

Understanding the Exponential Pace of Change – What Does it Mean for YOUR Context?

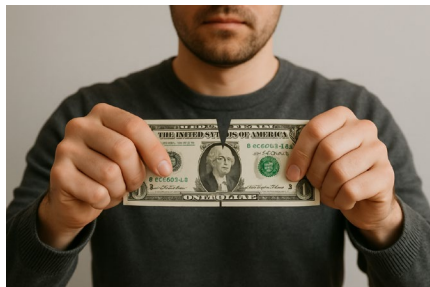
I've done a number of speaking engagements and webinars over the years, and in the field of innovation management the impact of the pace of change on innovation (and the impact of *innovation on the pace of change*) is of interest to the audience. When I get questions in this area, I find that not everyone can bring the discussion into their own context in a meaningful way.

I have been around for a while; my technical career started over 40 years ago when I was writing assembler programs using 80-column Hollerith punch cards to feed into the mainframe via card reader. Today, my ICS Labs division has been working on Convolutional Neural Networks, Agentic AI, Autonomous and self-directed agent workflow orchestration, and more. *In between* those two data points, there has been an *enormous* amount of change, and I have experienced it in meaningful ways. Until not too long ago that change occurred at a pace that was relatively easy for a technologist to absorb. But, as the law of exponents dictates, there are limits to what one can absorb as the rate of knowledge increases; it is something we *all* face.

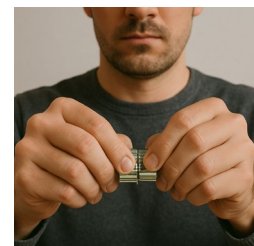
It's not just us "old fogies" that are hitting it; there are *many* in the workplace today that began their professional careers within the last 8-10 years (long *after* the iPhone was introduced), and while they experience the same frenzied pace of change, they have *not yet* experienced the number of technological *epochs* that those of us who have been around a bit longer have experienced. That doesn't mean they won't be impacted in a similar manner; in fact, the effects they will experience over the remainder of their careers will be *far more pronounced* than those that I have experienced.

This is due, of course, to the point on which we both entered technology's exponential timeline. So, I find it useful to provide some *easily digestible* visualizations that will help everyone *contextualize* the pace of change, and to then consider the potential impacts to business, the economy, technology and society.

One of the ways I do this in front of an audience is to take a dollar bill, tear it in half, and place the two



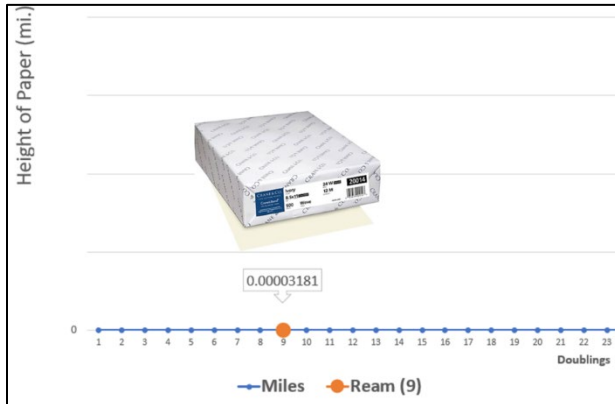
pieces together in a new stack – the demonstration of an exponential function. I repeat the process several more times, and by the 6th doubling, it becomes physically impossible (at least for me!) However, people can see that the original .01-centimeter dollar would then be a full half-inch thick stack. If I doubled it just 3 more times, the thickness of the stack would be around 2 inches tall - about



the thickness of a ream of paper (keep in mind, a ream of paper typically contains 512 sheets.)

