

# I. Presidential Address

---

## The Future of Labor and Employment Relations in a Global, Knowledge-driven Economy

JOEL CUTCHER-GERSHENFELD

*University of Illinois at Urbana-Champaign*

### Prologue

When the World Congress for the International Labor and Employment Relations Association (LERA) met this summer in Sydney, Australia, the opening of each major session began with a formal acknowledgment of the original owners of the land—naming the specific aboriginal tribes who first inhabited the land on which we were meeting. In our own community, arbitrator–mediators Tia and Richard Denenberg regularly visit and honor Native American burial grounds wherever we have meetings. So, upon returning from Australia, I asked them about the original owners of the land on which we would be meeting here in Atlanta. Based on their information, I now acknowledge the Creek Tribe as the original owners of the land. Long before Europeans arrived to this area, there was a trail that was later named by Europeans for a tall lone pine tree known for its pitch or sap—hence we are meeting on the pitch tree trail (later corrupted to be “Peachtree Street”) established by the Creek Tribe, and we acknowledge them as the original owners of the land.

### Introduction

In the great sweep of history, I believe that ideas matter. It is ideas, large and small, that mark the twists and turns of civilizations over time. In my remarks today, I will focus on three concepts, each of which embodies ideas that are central to our field and each of which is in a state of fundamental change that will have implications for theory, policy, and practice in our field.

To begin, I would like to share a brief story. This goes back to the early 1990s, when I co-led a team investigating the cross-cultural diffusion on new work systems, visiting a mix of unionized and nonunionized Japanese transplants in the U.S. One such facility made automotive heaters and air conditioners. With about 750 employees, it had what is called a *kaizen-teian* system, a suggestion system designed to support continuous improvement in operations. Each improvement suggestion would be brought to a team meeting, discussed, and, if agreed upon, submitted to the HR office, where it would be reviewed and, if approved, a work order written. Now many of you know what traditional suggestion systems are like—relatively few suggestions are ever submitted. This was different.

At the time we visited the facility they were implementing an average of over 7,000 suggestions a year—nearly one per person per month. Not only that, but one of our team observed that the transfer lines moving parts around the facility were made of light gauge metal and not even bolted to the floor. He commented that they would only last three to four years. The person showing us around, who was the head of organizational development, responded, “Exactly! Our product life cycle is about three to four years, and after 20,000 to 30,000 continuous improvements we are ready to redesign the whole factory. That’s at the heart of our business model: lots of small improvements, followed by a complete redesign based on what is by then a deep knowledge of the system.”<sup>1</sup>

---

Author’s address: School of Labor and Employment Relations, 504 E. Armory Avenue, Champaign, IL 61820

Why do I share this story? First, it illustrates the concept of “knowledge-driven work,” which I will discuss shortly. But I share it also because it illustrates an approach to change that combines small, incremental adjustments and periodic systems redesign, all grounded in knowledge. It is with this change model in mind that I would like to turn to the first of the three core ideas that are the focus of my remarks.

## Institutions

To motivate this portion of my remarks, I begin with the visual image of a 15th-century French tapestry [*Ed. note: in this and other instances, a piece of imagery was shown as part of the talk*]. As you can see, different parts of the tapestry illustrate the monarchy and the military. These are depictions of Roman institutions, significant because it was right around this time in France that the word “institution” was coined. I am told that there is an older Sanskrit word for institution, but in the West these stabilizing aspects of society existed for 500 to 1,000 years before there was even a word to describe them. Why is this significant?

I believe that it took a long time to coin a word for these arrangements because they emerged and took shape at a gradual pace, changing very little across the generations. They were a taken-for-granted part of life. By contrast, with the rise of the industrial revolution, institutions emerged and changed at a much more rapid pace. This included the emergence of constitutional monarchies, political parties, and labor unions along with other changes that took place at a pace almost an order of magnitude faster than the first wave of institutional arrangements. Major shifts happened in 50 to 100 years rather than 500 to 1,000 years.

This shift in the pace of change threw the institutional arrangements into sharp relief, and it drew the attention of one of the founding scholars in our field, John R. Commons,<sup>2</sup> who noted that changes in labor institutions were driven by underlying changes in markets and technology. It is in this context that I draw your attention to a second visual image, a picture of the shop floor of the Auburn Motor Company.<sup>3</sup> How many here have heard of Auburn Motors? Few people have heard of the company, though they made an excellent product and later produced another well-known vehicle—the Cord—all in the town of Auburn, Indiana.

