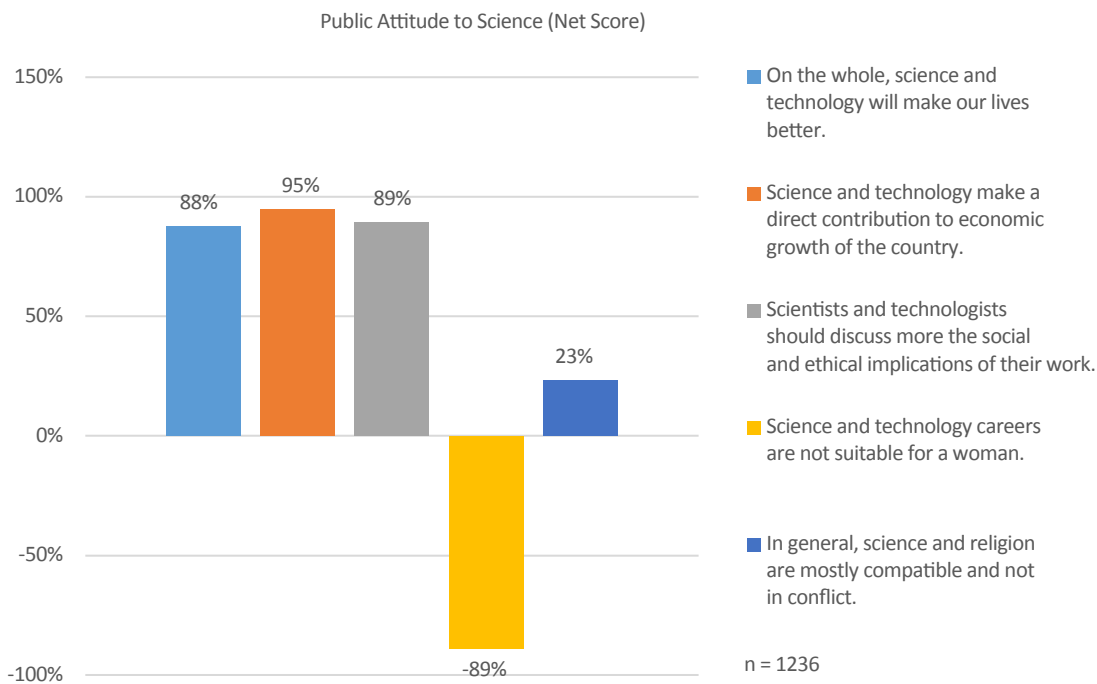


On whether science and religion are compatible, the respondents are divided in their opinions, with 51% agreeing and 27% disagreeing.

Hopes, concerns, and levels of trust about science?



