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FUTURE OF LAW

Who Am I – Human or Machine?

Synchronizing with Cyborgs



March 2024



Dedicated to the memory of our beloved
colleague **Darren Punnen**



“Hasta La Vista Baby!”

This line is etched in the hearts of Terminator fans. A terrorizing cyborg from the future has come to eliminate a future leader of the Resistance in a war between humans and machines.

Yes, cyborgs are coming into our life, not from the future, but soon in the near future. Technically speaking, some forms of cyborgs are already amongst us.

However, the gloomy picture of terrorizing cyborgs painted by Hollywood movies is only a small part of the future landscape. Most cyborgs are going to enhance our lives, provided we learn to live with them.

Overview

Cyborgs—portmanteaus of cybernetics and living biological organisms, are formed when electro-mechanical components are integrated within any living organisms to add or enhance certain capabilities. The living organism can be any—an insect, a bird, or a mammal, not just a human.

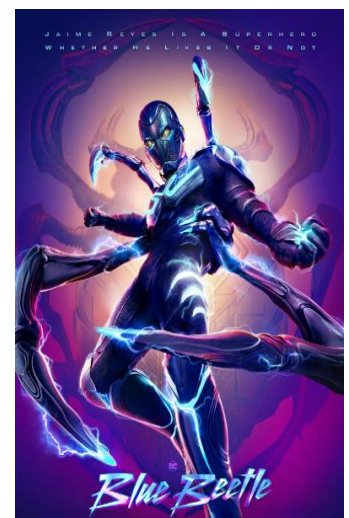
Biological Cyborgs	Devices like prosthetic limbs, pacemakers, and cochlear implants to add capabilities.
Mechanical Cyborgs	Enhancements such as exoskeletons and bionic limbs to enhance capabilities.
Neural Cyborgs	Interfaces with the nervous system or brain to provide stimulation, sensory perception or motor control.
Medical Cyborgs	Devices like insulin pumps, artificial organs, and continuous glucose monitors.

Unlike robots or androids, which are entirely made with artificial material and electro-mechanical components, cyborgs comprise of living organisms and can be anywhere in-between on this continuum.



Source: Orion Pictures

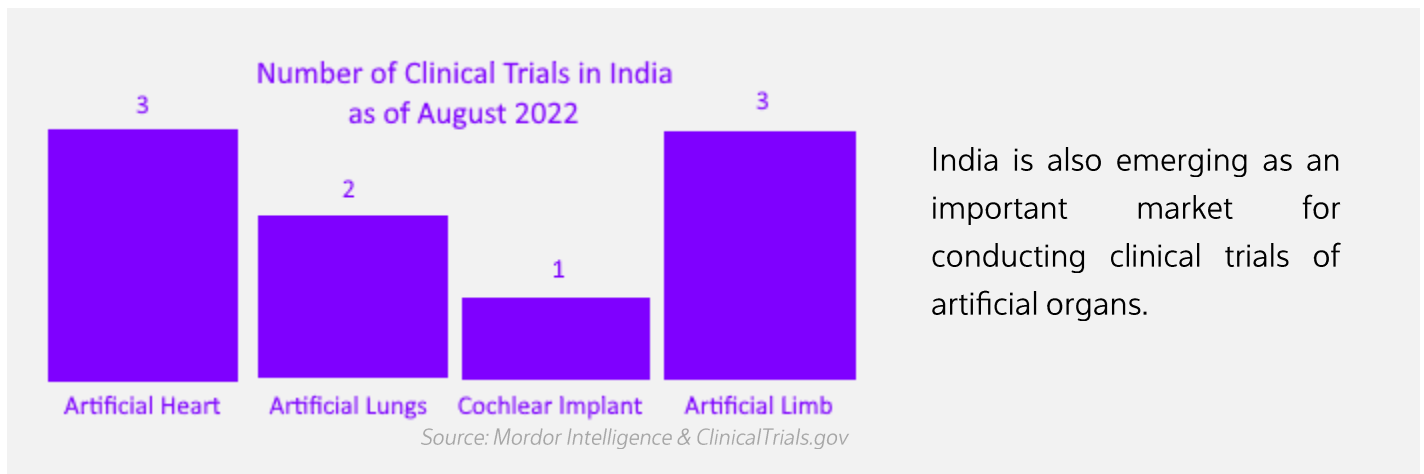
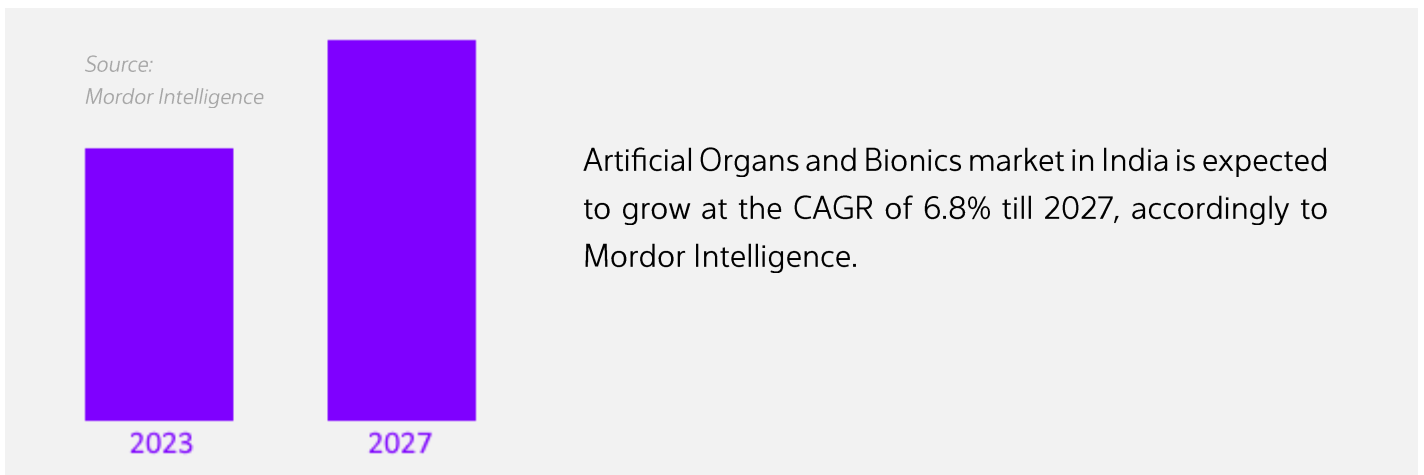
Human-like cyborgs have been existing in Hollywood movies for decades, but with each passing day, they are becoming a reality with which we will have to learn to coexist in future.