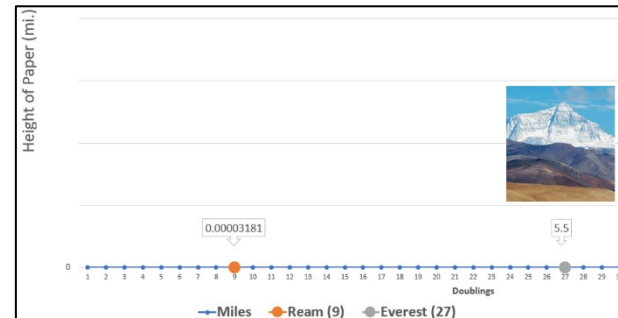
Now, start visualizing these doublings *in the context of the technological timeline*. For that, we need a baseline. Let's say our technological timeline begins at the start of the industrial revolution in 1790 –

some 235 years ago. Plotted out, the timeline would look something like the following graphic. Zero on the horizontal axis is the start of the industrial revolution. The vertical axis represents the height of the stack of paper being doubled (*in miles*), and the horizontal axis progression would be the number of doublings performed. You might think it strange to represent the height of a ream of paper in miles but just wait...you'll understand in a moment.

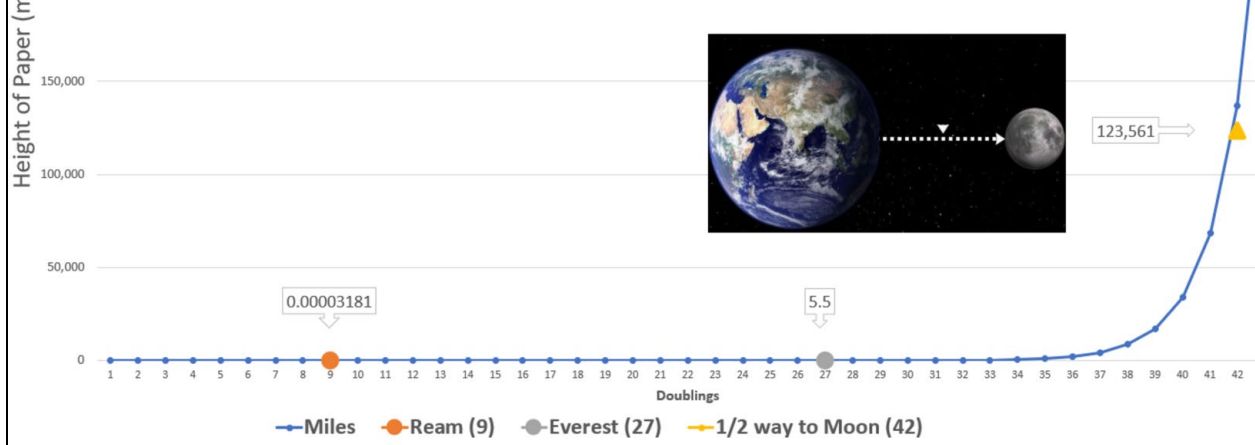


And yet, on the technological timeline, both the 9th and the 27th doubling are *indistinguishable from zero*.

However, if we add the vertical axis values to represent what will happen if we double it 15 more times, it becomes self-evident – and then the lightbulbs start going off:



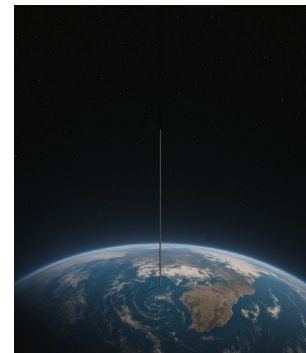
And yet, on the technological timeline, both the 9th and the 27th doubling are *indistinguishable from zero*.



The original .01cm dollar, halved and doubled a mere 42 times, would have grown to a height of over 123,000 miles.

Literally, halfway to the moon. So, what happened? How did we go from being indistinguishable to zero on the x-axis at 27 doublings to halfway to the moon at 42?

The Approach to the Vertical Asymptote.



If I double that dollar 18 more times, that stack would then be 5 ½ miles tall – *taller than Mt. Everest!* In other words, a single dollar halved and doubled *a mere 27 times* would create the largest structure on the planet.