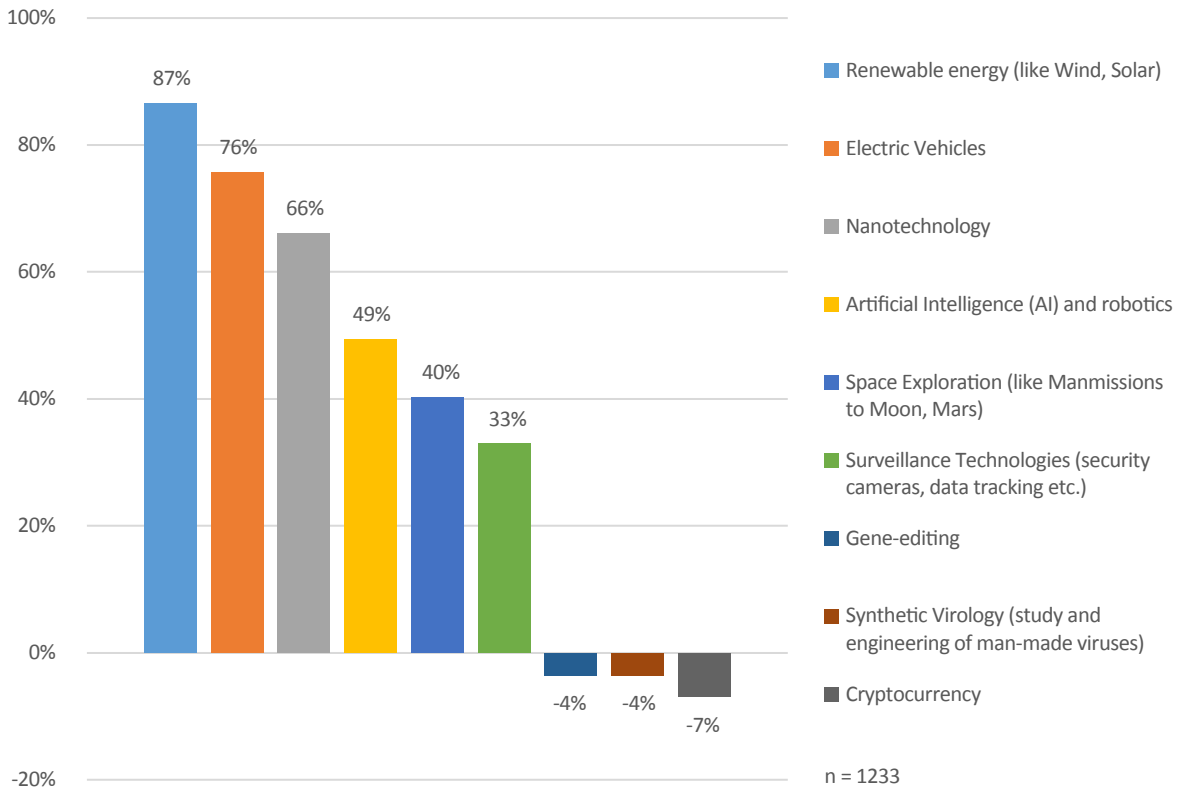
Hopes, concerns, and levels of trust about science?



1. The respondents have an optimistic attitude towards science.
 - 🏠 They believe that science will make our lives better (net score 88%)
 - 🏠 They believe science will make a direct contribution to economic growth of the country (Net score 95%)
2. The respondents are asking for more discussions on the social and ethical implications of science. (Net score 89%)
3. The respondents believe science careers are suitable for a woman (Net score of -89%)
4. On whether science and religion are compatible, the respondents are divided in their opinions (Net score 23%).

Net score is sum of positive responses minus sum of negative responses

Benefits vs Risks of technologies?



1. The respondents strongly believe that the benefits outweigh the risks for technologies like Renewable Energy (Net score 87%) and Electric Vehicles (Net score 76%).
2. The respondents believe that benefits outweigh risks in technologies like Nanotechnology (Net score 65%, but 16% don't know the answer) and Artificial Intelligence (Net Score of 49%)
3. The respondents do not believe that benefits outweigh risks for technologies like Cryptocurrency (Net score -7%), Synthetic Virology (Net score -4%) and Gene editing (Net score -4%).

