

Innovation in Economics

The Missing Pieces

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Chicago

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Innovation in the American Economy

The Advisory Committee recommends that the business community participate in research activities and, where appropriate[†], make innovation information available to government and academic researchers.

Recommendation on Measuring Innovation in the 21st Century Economy, Commerce (2008).

and earlier,

NBER Project on Industrial Technology and Productivity

The difficult tasks facing us we must do immediately, although the impossible ones may take some time. The impossible topic is quality change^{††}. Over the longer term I would like to see researchers begin to incorporate more of the research from the non-economics community.

Recommendation from Zvi Griliches to the project, Griliches (1999).

[†] Where public, by definition, Commerce (2007). An unfortunate exclusion of commerce's predominantly proprietary knowledge.

^{††} Quality in Economics is the functional performance of a consumer product. Changes in quality - especially from improvements using advancing industrial technology - remain impossible to measure within academic economics. This book delivers the missing pieces of this economic puzzle, and more.

Part Ia – A New Economic Equation

In the late 1980s Innovation Practitioners thought measuring innovation might be solved by Richard Foster's pioneering work at McKinsey on functional, or engineering performance, S-curves. Together with other pioneering work, this time by Fisher-Pry at General Electric, whose market penetration S-Curves were finding success in technology forecasting, it seemed that economic growth would become explainable from product succession alone. However, this was not realized because each S-curve treatment used completely different variables and existing literature, then as now, could not provide an economic link between them. To overcome this, the following commercial and economic knowledge is brought together. The resulting synthesis enumerates quality change from a foundational equation that opens the door on the economics of industrial technology and productivity. The obvious is algebraically confirmed. Innovation drives growth in the American Economy.

Starting from S-Curves

An S-Curve describes economically driven growth, rapid at first, but necessarily slowing down as it approaches a temporal barrier, or permanent upper limit.

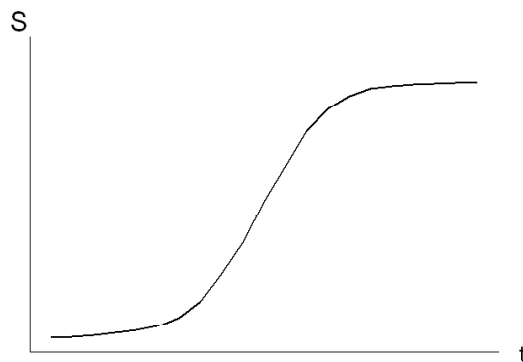


Figure 1 – Classic S-Curve

It's logical for growth to start fast and slow down¹, so many commodities fit this stretched S shape². When a particular and deceptively simple commodity, such as tire cord, is examined in great detail, new economics can emerge from it.

Applied to Tire Cords

Motorists are generally unaware that the quality of their ride is highly dependent on reinforcements hidden in their vehicle's tires. Tire remnants shed by trucks are a common sight on the interstate highway system. Their carcasses usually have ribs sticking out. These are tire cords. Their S-curves can be studied because the Goodyear Tire & Rubber Company has data available over decades.

¹ Its mathematical form is given by $S_t = S_\infty / (1 + \exp(a-bt))$ where S_t is the value in year t while S_∞ is the value at the upper barrier or limit and a and b are constants.

² The International Institute for Applied Systems Analysis, IIASA, collected hundreds.