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### Is the Internet a Maturing Market? If So, What Does That Imply?

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# Economic and Business Dimensions

## Is the Internet a Maturing Market?

*If so, what does that imply?*

**T**WO CONCERNS DOMINATE the current debates over U.S. Internet policy. The first is the relatively low level of U.S. broadband adoption. Although the U.S. once ranked 4th among industrialized nations in the percentage of residents subscribing to broadband, it has currently slipped into 15th place. Concerns that the U.S. may be losing its leadership position in this key industry have spurred a series of governmental initiatives to address the problem. The stimulus package enacted during the initial days of the Obama administration dedicated \$7.2 billion for new investments in broadband infrastructure. It also required the Federal Communications Commission to prepare a national broadband plan, which the agency released to much fanfare this past March. The plan is designed not just to ensure that broadband is available and affordable to all Americans, but also to devise ways to address the fact that a surprising number of house-

holds are not subscribing to broadband even when it is available.

The second is the debate over network neutrality. Network providers are experimenting with a variety of new business arrangements. Some are offering specialized services that guarantee higher levels of quality of service to those willing to pay for it. Others are entering into strategic partnerships that allocate more bandwidth to certain sources and applications.

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**The real question is not if the nature of competition and innovation will change, but rather how and when.**

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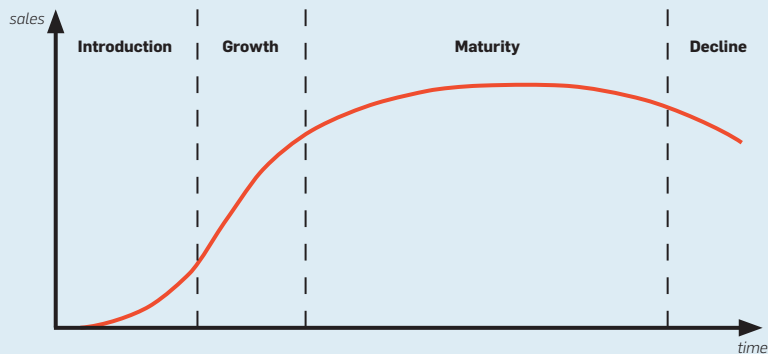
Interestingly, management literature exists suggesting that both developments may simply reflect the ways the nature of competition and innovation can be expected to evolve as markets mature. If applicable to the Internet, this literature has the potential to provide new insights into how to craft broadband policy and what steps business managers might take to prepare for the future.

### **Demand-Side Considerations: Product Life Cycle Theory**

The best-known theory of market maturation is known as the product life cycle. A central feature of every leading marketing textbook, product life cycle theory examines how the pattern of demand growth affects the nature of competition over time. Empirical research has confirmed that many, if not most, markets follow the pattern predicted by product life cycle theory.

The predominant version posits that new product markets pass through four distinct stages shown in the prod-



**The product life cycle.**

design theory, it posits that when a technological breakthrough first occurs, uncertainty fosters lack of product standardization, which provides little incentive to invest in advanced production processes. At some point the basic product features and technological characteristics coalesce into a dominant design. Innovation becomes less driven by trial and error and instead becomes more systematic and incremental. Other scholars have extended this analysis, suggesting that technological guideposts or paradigms emerge that direct research along particular avenues or trajectories. These technological trajectories frame the way each field determines which problems are worth solving and which technological solutions are likely to be the most promising. This impetus toward certain trajectories becomes more pronounced if a technology is embedded in a web of interdependent technological processes. The presence of such a design hierarchy establishes a technical agenda that channels subsequent innovation along particular lines. It also obstructs innovations that are

## Applying market maturation theory to the Internet comes with a number of limitations.

inconsistent with the existing architecture and can delay or prevent new architectures from evolving.

What does that have to do with the Internet? A growing number of technologists have noted the core architecture for the Internet, built around TCP/IP and its many extensions, is several decades old. They suggest the new demands being placed on the network are creating the need for fundamentally different design architecture. And as this theory would predict, they are finding that the standardization on a certain approach combined with the interconnected nature of the technologies comprising the architecture is limiting the Internet's ability to evolve to meet these new demands.

### Significance for Internet Policy and Business Strategies

The implications are myriad. The transformation of the Internet from an experimental testbed into a mass-market platform has made major architectural change more difficult, just as design hierarchy theory would predict. The flattening of revenue growth inevitably gives network providers incentive to experiment with increasingly specialized equipment, both to lower costs and to offer services targeted at particular subgroups of customers, just as product life cycle theory would predict. The desire to provide greater value to customers is creating greater interest in facilitating content providers' long-standing interest in monetizing content streams. At the same time, market maturation is causing firms to place greater emphasis on capturing a bigger fraction of the dollars that are available.

This theory also suggests that policymakers should be careful not to lock the Internet into any particular architecture or to reflexively regard deviations from the status quo as inherently anticompetitive. Such measures would reinforce the obstacles to architectural innovation that already exist. Instead, they should focus on creating regulatory structures that preserve industry participants' freedom to experiment with new solutions and to adapt to changing market conditions. Any other approach risks precluding the industry from following its natural evolutionary path and rendering the obstacles to architectural innovation that already exist all but insuperable.

Applying market maturation theory to the Internet comes with a number of limitations. Although the pattern of sales growth predicted by product life cycle theory is the most common, empirical research indicates that other patterns exist as well, which leads some to question the theory's generality. Others condemn these theories as self-fulfilling prophecies, as their widespread acceptance leads firms to manage their products in ways that cause these patterns to come true. Moreover, while key turning points are easy to identify in retrospect, they have proven quite challenging to anticipate far in advance.

Even if it is not always possible to anticipate precisely how the nature of competition and innovation will change, that both will change over time is a given. The real question is not if the nature of competition and innovation will change, but rather how and when. Business managers and IT professionals must not take for granted that the competitive dynamics and the technology underlying the industry today will still be in place tomorrow. Instead, they should look for indications that the market may be reaching saturation and plan for how their strategy and those of their customers and competitors are likely to change as these phase transformations occur. □

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