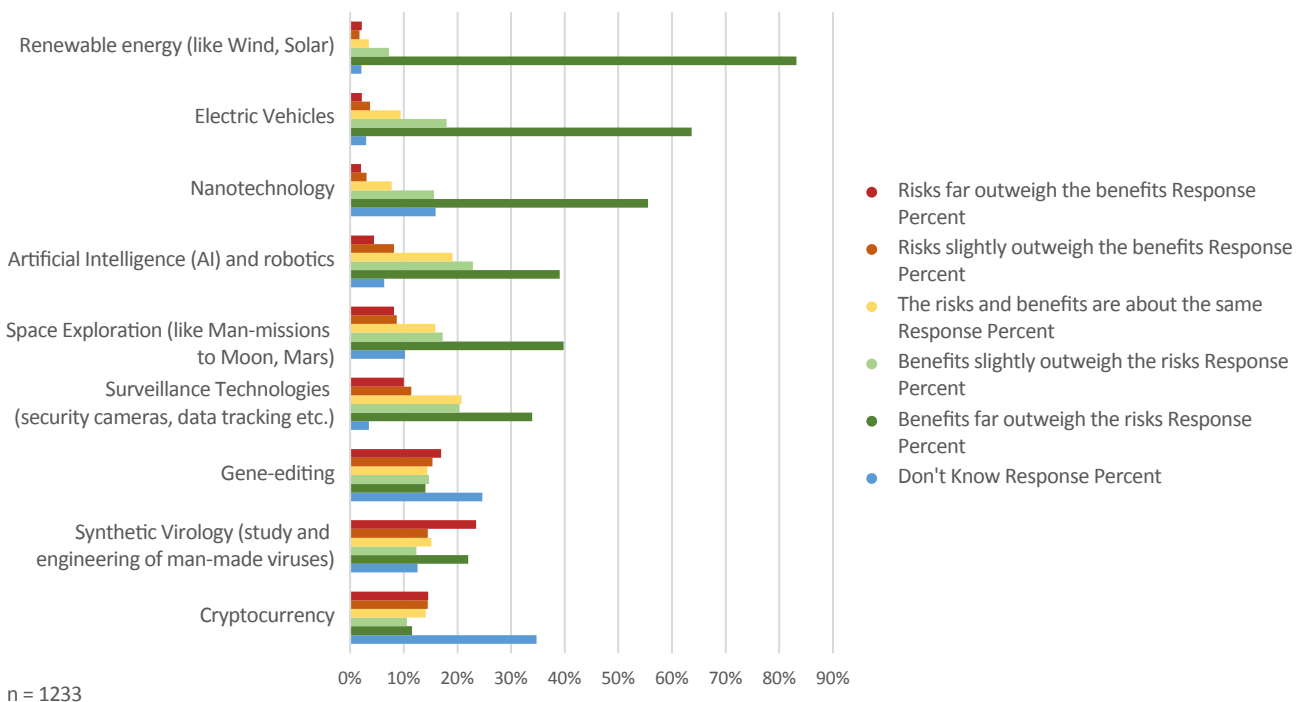
1. The respondents strongly believe that the benefits outweigh the risks for technologies like Renewable Energy (Net score 87%) and Electric Vehicles (Net score 76%).

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3. The respondents do not believe that benefits outweigh risks for technologies like Cryptocurrency (Net score -7%), Synthetic Virology (Net score -4%) and Gene editing (Net score -4%).

4. Age-wise analysis of Net Scores reveals interesting patterns


- 🏠 Respondents in age category less than 21 and 21-40 believe benefits outweigh risks for technologies like gene editing, cryptocurrency
- 🏠 Respondents in age category 21-40 are the only ones to believe benefits outweigh risks for synthetic virology and respondents in age category 41-60 feel the strongest about risks outweighing the benefits for synthetic virology (3X average)
- 🏠 Respondents in age category 61+ feel the strongest the benefits outweigh risks for AI (59% Vs 49% average)