I point to Auburn because around the time of this photo there were 140 car companies just in the state of Indiana. As you see from the photo, Auburn Motors did have some aspects of the mass production system. In the background there are interchangeable parts, one of the features of this system. In the foreground you can see that they had the concept of an assembly line at least for axle assembly, though they didn’t get the moving assembly line part of the system—overhead hoists are lifting the axles and moving them from sawhorse to sawhorse. We also know that the company originally manufactured carriages and that they were slow to shift from wood frame to metal frame bodies. In other words, they mastered parts of the new mass production system, but not the whole system. Organizations that pioneered the whole system have become household names. Today, a century later, Auburn is but a footnote on history.

Why do I raise this example? I do so because we are experiencing what Piore and Sabel termed a second industrial divide,<sup>4</sup> marking the shift from an economy led by mass production to something new—a second fundamental shift in markets and technology. With this shift we see an acceleration of the pace of change in markets and technology. If the first wave of institutions changed at a pace measured in millennia, and the first industrial divide accelerated to a pace of change measured over centuries, I suggest that the second industrial divide may bring institutional change yet another order of magnitude faster—change measured in decades, generating major shifts within a lifetime rather than across lifetimes.

We have certainly seen how quickly executive compensation has moved onto the policy agenda, how quickly the Federal Reserve Bank has expanded its focus to include unemployment, not just inflation; how quickly the very nature of pensions and retirement has changed; how quickly traditional career ladders collapsed; how quickly it has become possible to have a career on eBay; how quickly the very nature of research and development in corporations has shifted. And there are also many aspects of our field that are on the table for discussion, even if they haven’t yet fundamentally shifted, from the employer-based system of health care to strategies, structures, and processes for worker representation to the regulatory roles of government.

There is indeed evidence to suggest that changes in markets and technology are driving—or should I say, co-evolving to drive—accelerated change in institutions, and this is my first challenge to the field.<sup>5</sup> The idea of

institutions has been at the core of labor and employment relations, and we need to more fully and more deeply understand the changing nature of institutions in the present era. The importance of institutions is increasingly being recognized in the new institutional literatures in organizational behavior and economics,<sup>6</sup> but this is mostly an appreciation of institutional dynamics in organizations or markets. This only partly helps us to understand the institutions themselves.<sup>7</sup> Recently I was approached by one of our students in the School of Labor and Employment Relations at the University of Illinois, who connected my opening story about continuous improvement with a discussion of collective bargaining and labor law as institutions. She said, “Why don’t these institutions have mechanisms for lots of small improvements and then periodic redesign, just like the factory you described?” Similarly, in the LERA distinguished panel at these meetings, Michael Piore asked us how we might have institutions that reach beyond assumptions of the primacy of competition in order to enable cooperation.<sup>8</sup> These are very good questions—they go to the core of the challenge for institutions and for our field: to understand how to provide needed stability in society while still being flexible and adaptable in a rapidly changing context.

## Work

Institutions represent one of the three core ideas in our field that I am highlighting in these remarks. To motivate the second idea, consider this painting by former WPA artist Lawrence Kupferman. During the 1930s and 1940s Kupferman was noted for highly representational works—images of workers and buildings. This painting, which was produced in the 1960s, reflected his growing interest in the remarkable advances that were happening in psychology, biology, and chemistry. The image, which is entitled “landscapes of the mind—portrait of Ruth,” reflects this interplay between the physiological and the psychological, the physical and the social. If Lawrence Kupferman were with us today, I believe he would have been delighted and fascinated by the way technology is interweaving with our understanding of the human mind, as well as by the increasing importance of knowledge in our society. Thus, I use this image to introduce the second idea that is central to our field—the nature of work itself. I will focus on the interweaving of the social and the technical and on the significance of work becoming more knowledge-driven.

