

The End of the Internet Rush

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Abstract

The concept of natural growth in competition is being exploited to produce forecasts for the use of Internet worldwide. Population trends and Internet-user trends indicate that the percentage of the population using the Internet is slowing down everywhere despite large discrepancies: 68% in the US, 45% in Europe, and 8% in the rest of the world. Whereas new growth phases with slow rates of growth should be expected from the third world, the boom years of Internet explosion are over. Significant growth in the use of Internet in the rest of the world must await for a couple of decades.

Keywords: Internet use; Internet growth; Internet users; Logistic growth; World population; European Union formation

1. Introduction

Natural growth, otherwise referred to as organic growth, is typically evidenced by the S-shaped logistic pattern followed in the evolution of a species population. The law of natural growth can be invoked whenever there is growth in competition, for example rabbits filling an ecological niche in nature (a grass range). Forecasts based on such natural-growth processes benefit from the reliability ingrained in the natural law of competition. The better the agreement between the historical data and the S-shaped natural-growth pattern the more confident we can be that our forecast is reliable. There have been many successful forecast based on this approach [1]. The assumption made in this work is that both world population and the diffusion of Internet constitute competitive growth processes amenable to logistic description.

2. The use of internet

2.1. Worldwide

The world population has been following a logistic growth pattern very closely, see Fig. 1. The agreement between the theoretical curve and the data points over the entire 20th century is so good that it leaves little doubt about the forecasted trend.

Data on the number of Internet users, however, are less readily available. A number of data sources have been consulted for compiling a set as complete and as reliable as possible [2]. The data and the best-fit natural-growth curve are shown in Fig. 2. The agreement is not as good as in Fig. 1 and a new growth phase cannot be excluded in the future, after all logistic curves are known to cascade as new niches open up. Nevertheless the forecast in Fig. 2 should be reliable for a few years.

The logistic curves from Figs. 1 and 2 can be used to calculate a curve and a forecast for the percentage of the world population that uses the Internet. The curve thus calculated resembles a logistic and reaches a ceiling of 14% for the world users of Internet as a percentage of the world population, a discouragingly low figure.

This, however, is the situation during the first decade of the 21st century. Of course, there are large geographical differences with North America leading and the European Union (E.U.) following closely.

2.2. The United States

A similar analysis for US data leads to somewhat different results. Fig. 3 shows logistic fits to the population and the number of Internet users. As before the ratio of the two logistics thus determined yields the fraction of the US population that uses the Internet. This ratio indicates that the ceiling of US.

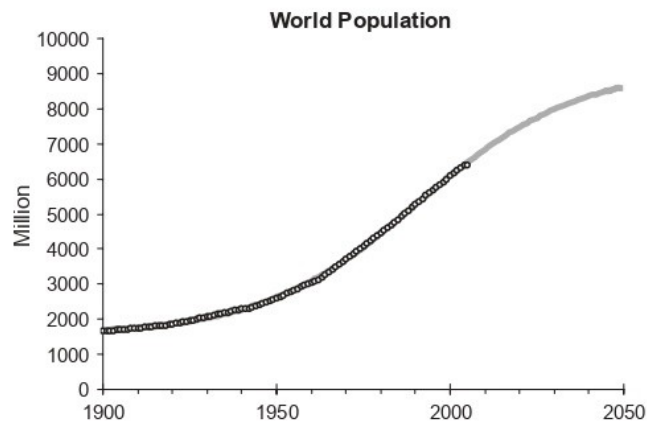


Fig. 1. A logistic curve (gray line) fitted on yearly data points of the world population.

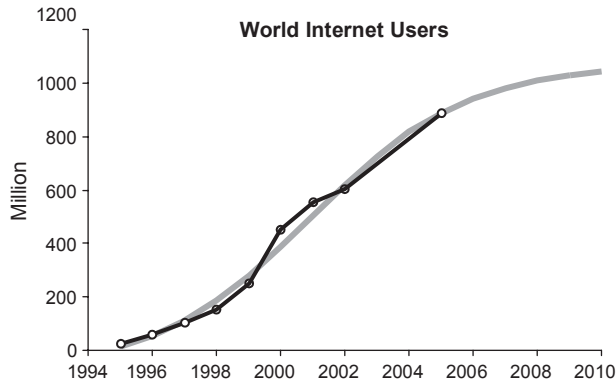


Fig. 2. Data and logistic fit on the number of Internet users worldwide.

Internet users has already been reached today with around 200 million people, i.e. 68% of the US population.

2.3. The European Union

The formation of the E.U. is shown in the top of Fig. 4. The graph at the left shows the logistic curve that best describes the data on the evolution of the E.U. population. It practically reaches a ceiling of 530 million people by 2020.

