Exponential Times – Applying Christian Discernment

Kerby Anderson discusses some of the trends in our rapidly changing world, calling for Christians to "understand the times" with discernment.

You may have seen the YouTube video asking, "Did you know"? Sometimes it has the title "We are living in exponential times." I want to look at some of the trends that illustrate the fact that we live in exponential times. While I will use the video as a starting point, I will also be citing other authors and commentators as well.

The video begins by talking about population. How often we forget that there are countries like China and India that have a billion people. For example, the video says that if you are one in a million in China, there are thirteen hundred other people just like you. That is because there are over a billion people in China.
The video also points out that twenty-five percent of India's population with the highest IQs is actually greater than the total population of America. Put another way, India has more honors kids than America has kids.

This reminds me of a statement in *The World Is Flat* by Thomas Friedman. He says that when he was growing up his parents would tell him "Finish your dinner. People in China and India are starving." Today he tells his daughters, "Girls, finish your homework—people in China and India are starving for your jobs."{1}

Consider the population explosion. There were one billion people in 1800. We did not reach two billion until 1930. The planet had three billion people in 1960 and four billion in 1975. We reached five billion people in 1987 and six billion

people in 1999. It is estimated that the planet will hold seven billion people in 2012.

Of course, life expectancy has been going up, and this is changing the demographic of various countries. Many more people are living to age 100 and beyond. For example, there were only two hundred centenarians in France in 1950. The number is projected to reach a hundred fifty thousand by year 2050. That is a seven-hundred-fifty-fold increase in one hundred years.{2}

Or consider the United States population increase in this demographic group. In 1990, there were approximately, thirty thousand centenarians. Some believe that estimate may be a bit too high, but it provides an approximate baseline. The U.S. Census Bureau estimates there will be two hundred sixty-five thousand centenarians by 2050.{3}

One last trend is that world population growth is slowing down as populations are aging. Demographers tell us that we need 2.1 children per woman to replace a population. Back in the 1950s, the average number of babies per woman of child-bearing age was 5.0 but has been dropping ever since. It will most likely reach 2.3 in 2025.{4}

In the developing world, fertility is already moderately low at 2.58 children per woman and is expected to decline further to 1.92 children per woman by mid-century.{5} While only three countries were below the population replacement level of 2.1 babies in 1955, there will be one hundred and two such countries by 2025.{6}

Exponential Growth

What is the impact of exponential growth on society? Richard Swenson argues in his book *Margin* that this has created unprecedented problems for us:

> *One major reason our problems today are unprecedented is because the mathematics are different. Many of the linear lines that in the past described our lives well have now disappeared. Replacing them are lines that slope upward exponentially.{7}*

Exponential growth is very different from arithmetic growth. We live our lives in a linear way. We live day-to-day, week-to-week, month-to-month. But the changes taking place around us are increasing not in a linear way but in an exponential way.

Exponential growth is not something that we would consider intuitive. Scott Armstrong demonstrated that when he asked a graduate class of business students the following question. If you folded a piece of paper in half forty times, how thick would it be? Most of the students guessed it would be less than a foot. A few guessed it would be greater than a foot but less than a mile. Two students guessed it would be great than a mile but less than two thousand miles. The correct answer is that the paper would be thick enough to reach from here to the moon.{8}

This is the challenge of living in exponential times. If the graph is linear, we have a fairly good grasp of what that will mean for us in the future. When the graph curves upward exponentially, we have a difficult time comprehending its impact.

But will the graph continue to trend upward? It will until it reaches some limit. Eventually there is an upper limit to most of the trends we are seeing. Objective things (people, government buildings, and organizations) have limits. Subjective things (relationships, creativity, and spirituality) also have limits.

At this point the curve changes from a J-curve to an S-curve. The exponential slope begins to flatten and reach a new

equilibrium. Eventually there is a turning point at which the upward curve no longer grows exponentially. Finally, the curve levels as growth and limits reach an equilibrium.

One of the challenges of living in exponential times is that the various trends are at different points on the curve. The amount of new information seems to be exploding exponentially and looks like a J-curve. The number of e-mails you receive might not be growing exponentially like it did a few years ago but may still be increasing. Population in many developing countries has been leveling off (and often decreasing), and so the graph looks more like the S-curve. All of these trends are at different parts of the curve and are happening simultaneously. Thus, it is often difficult for us to comprehend what this means to us personally.

Futurists who are trying to understand what will happen in the future are faced with an even more daunting task. If they look at each trend in isolation, they can begin to get an idea of what might happen. But as soon as someone tries to integrate all of these trends into a comprehensive whole, the future becomes blurred.