Economists tell us that the demand for labor is a “derived demand,” derived based on the demand for products and services. With traditional sources of competitive advantage, which are geography, capital, and technology, this is a pretty clear causal relationship. Increasingly, however, these traditional sources of competitive advantage are becoming less sustainable—geography is shrinking, capital flows quickly, and technology is soon replicated. Knowledge, reflected in capability and innovation, is emerging as the leading source of sustainable competitive advantage. It is the distributed knowledge of the whole workforce, not just the knowledge of a small group of experts and leaders, that is the key. Knowledge-driven work isn’t limited to consultants and high-level professions. As my opening story suggested, it is the distributed knowledge of the entire workforce that drives thousands of improvements in safety, quality, cost, schedule, and other metrics, as well as enables periodic total redesign. Continuous improvement based on knowledge—which is the definition of the term *kaizen*—becomes the business strategy. The demand for labor may still be a derived demand, but labor is much more tightly interwoven with the products and services themselves.

In *The Transformation of American Industrial Relations*, Tom Kochan, Harry Katz, and Bob McKersie documented the increasing importance of the nonunion sector of the economy in shaping labor and employment relations—in both promising and troubling ways.<sup>9</sup> On the troubling side was the ascendancy of a more unilateral, managerial set of institutional arrangements without effective counterbalance. On the promising side was the rise of high performance work systems, which are, at their core, knowledge-driven. Looking back, I see that it is the ability to value and appreciate distributed knowledge that was at the heart of nonunion success stories, and it is that same ability that provides the potential for transformation in the unionized sector.

Consider this chart, which is something that I found on the performance metric wall in a team meeting area in a UAW-Ford stamping plant.<sup>10</sup> It depicts what they call “hit-to-hit” performance, which is the downtime between the last good “hit” with one set of stamping dies and the first good hit with a new set of dies after there has been a change. Performance is measured in minutes and, as you can see from this chart, they were averaging around 140 minutes, or well over two hours, between die changes at the beginning of this

time period. Moreover, the process was highly variable. A foundational insight in the domain of knowledge-driven work comes from Dr. W. Edwards Deming, who noted two things—first, you have to reduce the variance in a system before you try to improve the system (otherwise you just get more variation), and, second, front-line knowledge properly engaged is central to reducing variance. This is exactly my point in sharing this chart. When I pointed to it on the wall out on the shop floor in this stamping plant, I asked about the right-hand side of the chart, where the variance had reduced and performance increased. I asked what had happened at this point, and the response was instant. They said, “Oh, that’s when the team leaders and the union committeepersons began to attend the daily shift-start meetings with the supervisors and superintendents.”

This is a story about work becoming more knowledge-driven, which changes everyone’s roles. It is also a story about a closer connection between the social and the technical. It was over 50 years ago that the concept of “socio-technical systems” emerged,<sup>11</sup> and I believe that the accelerating pace of change in technology requires us to revitalize this term and link it to the expanding importance of knowledge-driven work. To illustrate this point, here is a visual representation of Moore’s Law, using an exponential scale to represent an accelerating rate of improvement in computer processing speed. This is, I am sure, familiar to many of you. It is just one of many technologies that futurist Ray Kurzweil is following, and he reports that the rate of change for nearly every type of technology is moving exponentially.<sup>12</sup>

To illustrate the socio-technical and the knowledge-driven dimensions of this, consider a second chart drawn by Kurzweil, which shows the cost per sequenced pair of DNA. There are fewer points on this chart compared to the one on Moore’s Law, but there is a pattern of initially accelerating rates of change, followed by a leveling out after about five years, which is the mid-point on the horizontal axis. I have some insight into this story because a former doctoral student at MIT, Robert Nichols, became the director of operations at the MIT-Harvard Broad Institute at this time. What he noticed when he began work there is, frankly, something that any person in this room would likely notice. These fancy DNA sequencing machines were all organized in a linear fashion—just like the assembly line back in that picture of Auburn Motors. Each job was set up with one task following another. Nichols reorganized the equipment into related clusters, formed *kaizen-teams* teams, brought the test equipment manufacturers into the team meetings, and applied other principles of socio-technical systems design. That is where the right-hand side of the chart again accelerated. MIT-Broad won the race to sequence the human genome, and a new era of personalized medicine has opened up.

Not only is this story important for illustrating the way social systems combine with technical systems to generate accelerating rates of change, it is also part of a still unfolding story of accelerating increases in life expectancy. If the rate of increase shifts from linear, as was the case for most of the last century, to curvilinear, then the implications for work are quite significant. At a curvilinear rate of change, active working lives could double in length within one generation—from 30 to 40 years to 60 to 80 years. This would raise fundamental questions regarding retirement, careers, returns to education, discrimination, and other matters.