Coming back to the beginning of this article, I commented on whether it was the impact of the technological pace of change on innovation, or innovation’s impact on the technological pace of change. And, that’s the whole point.

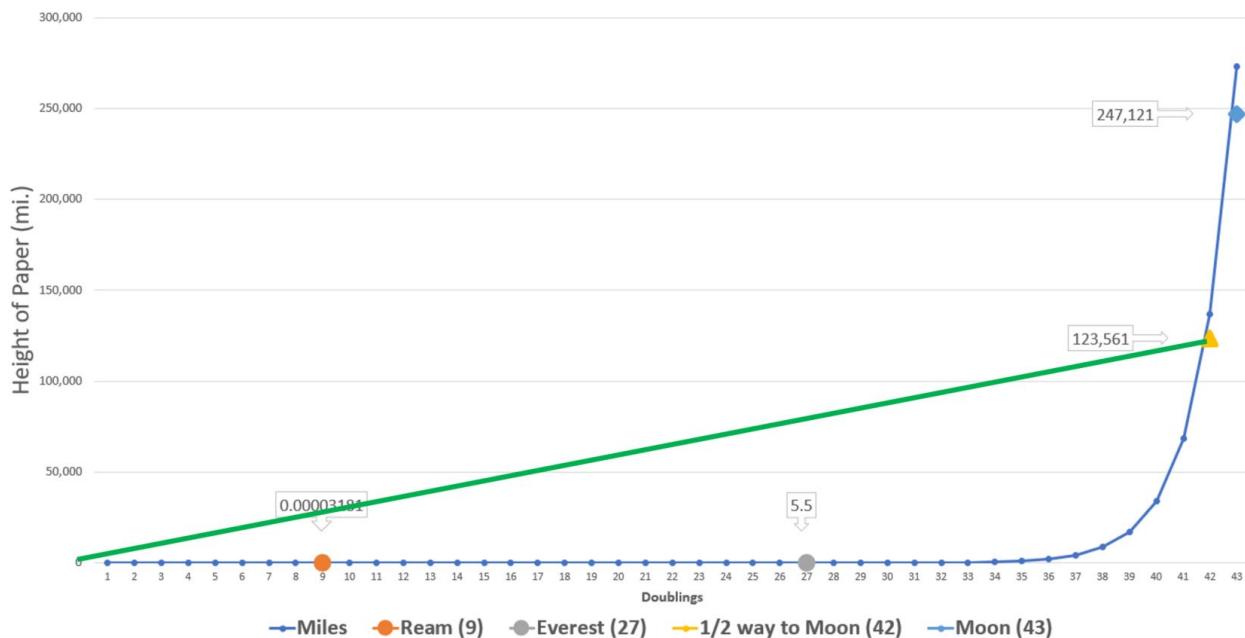
What people typically do not consider until they see a visualization is that as we move *right* along the x-axis (into the future), the technological changes introduced *in each jump* (every axis point is roughly a 5.4 year period from the start of the industrial revolution) represents an **aggregate set of innovation-enabling capabilities**. In other words, the *more* we innovate, the *better* we innovate – and the better we innovate the *faster* we innovate, etc. Each new technological advance supports more innovation, at a faster pace, until we are literally in an exponential technological race - to *infinity*.

And guess where we are now, in 2025?

That 42nd doubling? That’s today → Quantum computing, AI, ML, Autonomy, Augmented Reality, Robotics, etc.

Now, consider ALL of the technological *and societal* ramifications that have occurred between those 42 doublings. How many times has society shifted under the weight of these changes over the last 235 years?