Source: Warner Bros.

India Story

For India, a most important and near-term benefit is in the areas of artificial organs. Organ failure is one of the leading causes of death in India, especially due to the shortage of donor organs. According to the Georgia Institute, 1.4 million people die yearly because of kidney failure and cannot afford dialysis.

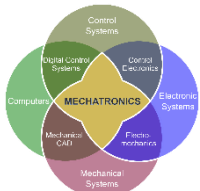


Source: WION

India's Defence Research and Development Organization (DRDO) is also interested in cyborgs. Recently, it developed "rat cyborgs" to help security forces in recovery operations, surveillance and intelligence gathering.

Underlying Technologies

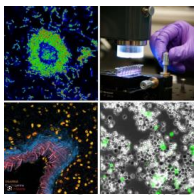
Robotics



Source: ASME

- Mechatronics – Integrating various branches of engineering: Electrical, Computer, Mechanical and Control.
- Sensors, optics

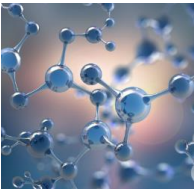
Bionics



Source: NIST

- Biomaterial – regenerating damaged tissues and organs
- Biotechnology / Bioengineering
- Genetic engineering

Material Science



Source: Plastic Industry Association

- Nanotechnology
- Rare metal alloys
- Polymers
- Ceramics
- Hydrogels

3D Printing



Source: HealthEuropa

- Complex designs
- Integrating various types of material, including biomaterial

Artificial Intelligence



Source: FreelconsPNG

- Provide application specific intelligence
- Learning capabilities
- Enable automation

Semiconductors

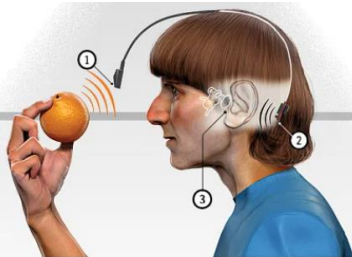


Source: SIA

- Processing power
- Communications
- Radio Frequency Identification

Interesting Use Cases

Perceiving colors

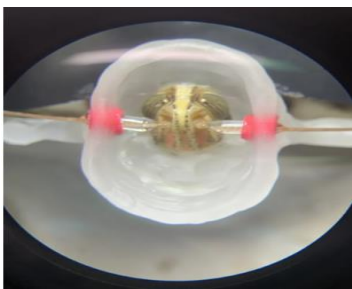


Source: *The Straits Times*

(Watch – [Cyborg Project–En un xip Multicolor](#))

A sensor (1) detects the frequency of the color and transmits it to a chip (2) installed on the back of head. The chip converts the color into a specific sound wave, like a musical note. This wave travels to the auditory system (3) through the skull using bone conduction.