Thinking systematically about the nature of work has always been central to our field, and I am highlighting two fundamental changes here. First, as we have just discussed, the intersection of the social and the technical will be fertile ground, given that technology is changing at an accelerating rate. Second, I believe that knowledge-driven work will, in the 21st century, be the defining successor to the mass production and bureaucratic models of work organization.

## Organizations

The next image is a well-known painting by Jacob Lawrence, signaling the value of everyday work across a range of occupations. What is notable here, of course, is that all of these people are jumbled together, out of their organizational context. That is the third idea that I would like to highlight—the concept of organizations. A defining feature of the first industrial divide was the shift from craft-based organizations to the hierarchical form. There has been increasing attention to networks as an alternative to hierarchy, on the one hand, and to markets, on the other. However, there is much to be done to more fully understand

network-based organizational arrangements. It is not just the absence of a hierarchy, as we saw was missing from this Jacob Lawrence painting, nor is it just networks of individuals.

I call your attention instead to networks of stakeholders who are both independent and interdependent in various systems. Consider this next image. It may take a moment to recognize what this is—it is a representation of the 2003 power blackout in the Northeast.<sup>13</sup> In a moment, I want to speak to the underlying organizational form associated with this, but first, I want to follow through on a personal commitment I made with respect to this presidential address. Let me say it now: this is the truth—the way we distribute power in this country is in need of a great deal of attention. That is the truth. There, I did something that I really wanted to do in this address—I spoke truth to power! [dramatic pause]

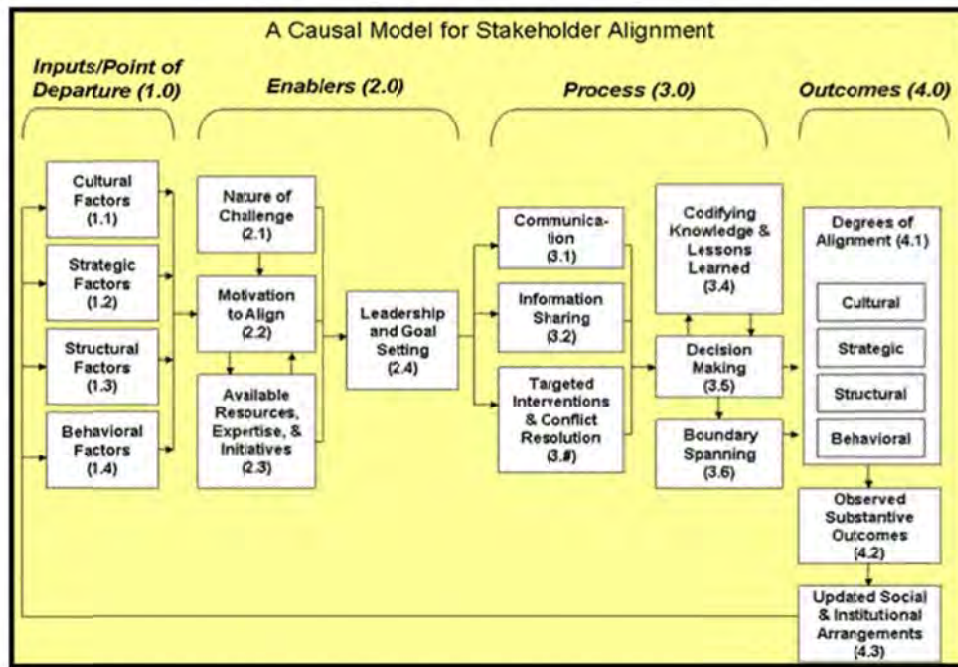
More seriously, there is a great deal of work to be done by our energy industry council and other stakeholder groups. Look at this next image. It presents the power grid control areas. Each area is associated with a hierarchical organization, and for the power grid to operate effectively the organizations need to be able to communicate and coordinate. This sort of coordination across organizations has been characteristic of most infrastructure systems for a very long time. However, the scale and complexity of most of these systems has increased dramatically with globalization—this is the case for air, ground, and water transportation systems as well as natural resource systems for food, water, and emergency relief. It is also true for supply chains. Moreover, we have added new systems, such as the internet, mobile telecommunications, distributed systems for research and development, systems to address global climate change and, sadly, terrorist networks. Further, existing organizations are forging new, network-based arrangements. Consider how the Department of Professional Employees in the AFL-CIO has forged alliances around professional standards with a broad range of professional associations that are not involved in collective bargaining in any way.

