Is The Pace of Change Accelerating?

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What is the evidence to suggest that the pace of change is changing - what could the impact be of slowing down?

Introduction

Our recent past is one in which we have enjoyed an accelerating pace of change for about 40 years. It has become normal for us to assume that this will continue indefinitely into the future. The purpose of this piece is to question that assumption. Why could the pace of change stop accelerating? What could be the consequences of this? We will consider these questions in turn before drawing some tentative conclusions.

The pace of change and Moore's Law

The impression of an accelerating pace of change is supported both by the increasing deployment of information technologies and the growth in their uses and applications. More and more technology appears to become available each year. As we move into the future, there is no reason why technologies should not be smaller, faster, more compact, more connected, and cost far less than they do today.

This has led many observers to speculate about the shape of our technological future. They would point to the growing integration of machine and body and take the view that humans are becoming more machine-like in their functioning. For example, we take for granted now the use of pacemakers to augment the functioning of hearts. There are those who acknowledge this trend, but who point to some of the more uncertain consequences that it may bring. If we accept the continued operation of Moore's Law, then there will come a point where computing power could have sufficient capacity to become sentient. This is a rather radical and extreme view. The point to note is that it is based on the assumption that the pace of technology, as embodied in Moore's Law, will continue to accelerate.

Limiting the pace of change

In this currently prevalent view of the future, not only will the accumulation of technology grow, it will also happen at a faster rate. This may not be possible. For the pace of change to continue growing exponentially, there has to be no finite limit to the resources that provide the inputs to that process. I believe this assumption is questionable. For example, in current manufacturing processes, rare earth elements are critical to the production of much of the hardware that makes up the information age. By definition, these elements are rare - they are not completely abundant. Unless alternatives or new sources of the elements can be found, they could present a physical limit to the pace of change.

There are also those who call into question whether technological change is growing that fast in any case. From the perspective of absolute levels of technology, it has to be granted that we currently have the largest stock of tools to hand in the history of humanity. There are those who argue however, that this reflects the fact that we have more people on earth than ever before. If we look at the pace of technological change per capita, then some hold that the most productive period in history was the 1870s, and that the pace of technological advance per capita has been falling throughout the 20th century. If these people are right, then the pace of change is actually decelerating rather than accelerating.

Assessing the pace of change - what should we be measuring

This view is not without its critics. In the modern world, technological developments consist less of major breakthroughs and are more about the incremental enhancement of existing technologies. The per capita pace of change may appear to be slowing, but we are measuring the wrong thing. If we examine total technological development (new innovations plus improvements to existing technologies), we may find that the pace of change could be accelerating.

This leaves us in an interesting position. From the perspective of an individual person or business, what really matters is the ready availability of effective and useful technology at an affordable price. Evidence suggests that such availability comes and goes in waves. As a new wave emerges, it becomes integrated into existing business processes, delivering higher productivity and lowering the cost base. There is nothing to suggest that this process is abating. Eventually, it may be that the resource constraint kicks in. If it does, then the cost of technology will rise, thus altering the balance between the cost and usefulness of the technology. Businesses acting with foresight would have a contingency plan in place should that day arrive.

The maturing of technologies

This situation represents the maturing of a set of technologies and the businesses that provide them. With maturing technologies, the business environment will change. The key to competition will shift away from the pursuit of innovation and first mover advantage towards the exploitation of mass markets and the integration of the new technologies into an existing technology set. It is likely, for example, that the path to driverless cars will be through the existing car manufacturers, who have a mass distribution network, but who will need to integrate the innovations from technology companies into a current product range.

This suggests a world in which the path to scale is dominated by mergers and acquisitions (M&A) rather than the organic growth which technology companies have seen to date. This M&A activity is likely to be both horizontal (technology companies blending into each other) and vertical (existing sectoral market leaders acquiring technology companies in their value chain for their intellectual property portfolio, and vice-versa). All of this acts towards lowering the cost of the end product to the consumer.

The focus of all companies in the future is more than ever likely to be global in scope. As the urban middle class of the developing world expands, and as the cost of innovative technologies falls, we can forecast greater sales of a wider range of products to those consumers. This growth is not without challenges - at some point the resource constraint will start to apply, forcing up the cost of goods to the mass market. It is then that the pace of change would slow.

Conclusion

The assumption of an accelerating pace of change is probably justified for a little while yet. However, at some point it would be reasonable to expect the pace of change to slow down as technologies mature and resource constraints start to bite. It is important for business to be alert to this possibility because it could significantly change the operating environment.

Those in business might like to consider three questions to forewarn themselves of this change of trend. All of these could indicate that the pace of change is slowing, and business would do well to be forewarned of them:

- *How should your organization respond in the face of evidence that resource markets are tightening and resource constraints starting to apply?*
- *What strategies can you adopt if the evidence suggests that consumers are buying new technologies less frequently and that markets are heading towards saturation?*
- *If evidence suggests that obsolescence rates are falling, what are the implications for the frequency with which you replace operating equipment?*