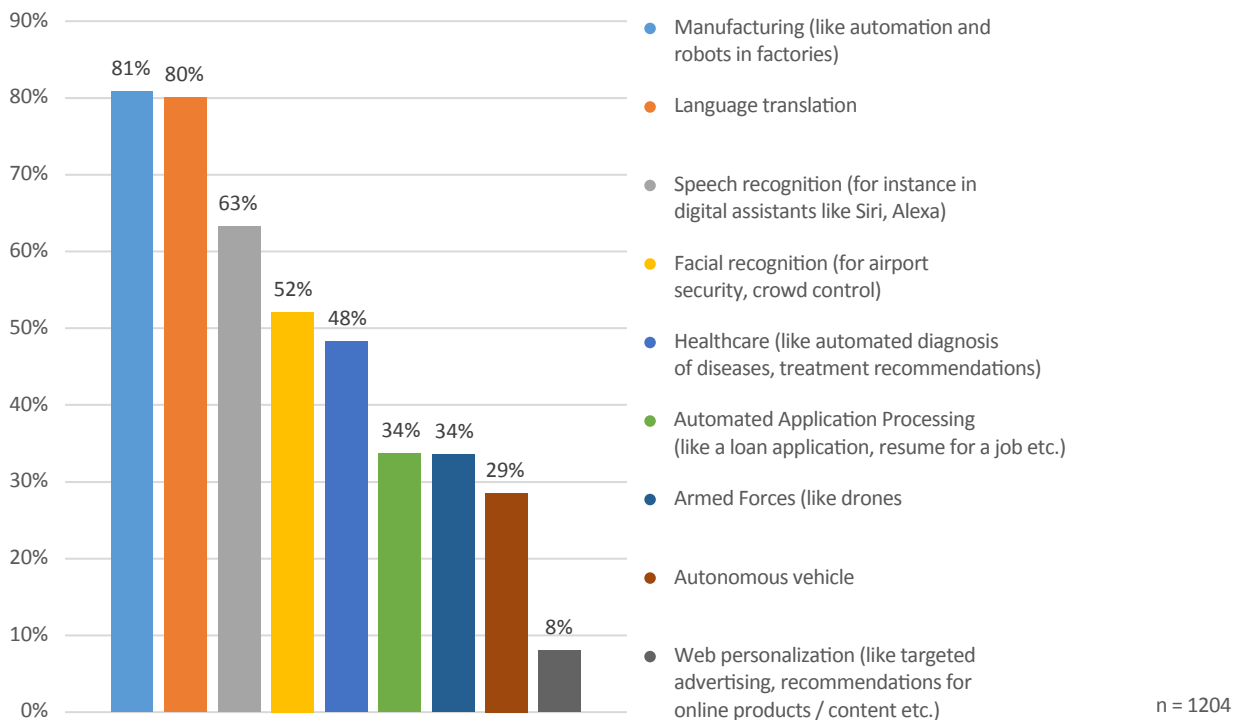


Perceptions about Public Attitude to Artificial Intelligence

Comfort level with applications of AI, sharing data for AI applications
Impact of AI on jobs
Artificial Intelligence Vs Human Intelligence



How comfortable are you with the usage of Artificial Intelligence (AI) in each of the following areas?

