**ASSIGNMENT 1: dUE aUG 5th   
To be submitted on moodle in typed documents**

1. For each of the 20 Metatrends that Peter Diamandis has identified, find a startup that is leveraging this Metatrend. The startup can be an existing company that exemplifies how the company leverages the Metatrend. Write one line and include a website link / any relevant URL.
2. Zomato went IPO last week for a monstrous valuation. Explain how the founders of Zomato demonstrated “Grit”, using Peter’s blog on “Grit” below.

**20 METATRENDS SHAPING OUR FUTURE**

**(1) Continued Increase in Global Abundance**: The number of individuals in extreme poverty continues to drop, as the middle-income population continues to rise. Everyday goods and services (finance, insurance, education, and entertainment) are being digitized and becoming fully demonetized, available to the rising billion on mobile devices. The case for abundance has massively proven out since the publication of ***Abundance: The Future Is Better Than You Think*** in 2012.

**This Metatrend is driven by the convergence of the following**: high-bandwidth and low-cost communication, ubiquitous AI on the cloud, growing access to AI-aided education and AI-driven healthcare.

**(2) Global Gigabit Connectivity Will Connect Everyone and Everything, Everywhere, at Ultra-low Cost**: The deployment of both licensed and unlicensed 5G, plus the launch of a multitude of global satellite networks (Starlink, OneWeb, etc.), allow for ubiquitous, low-cost communications for everyone, everywhere––not to mention the connection of *trillions* of devices. And today’s skyrocketing connectivity is bringing online an additional 3 billion individuals, driving tens of trillions of dollars into the global economy.

**This Metatrend is driven by the convergence of the following**: low-cost space launches, hardware advancements, 5G networks, artificial intelligence, materials science, and surging computing power.

**(3) The Average Human 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 10+ years to the human healthspan. Technologies include stem cell supply restoration, Wnt pathway manipulation, senolytic medicines, a new generation of Endo-Vaccines, GDF-11, and supplementation of NMD/NAD+, among several others. And as machine learning continues to mature, AI is set to unleash countless new drug candidates, ready for clinical trials. This is the topic of my next book called LIFEFORCE being co-authored with Tony Robbins and Bob Hariri, MD/PhD (Celularity) that will be available in February 2022.

**This Metatrend is driven by the convergence of the following**: genome sequencing, CRISPR technologies, AI, quantum computing, and cellular medicine.

**(4) An Age of Capital Abundance Will See Increasing Access to Capital Everywhere**: Over the past few years, humanity hit all-time highs in the global flow of seed capital, venture capital, and sovereign wealth fund investments. While this trend will witness some ups and downs in the wake of future recessions, it is expected to continue its overall upward trajectory. Capital abundance leads to the funding and testing of "crazy" entrepreneurial ideas, which in turn accelerate innovation. Already, $300B in crowdfunding is anticipated by 2025, democratizing capital access for entrepreneurs worldwide. And even during a pandemic (2020), the world deployed more venture capital than ever before, handily beating out the last high-water mark in 2019.

**This Metatrend is driven by the convergence of the following**: global connectivity, dematerialization, demonetization, and democratization.

**(5) Augmented Reality and the**[**Spatial Web**](https://www.diamandis.com/blog/the-spatial-web-part-1) **Will Achieve Ubiquitous Deployment**: The combination of Augmented Reality (yielding Web 3.0, or the Spatial Web) and 5G networks (offering 100Mb/s - 10Gb/s connection speeds) will transform how we live our everyday lives, impacting every industry from retail and advertising, to education and entertainment. Consumers will play, learn and shop throughout the day in a newly intelligent, virtually overlaid world. This is where technologies like SpatialWeb.net, Vatoms, and Apple’s next generation AR & VR headsets will shine.

**This Metatrend is driven by the convergence of the following**: hardware advancements, 5G networks, artificial intelligence, materials science, and surging computing power.

**(6) Everything is Smart, Embedded with Intelligence**: The price of specialized machine learning chips is dropping rapidly with a rise in global demand. Imagine a specialized $5 chip that enables AI for a toy, a shoe, a kitchen cabinet? Combined with the explosion of low-cost microscopic sensors and the deployment of high-bandwidth networks, we’re heading into a decade wherein every device becomes intelligent. Your child’s toy remembers her face and name. Your kid's drone safely and diligently follows and videos all the children at the birthday party. Appliances respond to voice commands and anticipate your needs.

**This Metatrend is driven by the convergence of the following**: AI, 5G networks, and more advanced sensors.

**(7) AI Will Achieve Human-level Intelligence**: As predicted by technologist and futurist Ray Kurzweil, artificial intelligence will reach human-level performance this decade (by 2030). Through the 2020s, AI algorithms and machine learning tools will be increasingly made open source, available on the cloud, allowing any individual with an internet connection to supplement their cognitive ability, augment their problem-solving capacity, and build new ventures at a fraction of the current cost.