Trying to integrate all the various trends (many growing exponentially) creates a challenge for anyone trying to accurately predict the future. We might know the individual trends, but trying to integrate hundreds of trends into a comprehensive picture is difficult, if not impossible.

Warnings About Exponential Growth

In the past, a number of authors have warned about the dangers of exponential growth. And because their predictions did not come to pass, the concept of exponentiality and its impact have faded from current discussion.

In the early nineteenth century, Thomas Malthus wrote his famous *Essay on the Principle of Population* in which he argued

that population growth would outstrip food production. He reasoned that population would grow exponentially while food production would merely grow arithmetically. Thus, he predicted a future crisis due to this exponential growth.

In 1968, Stanford biologist Paul Ehrlich published his controversial best-seller, *The Population Bomb*. He also noted that population was growing exponentially and made numerous predictions about catastrophes that would befall the human race in the 1970s and 1980s.

Dennis Meadows and others with a group known as The Club of Rome published their report in the book *The Limits to Growth*. The authors used a computer simulation to consider the interaction of five variables (world population, industrialization, pollution, food production and resource depletion). By changing the various assumptions about population and resources, they predicted various dire scenarios for the future.

Of course these doomsday predictions never came to pass. So it was inevitable that discussion and warning about exponential growth were no longer published on the front pages of newspapers and newsmagazines.

Another reason we have ignored the potential impact of exponential growth is due to the remarkable technological achievements of the twentieth century. Automobile manufacturers have been able to significantly increase gas mileage in cars. Petroleum engineers have been able to find more effective and efficient ways to pull oil from the ground. Farmers and scientists have essentially tripled global food production since World War II, thereby outpacing even population growth.

Nevertheless, there are indeed limits to growth. If we understand what those limits are and work within them, then the future will be bright. If we ignore them, the human race

could be in for some rough times. Harvard biologist E.O. Wilson expressed this dichotomy when he asked, “Are we racing to the brink of an abyss, or are we just gathering speed for a takeoff to a wonderful future? The crystal ball is clouded; the human condition baffles all the more because it is both unprecedented and bizarre, almost beyond understanding.”{9}

Columnist Tom Harper is more pessimistic: “Currently we are behaving like insane passengers on a jet plane who are busy taking all the rivets and bolts out of the craft as it flies along.”{10}

Whatever our future, it is certain that is will be more complex than ever before. And it will be a world in which information has exploded exponentially.

Information Explosion

One aspect of exponential times is the information explosion. The YouTube video by the same title reminds us that information is exploding exponentially. For example, it points out that there are thirty-one billion searches on Google every month. The best estimate is now there are about thirty-six billion searches on Google each month. In 2006, it was 2.7 billion. That’s a thirteen-fold increase in just three years.

In order to keep up with this information explosion, engineers have been working at a breakneck pace to increase the efficiency and capacity of computers and other devices that process and store information. Every year, fifty quadrillion transistors are produced. That is more than six million for every human on the planet.{11}

Look at the exponential growth of Internet devices. In 1984, there were a thousand. By 1992, there were one million. By 2008, there were one billion and the number is about to exceed two billion. Some experts believe that there will be fifteen billion Intelligent Connected Devices by the year 2015.{12}

The YouTube video estimates that a week's worth of *The New York Times* contains more information than a person was likely to come across in a lifetime in the eighteenth century. This figure is more difficult to quantify even though it, or variations of it, is cited all the time.

In fact, this may be our biggest challenge in the twenty-first century. There is so much information that most of us are having a difficult time trying to make sense of all the data. Facts, figures, and statistics are coming at us at an accelerating rate. That is why we need to evaluate everything we see, read, and hear from a Christian worldview in order to make sense of the world around us.

One last point is that most of this information is still in the English language. The YouTube video says that there are about 540,000 words in the English language. And this is five times as many words as in the time of Shakespeare.

It turns out that these estimates may be a bit off. Part of the problem is deciding what constitutes a word. After all, we have so many derivatives of a word and we have many words that have multiple meanings. Do you count the word or the various meanings of a word?

Let's start with the English vocabulary at the time of Shakespeare. We know how many words he used. If you count all the words in his plays and sonnets there are 884,647 of them. The estimate for the number of different words he used varies from eighteen to twenty-five thousand. I might also mention that it appears that Shakespeare coined or invented about fifteen hundred new words. Even so, it seems like the estimate that there were a hundred thousand English words in Shakespeare's time might be too high.