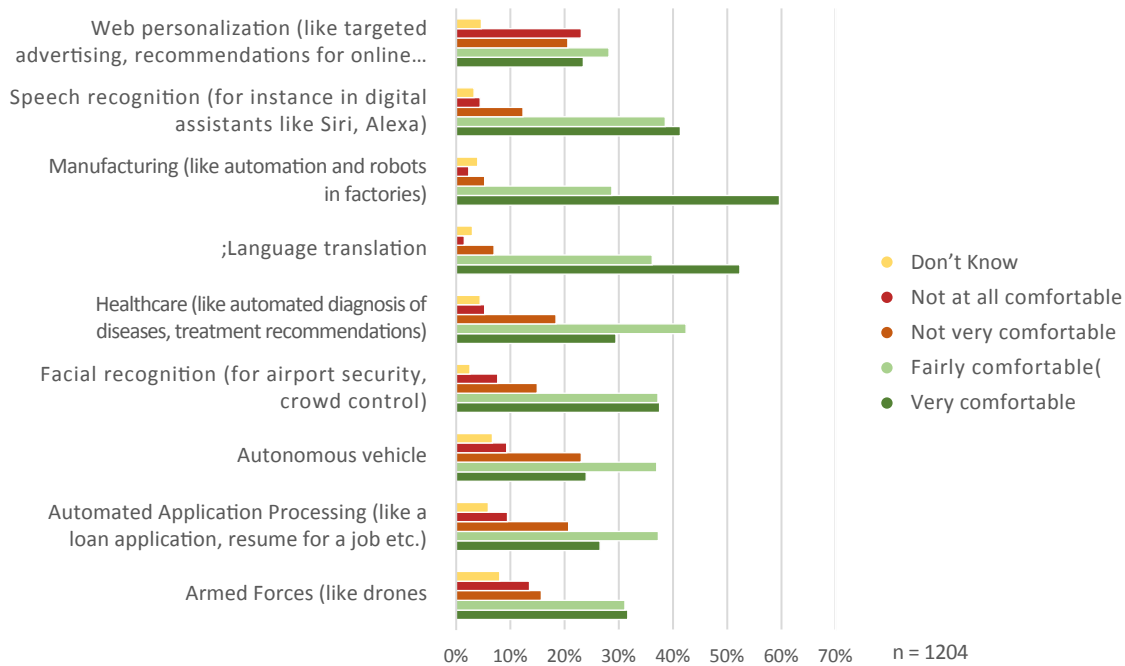


1. Respondents were comfortable when it comes to the usage of Artificial Intelligence (AI) in applications like manufacturing that included automation and robots in factories (81%) and language translation (80%).

2. Respondents were not comfortable in applications like web personalization that included targeted advertising, recommendations for online products / content (8%), autonomous vehicle (29%), armed forces like drones and UAVs (34%) and automated application processing (34%).

Net score is sum of positive responses minus sum of negative responses

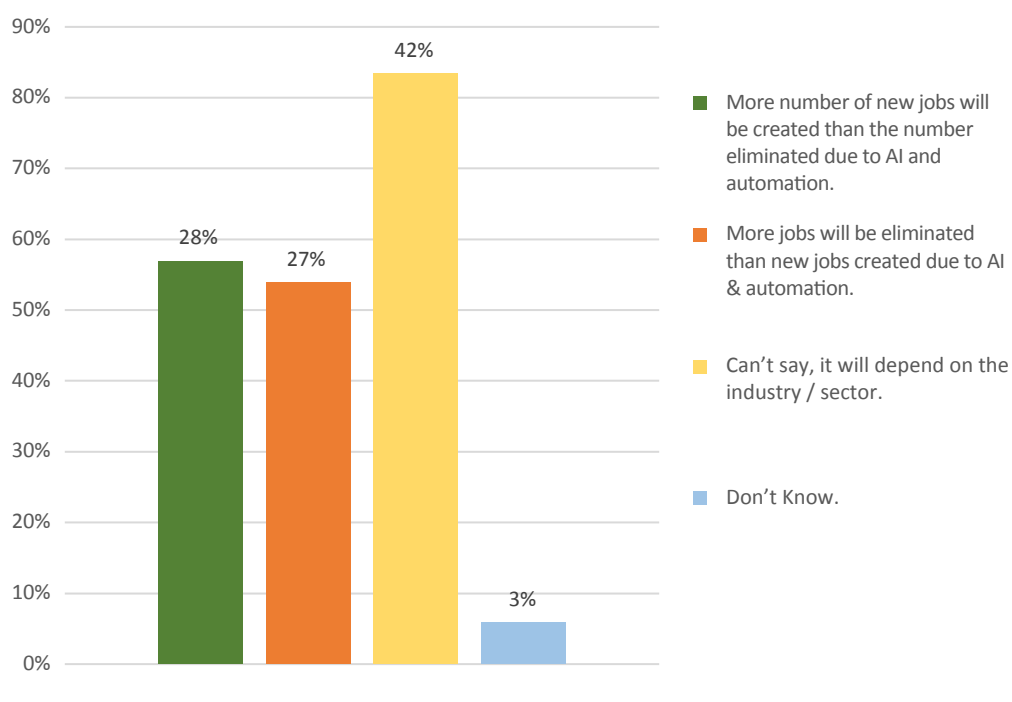
How comfortable are you with the usage of Artificial Intelligence (AI) in each of the following areas?



1. Age-wise analysis of Net Scores of comfort levels with AI applications reveals interesting patterns

- 🏠 Respondents in age category 21-40 are relatively the least comfortable with usage of AI in facial recognition (45%).
- 🏠 Respondents in age category less than 21 are relatively the least comfortable with usage of AI in armed forces (20%).
- 🏠 Respondents in age category 21-40 are relatively the most comfortable with usage of AI in Automated Application Processing (39%) and Autonomous Vehicles (36%).
- 🏠 Respondents in age category 61+ relatively feel the least comfortable with usage of AI in Web personalization (-8%), Automated Application Processing (27%), and Autonomous Vehicles (15%).
- 🏠 Respondents in age category 61+ relatively feel the most comfortable with usage of AI in Facial recognition (63%), and Armed Forces (58%).