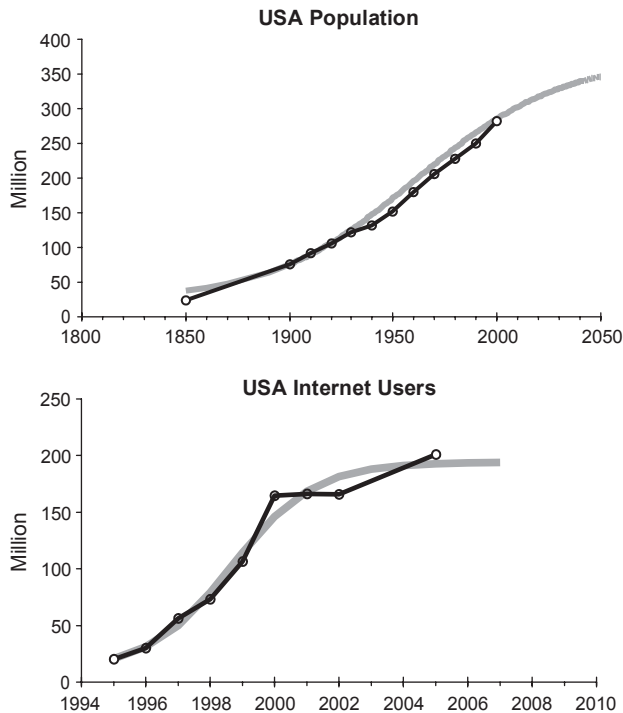


Fig. 3. Logistic fits on the evolution of the US population (top) and Internet users in the US (bottom).

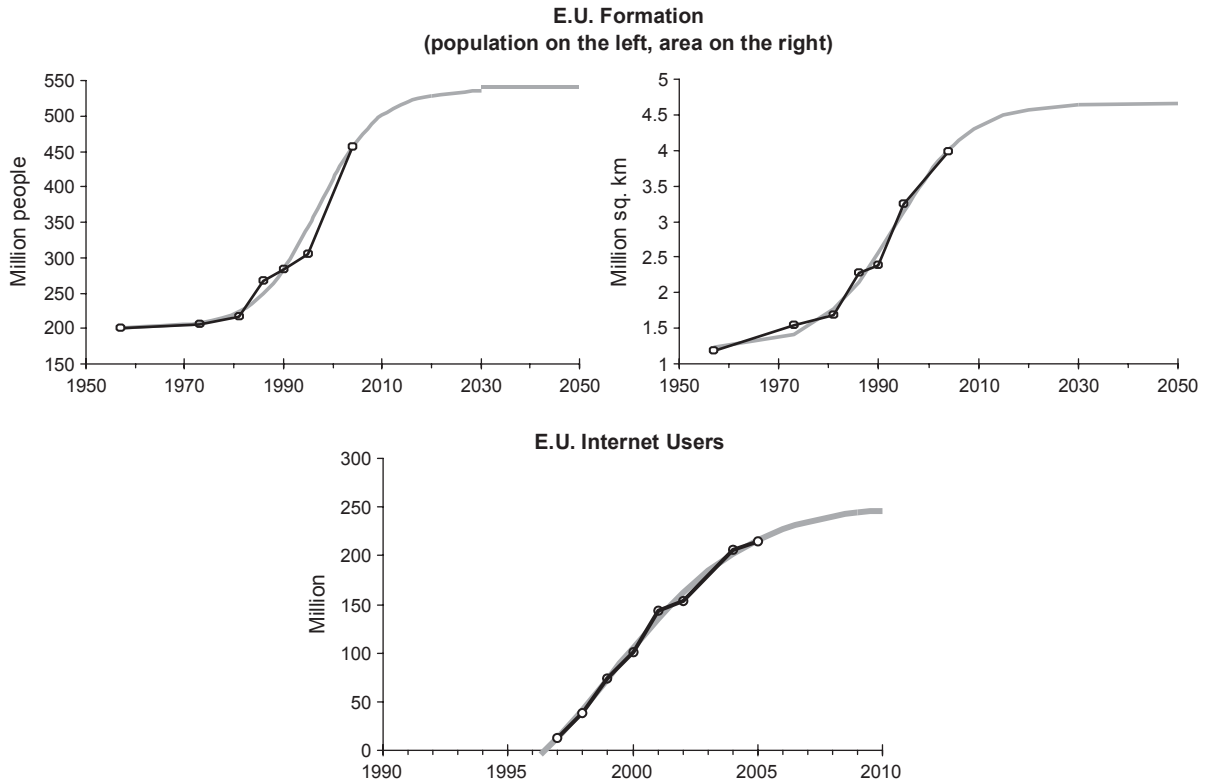


Fig. 4. Logistic fits on the formation of the European Union (top) and its Internet users (bottom).

