METATRENDS

2020 - 2030

abundance 360

1. **Global gigabit connectivity will connect everyone & everything, everywhere, at ultra-low cost:** The deployment of both licensed and unlicensed 5G, plus the launch of multitude of global satellite networks (OneWeb, Starlink, etc.) allows for ubiquitous, low-cost communications for everyone, everywhere; plus the connection of billions of devices. This connectivity is bringing online an addition 3 billion individuals, driving tens of trillions of dollars into the global economy. This is driven by the convergence of: low-cost space launches, hardware advancements, 5G networks, artificial intelligence, materials science, and surging computing power.

2. **Human longevity and the average healthspan will increase by 10+ years:** A dozen game-changing biotech and pharmaceutical solutions (currently in Phase 1, 2, or 3 clinical trials) will reach consumers this decade, adding an additional decade to the human healthspan. Technologies include stem cell supply restoration, *wnt* pathway manipulation, Senolytic Medicines, a new generation of Endobody Vaccines, GDF-11, supplementation of NMD/NAD+, among others will impact healthspan.

3. **AI is approaching near-human level intelligence:** As predicted by technologist/futurist Ray Kurzweil, artificial intelligence will reach human-level performance this decade in 2029. In the coming decade, AI algorithms and machine learning tools will be increasingly made open source, available on the cloud, allowing any individual with an internet connection the ability to supplement their ability and improve their problem-solving ability and earning capacity. This metatrend will be driven by the convergence of global high-bandwidth connectivity, neural networks and cloud computing. Every industry from industrial design, healthcare, education, and entertainment will be impacted.

4. **AI-Human Collaboration will skyrocket across all professions:** The rise of "AI as a Service" (AIaaS) platforms with enable humans to partner with AI in every aspect of their work, at every level, in every industry. AIs will become entrenched in everyday business operations, serving as cognitive collaborators to employees — supporting creative tasks, generating new ideas, and tackling previously untenable innovations. In some fields, partnership with AI will become a requirement, for example, in the future, making certain diagnoses without the consultation of AI may be deemed malpractice.

5. **Most individuals adapt a *JARVIS*-like "software shell," to improve their quality of life:** As services like Alexa, Google Home and Apple Homepod increase in their capabilities, such services will eventually travel beyond the home and become part of you 24/7. Imagine a JARVIS-like "software shell" that you give permission to listen to all conversations, read your email and monitor your blood chemistry. With access to such data, these AI-enabled-software shells will learn your preferences, anticipate your needs and behavior, shop for you, monitor your health and help solve your problems in support of your goals.

6. **Globally abundant cheap renewable energy:** Continued advances in solar, wind, geothermal, hydroelectric power, nuclear and localized grids will drive humanity towards cheap, abundant, and ubiquitous renewable energy. The price per kilowatt-hour will drop below 1-cent/kilowatt-hour for renewables at the same time that storage drops below 3-cents kilowatt-hour, resulting in the majority displacement of fossil fuels globally. The world's poorest countries are also the world's sunniest countries driving humanity towards an age of energy abundance.

7. **The insurance industry transforms from "recovery after risk" to "prevention of risk":** Today, fire insurance pays you *after* your house burns down; life insurance pays your next-of-kin *after* you die; and healthcare insurance (which is really sickcare insurance) pays only *after* you get sick. This next decade, a new generation of insurance providers will leverage the convergence of machine learning, ubiquitous sensors, low-cost genome sequencing and robotics to detect risk, *prevent* disaster, and guarantee safety before any costs are incurred.

8. **On-demand delivery & on-demand production will birth an "instant economy of things:"** Urban dwellers will learn to expect "instant fulfillment" of their retail orders as drone and robot last-mile delivery services carry products from local supply depots to your door step. Coupled with the deployment of regional on-demand digital manufacturing (3D printing farms), and even customized "stuff" can be obtained within hours anywhere, anytime. The metatrend is driven by the convergence of networks, 3D printing, robotics and artificial intelligence.

9. **Ability to sense and know anything, anytime, anywhere:** We're rapidly approaching the era where 100 billion sensors (the Internet of Everything) is monitoring/sensing (imagining, listening, measuring) everything, all the time. Global imaging satellites, drones, autonomous car LIDARs, forward-looking augmented reality headset cameras are part of a global sensor matrix allowing us to know anything, anytime, anywhere. This meta-trend is driven by the convergence of terrestrial, atmospheric and space-based sensors, combined with machine learning and data networks. In this future, it's not "what you know," but rather "the quality of the questions you ask" that will be most important.

10. **Disruption of Advertising:** As A.I. becomes increasingly embedded in everyday life, your custom AI will soon understand what you want better than you do. In turn, we will begin to both trust and rely upon AI to make most of our buying decisions, turning over shopping to AI-enabled personal assistants. Our AIs will make purchases based upon your past desires, as well as conversations you've allowed your AI to listen to, and by tracking where our pupils focus (i.e. what catches our attention). As a result, the advertising industry which normally competes for *your* attention (whether at the Superbowl or on our web searchers) will have a hard time influencing your AI. This meta-trend is driven by the convergence of machine learning, sensors, augmented reality, and 5G/networks.

11. **Cellular agriculture moves from the lab into the inner cities, providing high-quality protein that is cheaper and healthier:** This next decade we will witness the birth of the most ethical, nutritious, and environmentally sustainable protein production system devised by humankind. Stem-cell based 'cellular agriculture' will allow the production of beef, chicken and fish *anywhere*, on-demand, that is more nutritious and environmentally friendly than traditional live-stock options. This metatrend is enabled through the convergence of biotechnology, material sciences, machine learning and AgTech.

12. **High-bandwidth Brain-Computer Interfaces (BCI) will come online for public use:** As predicted by technologist/futurist Ray Kurzweil, towards the end of this decade we will begin connecting the human neo-cortex with the cloud. A variety of approaches will be developed that will allow the transfer of data in both directions, enabling those with spinal-cord injuries the ability to both sense and regain motor control. Beyond assisting those who are disabled, many will choose to supplement their normal cognitive abilities, with the potential to increase their sensorium, their memory and intelligence. This metatrend is enabled through the convergence of material sciences, machine learning and robotics.