

Evolutionary chimeras: towards a new model of technological innovation

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Abstract

Technology, albeit ostensibly a major factor of human civilization, is often considered just an outcome of science or a mere part of economy and therefore regarded as a lowly form of human culture, or even as no culture at all.

This seminar is aimed at proposing a different vision of technology: technology as a fundamental part of human culture, characterized by its peculiar nature whose dynamics is evolutionary.

Alas, the evolutionary traits of technological change are more evident in engineering details than in major socio-technical processes: the artifact, not scientific knowledge nor economic factors, is thus its natural unit of analysis.

Indeed, only the microhistory of technology can expose its hidden evolutionary nature.

This is hardly a new idea: the seminar presents some historical background from its deceptively naïve Victorian pioneers to the new extended synthesis, showing how a novel complex analogy between biological and technological evolution can be founded. Three critical disanalogies are also addressed, namely the difficult concept of species in technology, the apparently Lamarckian traits of technological heredity, the intentional nature of technological mutation.

The technological analogues of well-known evolutionary phenomena are then described, mostly through microhistorical engineering events, focusing in particular on exaptation. The systemic concept of modularity in biology and technology is outlined; cases of analogy versus homology in modular artifacts are also described.

The analogy is rich in engineering and managerial implications. The Web provides a natural social environment for experiments: some initial evidence is presented, confirming the explanatory power of the evolutionary analogy and suggesting new managerial approaches to radical innovation.

Finally three research threads are outlined and some open questions are proposed, showing how the contribution of social sciences complementing economics, engineering and biology could drive the analogy towards a new theory of artificial form.

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