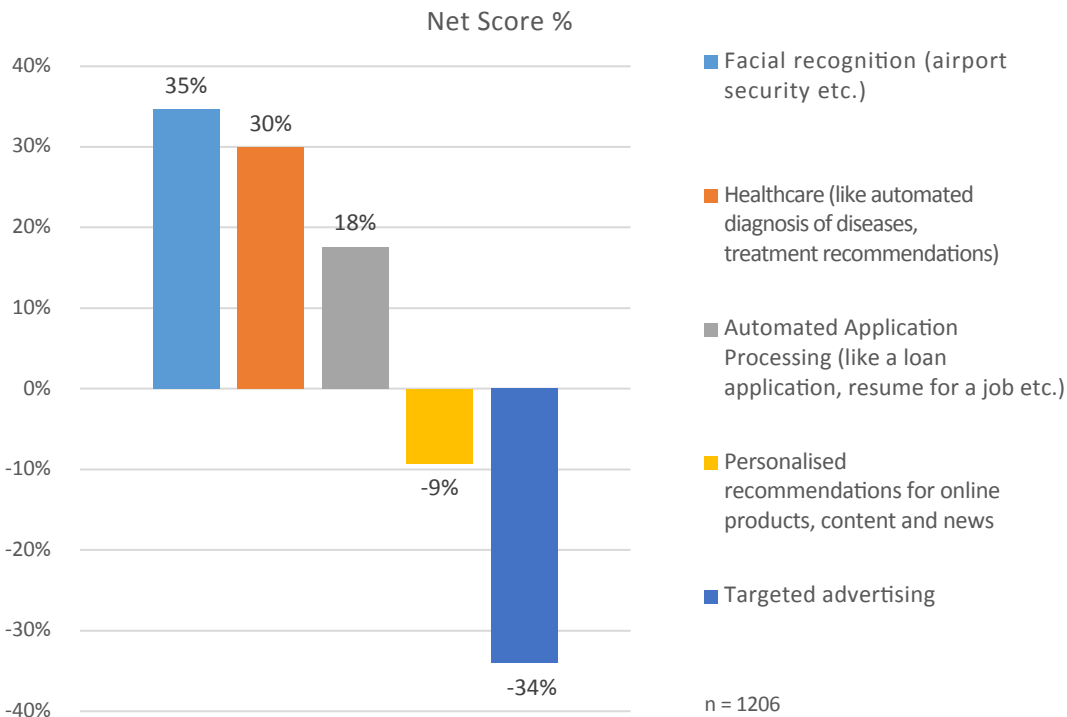
Impact of Artificial Intelligence (AI) on jobs?



1. 42% of the respondents believe that the impact of AI on jobs will depend on the industry / sector.
2. Respondents in age category more than 40 are relatively the most optimistic that more jobs will be created (Net score 14%) as compared to those aged less than 40 (Net score - 8%)

Net score is sum of positive responses minus sum of negative responses

What is your level of comfort in sharing your personal data for Artificial Intelligence (AI) applications in the following areas?



1. Respondents were not comfortable sharing data for AI applications like targeted advertising (-34%) and personalized recommendations (-9%).
2. Respondents were moderately comfortable sharing data for AI applications like Facial recognition (35%) and Healthcare (30%).
3. For the same AI application, respondents were less comfortable when asked if they would share personal data as compared to when asked their comfort level with the AI application category