Detecting cancer



Source: *MIT Technology Review*

A team of researchers inserted electrodes into lobes of the brain of a locust that receives odor signals from its antenna. Then they used human oral cancer and cancer-free cells to detect the differences in the patterns of brain activities.

Superhuman hearing



Source: *WIRED*

A 3D printed ear not just repairs lost hearing but also provides superhuman hearing. It disintermediates tiny inner-ear hair cells that transform audio signals into electrical signals for brain. Instead, it directly sends the signals straight to the medulla and enables hearing sound outside the normal human hearing range of 20-20k Hz spectrum.

Telepathy in infancy



Source: *The U.S. Sun*

A UK-based couple implanted in their arms chips, which remotely communicated with each other. This enabled one person to sense movement of the arm by the other person.

Who Would be Interested?

Healthcare/Medical Devices

- Develop medical devices and implants.
 - Artificial organs – Heart, kidney, lungs, cochlea, etc.
 - Bionics – Vision, ear, orthopedic, cardiac, etc.
- Increase capabilities of healthcare professionals.
- Provide greater resistance to certain types of infections and diseases.

Military and Defense

- Augment abilities of human soldiers.
- Enhancing lives of wounded veterans.
- Quicker and direct transfer of military commands.
- Develop cyborg warriors for specialized missions.

- Provide a helping hand to support staff.

Space Exploration

- Provide capabilities to survive in adverse environment of outer space.
- Allow habitation of life on other planets.

Sports and Athletics

- Enable disabled athletes to compete in sports.
- Fasten recovery of injured athletes.

Assisted Living

- Increase mobility and quality of life of older people.
- Give complementary abilities to incapacitated patients.
- Significantly improve monitoring of vitals and speed up response to adverse events.

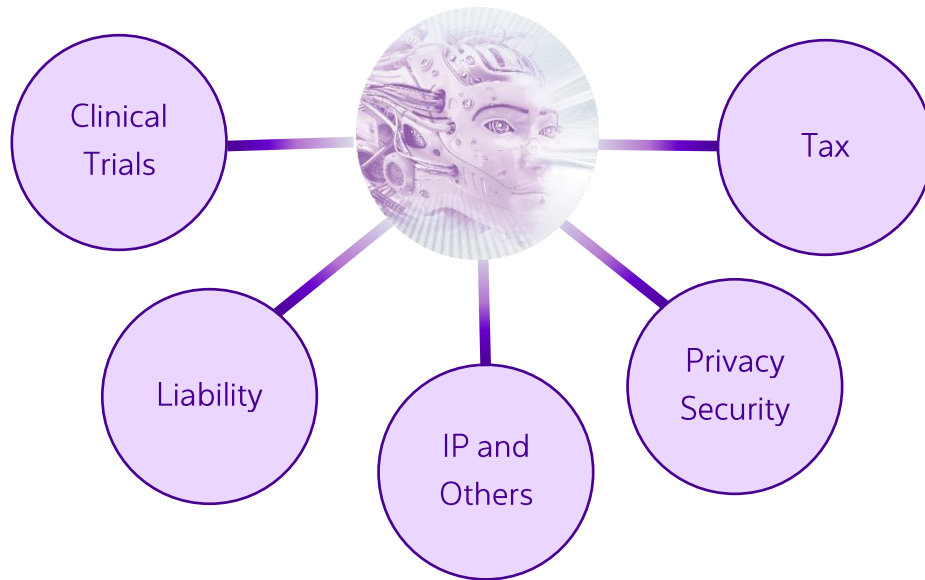
Agriculture

- Monitor plant health and environmental conditions.
- Increase pollination and crop yield.
- Support repetitive tasks such as weed picking.
- Enable organic farming.

Manufacturing

- Enhance skills and efficiency of human labor.
- Improve shop floor control.

Legal and Ethical Considerations



Stage-Wise Clinical Trials

- Cyborgs involve augmentation of human bodies. So, the underlying technologies are likely to be classified as medical devices under Drugs and Cosmetics Act in India and subject to clinical trials prior to their public uses. That would involve:
 - Compliance with general informed consent requirements to enable patients to make informed decisions.
 - Informed Consent & Disclosure requirements by the entity conducting clinical trials.
 - Mechanism for reporting adverse reactions on application of new technologies on trial subjects.