**This Metatrend is driven by the convergence of the following**: global high-bandwidth connectivity, neural networks, and cloud computing. Every industry, spanning industrial design, healthcare, education, and entertainment, will be impacted.

**(8) AI-Human Collaboration Will Skyrocket Across All Professions**: The rise of “AI as a Service” (AIaaS) platforms will 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 unattainable innovations. In some fields, partnership with AI will even become a requirement. For example: in the future, making certain diagnoses without the consultation of AI may be deemed malpractice.

**This Metatrend is driven by the convergence of the following**: increasingly intelligent AI, global high-bandwidth connectivity, neural networks, and cloud computing.

**(9) Most Individuals Adapt a *JARVIS*-like “Software Shell” to Improve Their Quality of Life**: As services like Alexa, Google Home, and Apple HomePod expand in functionality, such services will eventually travel beyond the home and become your cognitive prosthetic 24/7. Imagine a secure JARVIS-like software shell that you give permission to listen to all your conversations, read your email, monitor your blood chemistry, etc. 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 you problem-solve in support of your mid- and long-term goals.

**This Metatrend is driven by the convergence of the following**: increasingly intelligent AI, neural networks, and cloud computing.

**(10) Globally Abundant, Cheap Renewable Energy**: Continued advancements in solar, wind, geothermal, hydroelectric, nuclear and localized grids will drive humanity towards cheap, abundant, and ubiquitous renewable energy. The price per kilowatt-hour will drop below *1 cent per kilowatt-hour* for renewables, just as storage drops below a mere 3 cents per kilowatt-hour, resulting in the majority displacement of fossil fuels globally. And as the world’s poorest countries are also the world’s sunniest, the democratization of both new and traditional storage technologies will grant energy abundance to those already bathed in sunlight. Incredible companies like Heliogen will be able to mine sunlight and water to create cheap, abundant hydrogen as a storage medium. We are also on the cusp of many breakthroughs in fusion power as capital, new materials, and entrepreneurs pour in this arena.

**This Metatrend is driven by the convergence of the following**: materials science, hardware advancements, AI/algorithms, and improved battery technologies.

**(11) 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 health insurance (which is really sick insurance) pays only *after* you get sick. During the next decade, we’ll see a new generation of insurance providers that offer you a service to KEEP you healthy and keep your house safe during a wildfire.

**This Metatrend is driven by the convergence of the following**: machine learning, ubiquitous sensors, low-cost genome sequencing, and robotics to detect risk, *prevent* disaster, and guarantee safety before any costs are incurred.

**(12) Autonomous Vehicles and Flying Cars (eVTOL) Will Redefine Human Travel (Soon to be Far Faster and Cheaper):** Fully autonomous vehicles, car-as-a-service fleets, and aerial ridesharing (flying cars) will be fully operational in most major metropolitan cities in the coming decade. The cost of transportation will plummet 3-4X, transforming real estate, finance, insurance, the materials economy, and urban planning. Where you live and work, and how you spend your time, will all be fundamentally reshaped by this future of human travel. Your kids and elderly parents will never drive. Already, a half dozen eVTOL companies have gone public raising >$10B to fuel their growth. These vehicles are real and will help define the decade ahead.

**This Metatrend is driven by the convergence of the following**: machine learning, sensors, materials science, battery storage improvements, and ubiquitous gigabit connections.

**(13) On-demand Production and On-demand Delivery Will Birth an “Instant Economy of Things”:** Urban dwellers will learn to expect “instant fulfillment” of their retail orders as drone and robotic last-mile delivery services carry products from local supply depots directly to your doorstep. Further riding the deployment of regional on-demand digital manufacturing (3D printing farms), individualized products can be obtained within hours—anywhere, anytime.

**This Metatrend is driven by the convergence of the following**: networks, 3D printing, robotics, and AI.

**(14) Ability to Sense and Know Anything, Anytime, Anywhere:** We’re rapidly approaching the era wherein 100 billion sensors (the Internet of Everything) is monitoring and sensing (imaging, listening, measuring) every facet of our environments, all the time. Global imaging satellites, drones, autonomous car LIDARs, and forward-looking augmented reality (AR) headset cameras are all part of a global sensor matrix, together allowing us to know anything, anytime, anywhere. In this future, it’s not “what you know,” but rather “the quality of the questions you ask” that will be most important.

**This Metatrend is driven by the convergence of the following**: terrestrial, atmospheric, and space-based sensors, vast data networks, 5G communication networks, next-gen Wi-Fi, and machine learning.