🏠 Healthcare: 30% Vs 48%

🏠 Facial Recognition: 35% Vs 52%

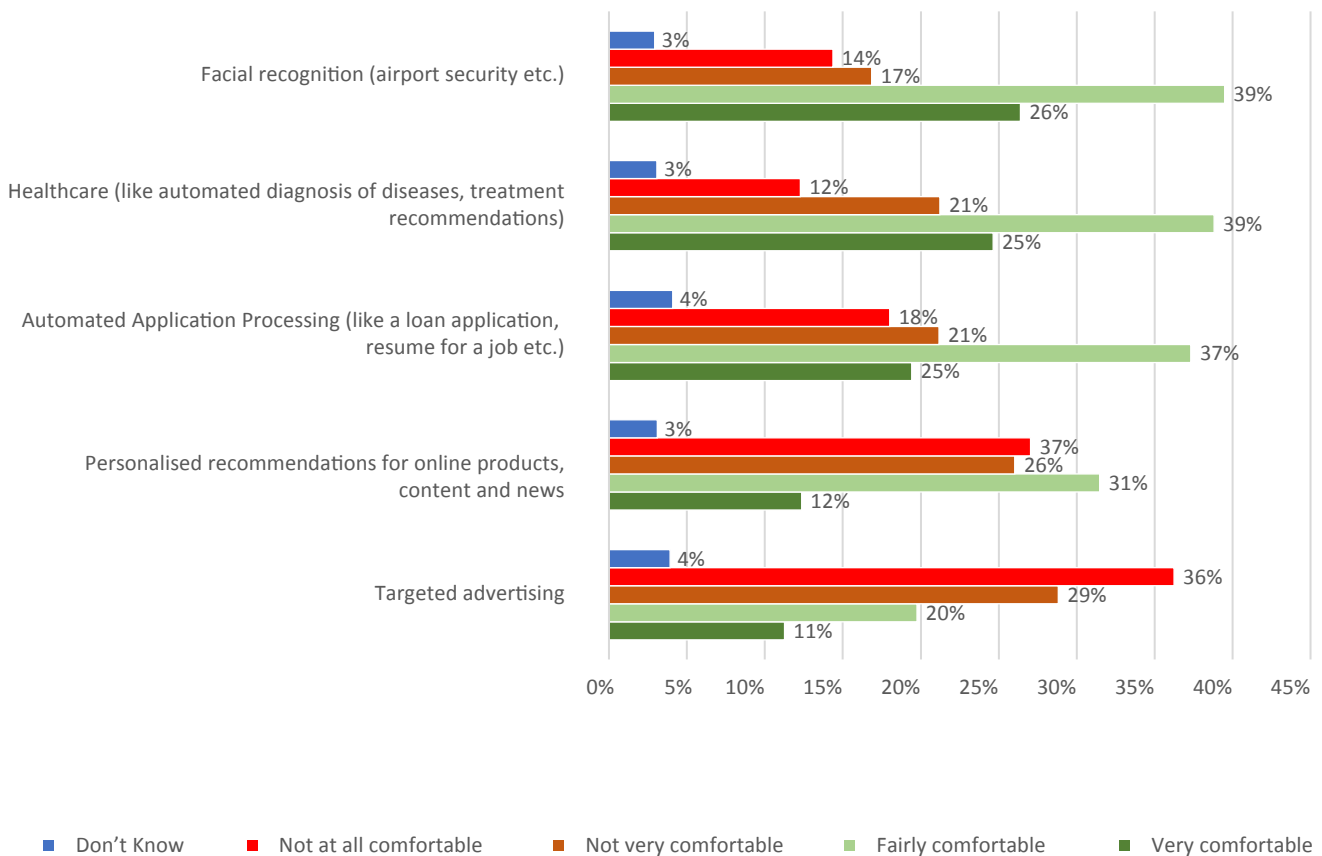
🏠 Targeted advertising and personalized recommendation: -34%/-9% Vs +8%