Liability

- Just like any other technologies, cyborgs are likely to malfunction.
- Liability and compensation in case of accidents by robots and cyborgs fall in the grey areas in law and need special legal treatment.
- Stakeholders for potential liability would include healthcare providers, technology manufacturers, owner of the cyborg, or all of them. Their roles and responsibilities would have to be clearly documented in the risk disclosures and future laws.
- Another aspect to consider is medical malpractice of using cyborg technologies when they are not needed.

Data Privacy

- Cyborgs may process vast amounts of personal data (including health data). It will be important to determine at which point “processing” of personal data commences.
- Cyborg technologies may lead to data mining and data exploitation.
- Consent requirements to include the scope of processing personal data by Cyborgs and data sharing and ownership aspects.
- Cyborgs can lead to mass surveillance which may pose privacy concerns.
- In India, Digital Personal Data Protection Act, 2023 (DPDPA) regulates the operations performed on digital personal data including collection, recording, organization, structuring, notice and consent requirements, safeguarding of personal data, cross-border transfer restrictions, etc.

Cybersecurity

- Cyborg technologies could be vulnerable to cyberattacks.
- Laws related to cybersecurity and data breaches may need to be adapted to cover these new risks.
- The Indian cyber security laws prescribe certain category of cybersecurity incidents which must be mandatorily reported within a prescribed timeline.

Tax

- As of now, no law in India recognizes artificially intelligent entities to be ‘persons’. Hence, it is not clear in whose hands such income will be taxed. It may be argued that the income which is earned by the Cyborg should be taxed in the hands of the programmer / user who eventually realizes that income.
- Permanent Establishment (PE) Considerations
 - Generally, a PE is constituted in India if a non-resident carries on business in India either through a fixed place of business or through employees / dependent agents (carrying on certain activities on behalf of the non-resident).
 - When a non-resident provides services in India through the use of Cyborgs, robots or automated systems situated in India, questions may arise as to whether it would constitute a PE for the non-resident in India.
 - Further, even if the Cyborg is not situated in India, it may constitute a PE in India if the internet connectivity of the robot is directly linked to a server located in India.
 - In case of the latter, the discussions around whether servers/ websites constitute a PE become relevant.
 - Since the jurisprudence on this issue is still evolving, activities which may constitute a PE (in similar circumstances as mentioned above) is still not very clear.

Intellectual Property

- Need to address issues related to the intellectual property rights of the technology creators and the rights of individuals who have cyborg enhancements.
- When a cyborg produces a piece of “work” (literary, dramatic, musical, artistic, cinematographic film, sound recording etc.), patent or other intellectual property, it is unclear who will be the author and owner of such work under the Indian Copyright Act, 1957. From an Indian copyright law perspective, machines may not be recognized as authors hence ownership.

Identity and Legal Personhood

- The blurring of the line between human and machine may lead to legal questions about a person's identity and legal status. For example, who is legally responsible when a cyborg commits a crime.

Ethical and Societal Implications

- Ethical concerns surrounding cyborgs include questions of identity, discrimination, and societal acceptance.
- Another important concern is military applications. Internationally accepted norms need to be developed and endorsed by treaties to restrict certain military applications of cyborgs.

End-of-Life Decisions

- Legal frameworks may need to clarify the rights and choices of cyborg individuals regarding the deactivation or removal of technological components at the end of life.

Human and Animal Rights

- Cyborgs may face unique human and animal rights challenges.
 - Human rights: the right to bodily autonomy, non-discrimination, and freedom from coercion.
 - Animal rights: experimentation in R&D, freedom from torture, avoiding suffering,

Sources and Further Reading

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About US

We are an India-centric, research-based global law firm (www.nishithdesai.com) with five offices in India (Mumbai, Bangalore, New Delhi, Mumbai BKC, and GIFT City) and with license to practice Indian law from our international offices in Silicon Valley, New York, Singapore, Munich, and Amsterdam. Over 70% of our clients are foreign multinationals and institutional investors and over 84.5% are repeat clients.

We are a firm of specialists and the go-to firm for companies that want to conduct business in India, navigate its complex business regulations, and grow. We are known for handling complex, high-value transactions and cross-border dispute resolution (see [Annexure A](#)). And that prestige extends to our engagement with and mentoring the start-up community that brings about industry-changing innovations.

Dedicated to shaping the future of law & society, we have set up a first-of-its kind IOT-driven Blue Sky Thinking & Research Campus named *Imaginarium AliGunjan* (see [Annexure B](#)) near Mumbai. Our ability to anticipate and address challenges from a strategic, legal and tax perspective in an integrated way (see [Annexure C](#)) have won recognitions globally from not just our clients but also government ministries.

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