**(15) Disruption of Advertising:** As AI 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 our AIs to make most of our buying decisions, turning over shopping to AI-enabled personal assistants. Your AI might make purchases based upon your past desires, current shortages, conversations you’ve allowed your AI to listen to, or by tracking where your pupils focus on a virtual interface (i.e., what catches your attention). As a result, the advertising industry—which normally competes for *your* attention (whether at the Superbowl or through search engines)—will have a hard time influencing your AI.

**This Metatrend is driven by the convergence of the following**: machine learning, sensors, augmented reality, and 5G/networks.

**(16) Cellular Agriculture Moves from the Lab into Inner Cities, Providing High-quality Protein that is Cheaper and Healthier:** This next decade 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, with far higher nutritional content, and a vastly lower environmental footprint than traditional livestock options. To support this area, the XPRIZE has launched a $15M “Feed the Next Billion” competition focusing on fish and chicken.

**This Metatrend is driven by the convergence of the following**: biotechnology, materials science, machine learning, and agtech.

**(17) High-bandwidth Brain-Computer Interfaces (BCI) Will Come Online for Public Use:**Technologist and futurist Ray Kurzweil has predicted that in the mid-2030s, we will begin connecting the human neocortex to the cloud. This next decade will see tremendous progress in that direction, first serving those with spinal cord injuries, whereby patients will regain both sensory capacity and motor control. Yet beyond assisting those with motor function loss, several BCI pioneers are now attempting to supplement their baseline cognitive abilities, a pursuit with the potential to increase their sensorium, memory, and even intelligence. Recent demonstrations of a macaque monkey playing Pong using a Neuralink implant is proof of incredible progress. Add to this the breakthrough work of Dr. Mary Lou Jepsen using red laser light holography to read and write onto brain neurons, and we have the making for an incredible future.

**This Metatrend is driven by the convergence of the following**: materials science, AI/machine learning, and robotics.

**(18) High-resolution VR** **Will Transform Both Retail and Real Estate Shopping & the Future of Education:** High-resolution, lightweight virtual reality headsets will allow individuals at home to shop for everything from clothing to real estate—all from the convenience of their living room. Need a new outfit? Your AI knows your detailed body measurements and can whip up a fashion show featuring your avatar wearing the latest 20 designs on a runway. Want to see how your furniture might look inside a house you’re viewing online? No problem! Your AI can populate the property with your virtualized inventory and give you a guided tour. On the education front, the use of VR and AI-driven avatars with technology such as that demonstrated by Dreamscape promises a future of game-like, immersive, and powerful education and training.

**This Metatrend is driven by the convergence of the following**: VR, machine learning, and high-bandwidth networks.

**(19) Increased Focus on Sustainability and the Environment:** An increase in global environmental awareness and concern over global warming will drive companies to invest in sustainability—both from a necessity standpoint and for marketing purposes. Breakthroughs in materials science, enabled by AI, will allow companies to drive tremendous reductions in waste and environmental contamination. One company’s waste will become another company’s profit center. A key example of this area of focus is the recent launch of the $100M XPRIZE Carbon Removal that has been funded by Elon Musk. Thousands of prospective teams have hit our XPRIZE website and many hundreds have registered thus far.

**This Metatrend is driven by the convergence of the following**: materials science, AI, CRISPR, digital biology, and broadband networks.

**(20) CRISPR and Gene Therapies Will Minimize Disease:** Perhaps one of the most powerful, underappreciated technologies in the world is CRISPR. In 2020, two incredible women won the Nobel Prize in medicine for its discovery, and revenues from CRISPR doubled between 2019 and 2020 to over $1.5B. A vast range of infectious diseases, from AIDS to Ebola, are now potentially curable, as are a wide range of genetic ailments like sickle cell anemia, thalassemia and certain forms of congenital blindness. In addition, gene-editing technologies continue to advance in precision and ease of use, allowing families to treat and ultimately *cure* hundreds of inheritable genetic diseases.

**This Metatrend is driven by the convergence of the following**: various biotechnologies (CRISPR, Gene Therapy), genome sequencing, and AI.

In the decade ahead, master entrepreneurs will look beyond the immediate effects of a given technology to seize second-order, Google-sized business opportunities on the horizon.

As an entrepreneur, you should be asking yourself: What challenges or problems can I solve? How can I leverage the coming waves of tech advancements?

**ENTREPRENEURSHIP IS NON-LINEAR*… AND GRIT IS YOUR FRIEND***

By: Peter Diamandis

Today’s blog is about “GRIT"… one of the most critical attributes of being a successful entrepreneur.

*So, what is grit?*

Grit is refusing to give up. It’s persistence. It’s making your own luck.

Entrepreneurial success is *almost always* harder than you think and almost always takes longer than you expect.

But that’s also why it’s *fun*. It’s a challenge that you have to throw your whole life into, and when you get it right, the rewards are well worth the effort.

