The Industrial Revolution: Hard and Soft Laws

Author : James Annable

Date : May 28, 2021

The GEM Blog's month-long series on modeling of management reveals New Keynesian (NK) theorists' badly incomplete understanding of the Industrial Revolution. The impact on the evolution of productivity-enhancing capital equipment is adequately grasped. Many also know that those technological advances were greatly facilitated by the powerful guidance provided by the earlier work of two Cambridge-educated mathematicians, Isaac Newton's (1642-1727) laws of motion and James Clerk Maxwell's (1831-1879) laws of electromagnetic radiation. Their fundamental laws informed the construction of the steam engine, railroads, large-scale assembly lines, electric generators, AC distribution, wireless communication, and much more that enabled the extraordinary jump in labor productivity that broke economies out of the millennia-long stagnate growth in living standards.

Less understood is the equally important soft technology that allowed large numbers of employees to come together in cooperative endeavors that effectively utilized production scale made possible by the hard-technology innovations. An important difference between the hard and soft variants is that the latter occurred absent guidance from relevant scientific laws. Its development was, instead, the time-consuming process of trial and error. Important touchstones of the lengthy process, summarized three weeks ago, include the drive system (rooted in uber supervision), scientific management (rooted in detailed instruction on how to do particular jobs), the so-called American Plan (rooted in a growing appreciation of employee's strong preference for fair treatment), and modern human-resource management (honing the construction of intra-firm systems that produce wages and work practices that employees perceive as equitable).

Social scientists, late to the game, scrambled to describe the dominant soft technology. First out of the gate were the middle-20th-century NR labor economists, who conducted on-site investigations on what goes on inside large, highly specialized firms that are inherently restricted by costly, asymmetric employee-employer information. They crucially identified the strong worker preference for fair treatment by management. Their research was followed by Herbert Simon's Organization Theory, which provided a more general descriptive analysis of complex firm administration. Simon notably identified the fundamental issue of labor management: How to elicit voluntary employee cooperation with the firm's objectives? The criticality of that LEV management goal must be grasped if economic theory is ever to align with the range of relevant evidence.

Somewhat later, a third powerful contribution to the descriptive literature was provided by evolutionary biologists. They persuasively argued the human preference for equity (and the desire for redress of unfair treatment) is axiomatic, an outcome of evolutionary biology that was embedded in neural networks as our distant ancestors adapted to survival advantages available from group cooperation. From a prominent neuroscientist: "Our instincts for sensing and responding to fair exchange evolved in a social environment where tit for tat was king. What you did to me today was coming back to you tomorrow in kind."

Modern brain research and behavioral experiments continue to produce guidance information on proper axioms for use in economic modeling. Their findings, remarkably consistent across cultures, cannot be ignored by serious economic theorists. Following a complementary research agenda, behavioral economists have been exploring the biochemistry of decision-making and its implications for economic postulates (for example, Camerer, Lowenstein, and Prelec (2005)). Their work is notably consistent with Gary Becker's 1996 assertion that the roots of stable preferences are found in biology, not society and informed by Joel Mokyr's 2006 essay on the progress in, and difficulty of, importing concepts of evolutionary science into mainstream neoclassical theory.

The workplace model's employee preferences were anticipated, as was so much else, by Adam Smith. In his *The Theory of Moral Sentiments*, important behavior motivators are the interrelated factors of status, respect, and justice. An overriding preference is fair treatment: "… we find ourselves to be under a stricter obligation to act according to justice than agreeably to friendship, charity or generosity; that the practice of these last-mentioned virtues seems to be left to some measure to our own choice, but that, somehow or other, we feel ourselves to be in a peculiar manner tied, bound, and obliged to the observation of justice."

The fair-treatment modeling from NR labor economists, organization theorists, evolutionary biologists, and

Adam Smith, however, remains descriptive. Scholars interested in labor management had to wait for the GEM Project to deliver the mathematics needed to rigorously capture the relevant behavioral laws at work here. With its generalization of rational exchange from the marketplace to information-challenged workplaces, the Project provides the macro academy a powerful set of scientific laws that open up an exciting research frontier.

Blog Type: New Keynesians Saint Joseph, Michigan