🏠 Automated Application Processing: 18% Vs 34%

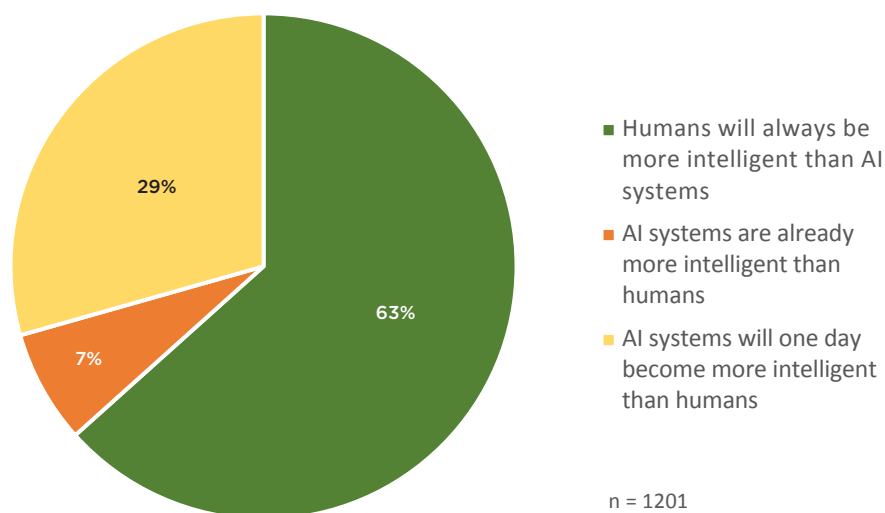
Net score is sum of positive responses minus sum of negative responses

What is your level of comfort in sharing your personal data for Artificial Intelligence (AI) applications in the following areas?

n = 1206



Human intelligence Vs. Artificial Intelligence?



1. 63% of the respondents felt that humans will always be more intelligent than AI systems, while 36% felt AI systems are already or will become more intelligent than humans.
2. Respondents aged less than 40 are 3 times less confident than those aged 40+ that human intelligence will not be overtaken by AI.

Net score is sum of positive responses minus sum of negative responses

Questionnaire

New Normal Section

1. How confident are you that we will drive a thriving, new normal in the next few years?
2. What are the top two priorities for India in this new normal?
3. What top two technology domains should become a priority for India in this new normal?
4. Do you agree that the rapid digitisation of our lives that we are witnessing now will become permanent in the new normal?
5. Which of the following scenarios do you believe best describes the future of work in the new normal?
6. Which of the following scenarios do you believe best describes the future of education in the new normal?
7. Which of the following scenarios do you believe best describes the future of Micro, Small & Medium Enterprises (MSMEs) in the new normal?
8. Which of the following scenarios do you believe best describes the future of startups in the new normal?
9. What are the top two challenges impacting new start-ups in the new normal?
10. From a personal development perspective in the new normal, which of the following is the top priority for you?

Public Attitude to Science Section

1. When you hear the word 'science', the branch of science that comes to your mind falls into which one of the following categories?
2. To what extent do you agree or disagree with the following statements?
3. With respect to the technologies listed, which of these statements most closely reflects your own opinion?
4. When think of 'emerging technology', which one of the following technologies comes to mind foremost?
5. How well informed do you feel about scientific and technological research and developments in general?
6. Select two from the following list of sources of information from which you most often hear or read about the latest science and technology findings?
7. Which of the following statements with respect to your online sharing of scientific information do you relate to the most?
8. How comfortable are you when it comes to the usage of Artificial Intelligence (AI) in each of the following areas?
9. Which of these statements most closely reflects your own opinion with respect to increased usage of Artificial Intelligence (AI) and jobs?
10. What is your level of comfort in sharing your personal data for Artificial Intelligence (AI) applications in the following areas?
11. Which of these statements most closely reflects your own opinion with respect to human intelligence and Artificial Intelligence (AI)?

About IIT Madras Alumni Association (IITMAA)

www.iitmaa.org

IIT Madras Alumni Association (IITMAA) was founded in 1964, after the graduation of its very first batch.

IITMAA represents around 50,000 alumni of IIT Madras across the world. Its motto is: **'Reconnect... Engage... Impact'**.

- Reconnect with our alma mater, with our faculty and friends.
 - Engage through active participation through Chapters, Special Interest Groups but online and virtually.
 - Impact through giving back to our Country, our Society, our alma mater, and our association.
-