It is not surprising that rate of growth of the E.U. population drops to zero in a few decades as many western European countries already have shrinking fertility rates. More surprising is that the completion of the E.U. population growth process is presently 85% completed and that between now and 2020 there is only about 80 million more people to be added. These numbers can barely accommodate the adhesion to the E.U. of the remaining European countries possibly including Switzerland. However, the

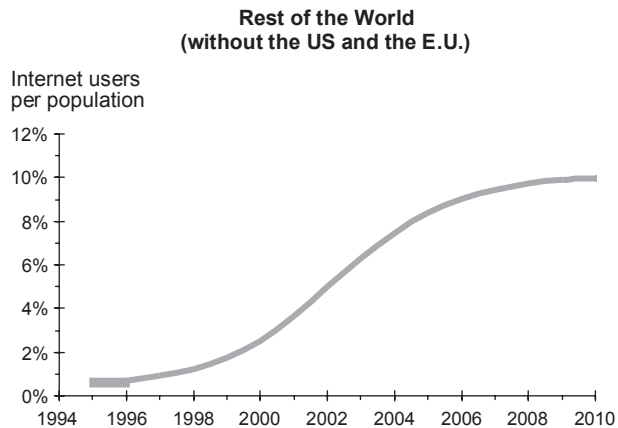


Fig. 5. The curve shown looks like a logistic but is not. It has been calculated from the logistic curves determined in Figs. 1–4.

adhesion of Turkey or other large such country seems to be excluded. This result is corroborated by the evolution of the surface area of the E.U., a growth process shown at the top right side of Fig. 4. It is also a natural-growth process completed to the level of 81%.

The evolution of Internet users in the E.U. is shown at the bottom of Fig. 4. The best-fitted logistic points to a ceiling of 253 million to be achieved around 2020. This brings the final number of E.U. Internet users to 48% of its population, not far from today's 45%.

2.4. Rest of the world

Having obtained growth curves for populations and Internet users of the world, the E.U. and the US, we can now calculate the Internet penetration for the part of the world outside the E.U. and the US. This part of the world includes developed countries like Japan, Australia, Hong Kong, and Russia, but is dominated by the masses of people with no access to Internet in Asia and Africa. The result as percentage of the population is shown in Fig. 5. The final ceiling of the growth process describing Internet users is at 9% of the population.

3. The logistic fits

From all the logistic fits in this paper only the first one in Fig. 1 can stand scientific scrutiny. The data in all the others carry large uncertainties and it would be pretentious to try to quantify the quality of those fits. It is clear, for example, that in Fig. 2 a logistic fit on the data up to 2002 would have resulted in a significantly lower final ceiling. Similarly, a future "deviation" of the data pattern may yield an even higher ceiling for the logistic.

But in all fits, the slowing down of the rate of growth is well-established, if only by visual inspection. And even as semi-quantitative determinations the logistics of Figs. 2–4 yield significant conclusions.

4. Conclusions

Natural-growth-process fits to the data imply that the percentage of the population using the Internet will not grow much in the coming years. In the US a ceiling of 68% of the population has already been reached, and the E.U. we expect to rise from today's 45% to 48% by the mid 2010s. In the rest of the world today's 8% will only grow to 9% in ten years.

It would be unreasonable to expect the percentage of the rest of the world to remain at this low level forever. The rest of the world includes such countries as Japan, Korea, Hong Kong, and Australia where the number of Internet users is already practically at maximum. But the rest of the world also includes Africa, China, and India, where one can be certain that the number of Internet users will eventually grow by a large factor. However, it will be some time before the necessary infrastructures are put in place there to permit Internet diffusion.

For the time being one may infer that the boom we have been witnessing in Internet expansion is over. The parts of the world that were ready for it have practically filled their niches whereas the parts of the world that were not ready for it need much preparatory work (infrastructures) and will therefore grow slowly.

The final percentage of Internet users may also reflect cultural differences. A percentage of 68% in the US compared to 48% in the E.U. might partially reflect missing infrastructures in some of the lesser-developed E.U. countries but most likely also reflects the different life styles. European society admits less change than American society. For example, there are fewer cars per inhabitant in Europe, and the Europeans never went (and never will go) to the moon. They will probably end up using the Internet less than Americans.

We can make a rough estimate of when the next Internet growth phase should be expected. Logistics that cascade harmoniously show periods of low and high growth of comparable duration [3]. Accordingly, and given that Internet has had a decade of rapid growth, a decade of low growth can reasonably be expected before a new rapid growth phase begins.

References

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 - The World Factbook (<http://www.cia.gov/cia/publications/factbook/>);
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