*Let's dive in...*

Let’s look at the non-linear trajectories and sometimes crazy paths to success of a few well known billion-dollar companies: Airbnb, Instagram, and Pinterest.

**First, Airbnb**:

Here are some of my favorite highlights:

* Two co-founders can’t make rent and decided to rent out their spare bedroom.
* They launched at SXSW in 2007 and only got TWO bookings.
* They had to sell Obama “O’s” CEREAL at $40 a pop to keep the lights on, a service that wasn’t even remotely related to their core business.
* They were making $200 a week for months and NOT GROWING.
* They pitched and were REJECTED by many VCs along the way.

Thankfully, they stuck with it. Their little idea is now a public company with a market cap over $90B.

**Next, let’s look at Instagram**:

Some highlights:

* Kevin (co-founder) learns to code after work.
* He builds an app called Burbn that did everything from check-ins to photos.
* Didn’t work, so he decided to just focus on photos and built a different app…
* It didn’t work, so they went back to Burbn…
* Iterated again, scrapped everything, simplified, and renamed it Instagram.

The photo sharing app was acquired by Facebook for $1 billion. And it’s now estimated to be worth $100B.

**And finally, here’s Pinterest**:

A few of my favorite highlights:

* In 2008, Ben (co-founder) hates his job, quits, but doesn’t know what he wants to build.
* Built an app called Tote, and it flopped.
* Decided to try a new idea, a site for collecting things…
* Rejected by lots of investors.
* Makes 50 different versions of the site.
* Launches site and gets 200 initial users.
* Personally writes emails to first 7,000 users (whew!), and in doing so, finds his early adopters to be “moms.”

Pinterest is now a public company with a market cap over $50B.

*All* these companies started as little ideas.

Then, through the combination of hard work, determination, experimentation, GRIT, timing, luck and a lot of drama, these companies stumbled their way to become billion-dollar powerhouses.

**2 PERSONAL STORIES: ZERO-G & XPRIZE**

In my life, over the course of 24 companies, this story has been the norm. Two of the companies I’ve founded or cofounded have taken 10+ years to really get going.

Here are their stories (in brief):

**Zero-G Story**:

In 1993 I wanted to fly on NASA’s Zero-G plane… but as much as I tried, they told me no.

My response (as usual) was okay, screw it, I’ll start a zero-g company myself. So… I did, along with Byron Lichtenberg and Ray Cronise, and in May 1993 we had our first meeting with the FAA.

Their response? "What? YOU WANT TO DO WHAT? Put 30 people in an airplane, take off their seat belts, put the plane into a dive and have them float around the cabin? What, are you crazy?”

***It took us 11 years*** of hard work, test flights, lobbying and outlasting bureaucrats to become operational, finally in September of 2004.

Since then I’m proud to say that we’ve flown *over 15,000 people ranging from age 7 to 93*, including the late, great Professor Stephen Hawking (giving the world’s expert in gravity the experience of zero-gravity was the experience of a lifetime!).

**XPRIZE Story**:

I first read Charles Lindbergh’s *Spirit of St. Louis* book in 1994. The idea of the XPRIZE came to mind and I started the Foundation.

And in May of 1996, without any prize money in hand, we announced the $10M XPRIZE anyway under the Arch in St. Louis.

I thought for sure that someone would fund the purse. After all, you didn’t have to pay the money until AFTER the prize was won.

But what occurred next was 5 years of continuous “NO’s"… I pitched 150+ sponsors and potential donors who all said it was too dangerous, or that it would never work, or that spaceflight was only for governments.

Finally (long story), I met the Ansari family who funded the purse (we named it the $10M Ansari XPRIZE in their honor), and a few years later on October 4th, 2004 the Ansari XPRIZE was won.

***It took 10 years***, from concept to Prize Award…

And after the first XPRIZE succeeded, things got much, much easier. Larry Page and Elon Musk joined our board of Trustees, and we started launching a lot more competitions.

And today, as we are hitting our stride with over $250M worth of XPRIZEs, the Foundation is now 27 years old!

**TIMING, EXPERIMENTATION & ITERATION**

It’s rare for a company to "get it right” on the very first try.

Most companies and entrepreneurs need experimentation and iteration to really find product-market fit and strike a chord with the business.

And as I’ve said before, it’s often about timing.

**Here is the key**: If you can survive long enough, and you are constantly iterating, experimenting, and improving your business, then eventually the timing will be right!

To get there, you *need* GRIT.

This was the case with all the companies outlined above.

If you believe in your vision, if you’re building your company because it is part of your Massively Transformative Purpose (i.e. you're not just doing it for the money), then don’t give up.

Keep trying, keep testing, keep iterating, and eventually you’ll get it right.