Those 235 years represent an IMMENSE amount of change and adaptation across the entire world:

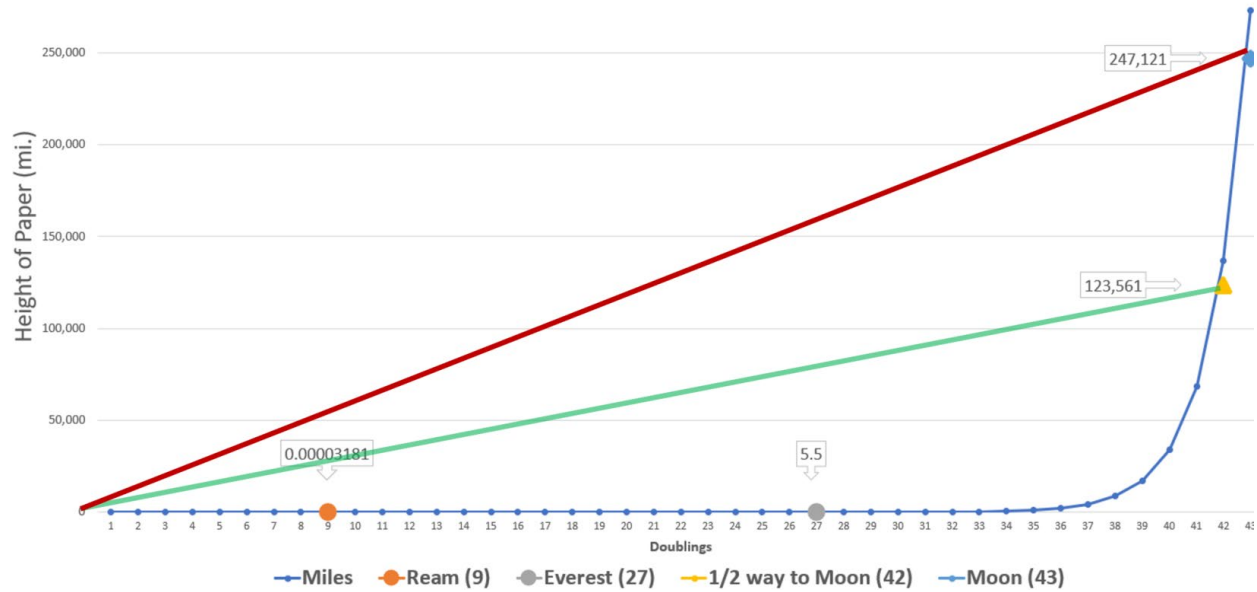


Everything under that green line represents all technological change and societal adaptation over the last 235 years.

Double that **one** more time, and in the space of the next 5.4 years – roughly 2030 as Langdon Morris, Moses Ma, Dr. Carole Grojean and I called out in our book, “[The AI Future](#)”, the IMPACT of ALL those advancements and disruptions to society happens all over again.

All of the ramifications from the industrial revolution until today, within the next 5.4 years.

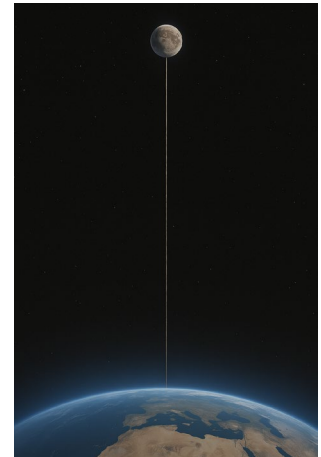
Take a look:



Can you swallow that? Can you fathom it? Do you feel like you can't keep up? That things are changing so fast that everything is passing you by? You are not alone.

In terms of the technological timeline, my professional career started around the 36th doubling – just when the curve started to lift off the x-axis. Wherever *yours* started on the timeline, the only piece of advice I can offer is this: You can't experience it all. You can't understand it all.

*Find what matters to your context, grab a hold, and ride that wave.
Otherwise, you'll be lost at the vertical asymptote.*



You have 5.4 years till the stack hits the moon. Good luck!

I'll be in my garden. 😊