Do we have over five hundred thousand words in the English language today? Again, it depends how you count words. The largest English dictionary has about four hundred thousand

entries. A more realistic number is around two hundred thousand. The latest edition of the *Oxford English Dictionary* contains entries for 171,476 words in current use, and 47,156 obsolete words.

Nevertheless, English has become the language of choice for the world. Approximately three hundred seventy-five million people speak English as their first language. Another seven hundred million speak English as a foreign language. English is also the language most often studied as a foreign language in the European Union. English is more widely spoken and written than any other language.

English is the medium for eighty percent of information stored in the world's computers. English is the most common language used in the sciences as well as on the Internet. Not only have the number of English words expanded since Shakespeare's time, its influence has expanded as well.

Exponential Times and a Biblical Worldview

The Bible tells us that we are to understand the times in which we are living. First Chronicles 12:32 says that the sons of Issachar were "men who understood the times, with knowledge of what Israel should do." Likewise we need to understand our times with knowledge of what we as Christians should do.

We have also been looking to the future by trying to plot trends from today into tomorrow. The Bible also tells us that we should plan for the future. Isaiah 32:8 says that "the noble man devises noble plans, and by noble plans he stands." Proverbs 16:9 says "the mind of man plans his way, but the Lord directs his steps." So we should not only plan for the future, but commit those plans to the Lord and be sensitive to His leading in our lives.

When you live in a world that is increasing exponentially, you have to be ready for change. In fact, it is probably true that most of us now expect change rather than stability in our world. Not so long ago, there were those telling us that change would shock our senses and disorient us.

As commentator Mark Steyn points out, we developed a whole intellectual class of worriers. He says:

> *The Western world has delivered more wealth and more comfort to more of its citizens than any other civilization in history, and in return we've developed a great cult of worrying. You know the classics of the genre: In 1968, in his bestselling book The Population Bomb, the eminent scientist Paul Ehrlich declared: "In the 1970s the world will undergo famines—hundreds of millions of people are going to starve to death." In 1972, in their landmark study The Limits to Growth, the Club of Rome announced that the world would run out of gold by 1981, of mercury by 1985, tin by 1987, zinc by 1990, petroleum by 1992, and copper, lead and gas by 1993.{13}*

Obviously none of that happened. But we shouldn't dismiss the potential impact of exponential growth, but learn to be more careful in our predictions.

> *I believe one of the greatest challenges for Christians will come from the information explosion. Not only are we inundated with facts, figures, and statistics, but we must also confront various philosophies, worldviews, and religions. It is absolutely essential that Christian develop discernment. We must work to evaluate everything we see, read, and hear from a Christian worldview.*

This is one of the foundational goals of Probe Ministries. We are dedicated to helping you to think biblically about every area of life. I would encourage you to visit the Probe website

(www.probe.org) to read other articles. You can also get a podcast of this program or any other program, and even sign up for the *Probe Alert*.

Kerby Anderson discusses some of the trends in our rapidly changing world, and calls for Christians to 'understand the times' with discernment.We live in a world of change. And as I have discussed above, many of these changes are not linear but exponential. May all of us be found faithful in speaking biblical truth to a culture in the midst of change.

Notes

1. Thomas Friedman, *The World is Flat: A Brief History of the Twenty-First Century* (New York: Farrar, Straus and Giroux, 2005), 237.

2. "50 Facts: Global health situation and trends," World Health Organization, 1998.

3. "Centenarians in the United States," U.S. Census Bureau, 1999.

4. "50 Facts: Global health situation and trends."

5. "World population to increase by 2.6 billion over next 45 years," World Population Prospects, 24 February 2005.

6. "50 Facts: Global health situation and trends."

7. Richard Swenson, *Margin: How to Create the Emotional, Physical, Financial, and Time Reserves You Need* (Colorado Springs: NavPress, 1992), 44.

8. Scott Armstrong, *Long-Range Forecasting: From Crystal Ball to Computer* (NY: Wiley, 1985), 102.

9. E.O Wilson, "Is Humanity Suicidal?" *The New York Times Magazine*, 30 May 1993, 27.

10. Tom Harper, quoted by William Goetz, *Apocalypse Next: The*

End of Civilization as We Know It? (Camp Hill, PA: Horizon Books, 1996), 15.

11. George Gilder, “Happy Birthday Wired: It’s Been a Weird Five Years,” *Wired*, January 1998, 40.

12. “15 Billion Connected Devices – Powered by the Embedded Internet,” Small Forms Factors Blog, 28 April 2009.

13. Mark Steyn, “It’s the Demography Stupid,” *Wall Street Journal*, 4 January 2006.

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