

THE FUTURE BELONGS TO SCIENCE

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The Fourth Industrial Revolution can be accelerated if we can foster a conducive innovation ecosystem

IN his 2017 book *Hit Refresh*, Satya Nadella, the chief executive officer of Microsoft, says: "Artificial intelligence, mixed reality and quantum computing are going to be game-changers... (They) will be more profound in (their) impact on the economy than those revolutions that came before."

That is both scary and salutary.

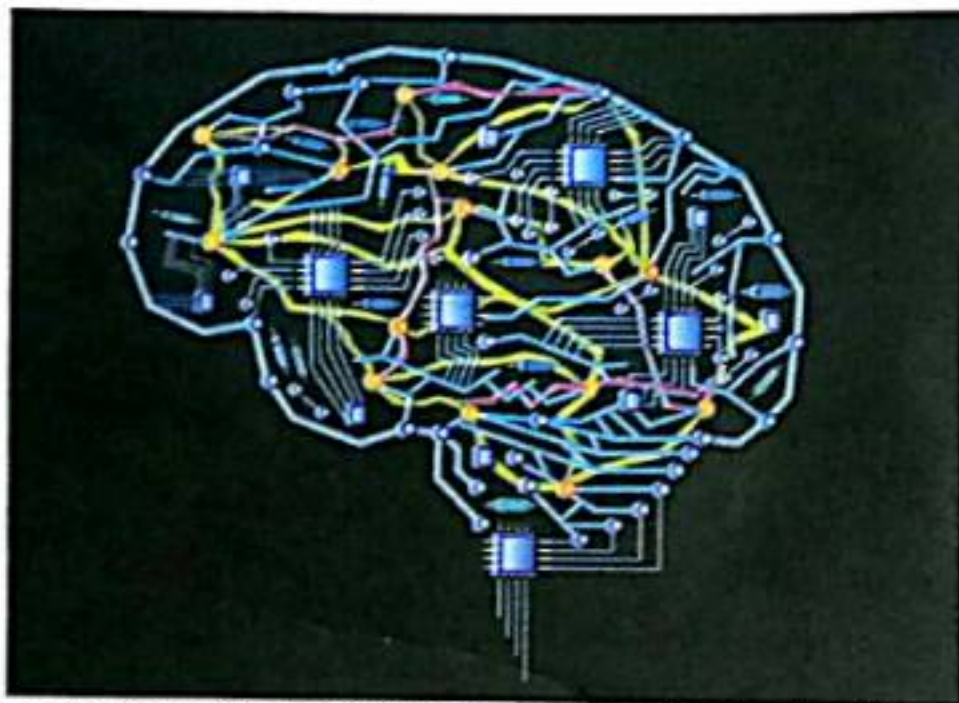
It is scary because computers, driven by artificial intelligence, or AI, can think better and quicker. They can do tasks many times faster than a human. Then, the world's chess champion, Garry Kasparov's loss of a game to IBM's Deep Blue computer in 1997, was merely a foretaste of last year's loss to Google's DeepMind by Lee Se-dol, a South Korean and one of the world's best players of the ancient Chinese board game - Go.

AlphaGo, the AI-powered programme, went on to beat many others at the game, culminating in soundly beating this year Ke Ji, the world champion. Ke subsequently wrote on Weibo, a Chinese social media platform: "I would go as far as to say not a single human has touched the edge of the truth of Go."

With trillions of possible moves, Go is much more complex than chess. So, it might not have come as a surprise that man lost roundly to a machine.

But what is notable is that AlphaGo, as with other AI programmes, has a deep capacity to learn by playing endlessly with itself.

Such deep machine-learning enables an AI-driven computer to teach itself complicated tasks



Artificial intelligence has contributed tremendously to healthcare, energy conservation, climate change and networks. NYT PIC



Satya Nadella

performed by humans - be they menial or complicated ones, such as face and speech recognition and big-data analytics.

The salutary aspect is that AI, that learns unsupervised, can be unleashed on unsolved problems. Indeed, AI has made tremendous

contributions in the field of healthcare, energy conservation, climate change and networks - both human and machine.

It has boosted productivity and taken the drudgery from 3D jobs - those that are dirty, dangerous and demeaning.

And it has contributed to enriching people's lives.

Take Shaqib Shaik, a Microsoft software engineer, who has been blind from young. At the "Future of Work" Talent Corp conference in Kuala Lumpur a fortnight ago, Shaqib showed a video of him using tech-enabled sunglasses.

The glasses convert visual data into audio that he can then hear, thereby allowing him to experience life in real time.

Admittedly, industrial technologies trigger worries that machines will replace humans. Indeed, in Malaysia alone, four out of five semi-skilled and unskilled jobs are at risk of obsolescence.

However, such concerns are misplaced. We will still need human intelligence to make and con-

trol machines. Further, the way machines solve problems can inspire innovation among humans.

And that is precisely what Ke did. As its games are novel and, at times unhuman, Ke studied AlphaGo's moves to discern its winning patterns. And he then went on to win 22 games in a row against his human rivals after the match with AlphaGo.

Robert Gordon, in his 2016 book *The Rise and Fall of American Growth*, argues that very source of growth can be distilled to innovation and technological change.

As such, the Fourth Industrial Revolution, or 4IR, that comprises AI, mixed reality and quantum computing, can be accelerated if we foster a conducive innovation ecosystem.

Here are five suggestions to develop such an ecosystem.

FIRST, we need to re-skill those who are at risk of job displacement. We need to invest in human capital, especially through technical and vocational training, to cultivate digital literacy in the workplace.

Further, the education curriculum in schools and higher-learning institutions should be re-designed to expose students to creative and design thinking.

The integrated teaching of science, technology, engineering and mathematics (STEM) should be pursued with even greater vigour to equip graduates with useful skills to fuel the innovation

race. To promote digital literacy and grow a future digital-ready workforce, schools should have inexpensive access to technology and learning tools.

SECOND, to enjoy the benefits of 4IR, every segment of society should have access to the Internet and cloud computing, and at faster speed. Currently, 79 per cent of the population is connected to the Internet as against 93 per cent in South Korea.

The veritable explosion of smartphone usage has narrowed the digital divide in the country. Two-thirds of Malaysians have smartphones as against three-quarters of Singaporeans.

While the digital divide is shrinking fast, failure to bridge it quickly may make us fall behind in a fast-paced global economy. As such, greater investments are warranted to upgrade the telecommunications and broadband infrastructure.

THIRD, building access to communications technology alone is not enough. People, especially the rural folk, must be enabled to exploit the technology to the maximum if they are to benefit from the digital revolution. Here, citizens should invest in lifelong learning in cloud computing.

FOURTH, for the 4IR to have maximum impact on the citizenry, our Internet speed must be boosted. Of the 189 countries surveyed by the United Kingdom's Cable Co over the year ending in May, Malaysia came out 63rd. Singapore topped the scale. We have some way to go.

FIFTH, we need to engender trust in machines and their capabilities. To do that, we need to protect these technologies and their data against cybercrime, including protecting data privacy and security.

We need to move ahead with the inexorable march of 4IR.

As Jawaharlal Nehru said long ago: "It is science alone that can solve the problem. At every turn, we have to seek its aid. The future belongs to science and those who make friends with science."

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