Many key systems in society have been deregulated in recent decades, including air transportation, trucking, banking, utilities, and others. In the process, society was making an implicit assumption that these complex socio-technical systems would operate more effectively on a market-driven model. In fact, there have been some consumer benefits of deregulation, but there have also been a number of what economists call externalities—additional costs to society not addressed by the market. The reality is that something more than market-based institutional arrangements is needed for these systems to maximize their effectiveness and mitigate the risk of catastrophic failures. I believe this is exactly what Michael Piore was signaling when he urged us to examine the core assumptions about cooperation and competition that are embedded in institutions.

In my own research, I have focused on the lateral and cross-layer alignment of stakeholders in these systems. The ideas crystallized during a successful effort to generate a consensus vision for Congress on aircraft noise and emissions.<sup>14</sup> For me, it is much like studying collective bargaining, only instead of two parties, there are *n* parties. Many of the same principles apply. There is a mixture of common and competing interests among the parties, generating integrative and distributive dynamics. Further, staying with the Walton and McKersie<sup>15</sup> framework, attitudinal dynamics play a key role, since leadership happens in these systems more by influence than by authority. Intraorganizational bargaining is key—now it is *n* parties that need to achieve internal alignment in order to engage in lateral alignment. Trust in these systems provides an essential, if fragile, foundation. Even as many of us are working to update collective bargaining as an institution so that it is more flexible and adaptable,<sup>16</sup> it is perhaps ironic that collective bargaining theory helps us to understand new, emerging institutional arrangements.

My colleague Chris Lawson and I have developed a causal model to guide us in research on stakeholder alignment.<sup>17</sup> I put this next image up not to go through it in any detail, but to call your attention to the right-hand side of the model. We argue that the outcomes include four aspects of alignment (or misalignment). First is behavioral alignment—reflected in communications, information sharing, decision making, leadership and other behavioral interactions. Second are structural aspects of alignment—reflected in incentives, forums, and other structural features of the systems. As we all know, structure drives behavior, so this is important. Third is the strategic intent and strategic moves by individual stakeholders and by the system as a whole. Finally, there is the cultural dimension. As my friends in industry readily point out, culture eats strategy for breakfast. But of course, the daily patterned behaviors define and change culture over time, so all the dimensions are interdependent.<sup>18</sup> Not only that, but these systems of stakeholders are new

institutional arrangements, or a transformation of older ones—with human agency more visible and intentional than in most inherited institutions.



Systems of stakeholders are not new. Their significance in the 21st century will, however, be far greater. The 20th century was defined by individual organizations pursuing self-interest in powerful new ways, generating value, but also generating a legacy of various tragedies of the commons. Broadly defined, it is the work of these systems of stakeholders to more fully value the commons,<sup>19</sup> and this will, I believe (and I hope), become a defining feature of the 21st century. Thus, organizations have been a central focus of our field, and I call attention to an organizational form—aligned stakeholders in complex systems—as worthy of greater attention and, potentially, a defining organizational form for the 21st century.

## Integration

In conclusion, I would like to share with you two final images to motivate an interweaving of the three ideas highlighted in these remarks—institutions, work, and organizations.

This chart has become an almost iconic representation of the 20th century.<sup>20</sup> Let me review what it stands for and suggest how much change will be needed for the 21st century. Each of the three lines on the chart is an index of time-series data beginning in 1947. The top line, which is green, is a productivity index; it illustrates remarkably consistent 3% year-over-year productivity gains. The bottom line, which is blue, is an index of average hourly earnings. The left-hand side of this line illustrates the post-World War II formula pioneered in the auto industry—what was termed the “annual improvement factor”—that linked approximately 3% wage increases (after accounting for inflation) with the 3% productivity gains. It was also preceded a half-century earlier by Henry Ford’s \$5 day—first making the connection between workers as both wage earners and consumers. As you can see, however, by the mid-1970s the connection began to break down, and hourly earnings went flat. The middle line, which is pink, charts the index for household income, which continued to rise for a little while after wages went flat—marking in particular the increased proportion of women entering the workforce. By the mid-1980s, however, that too went flat. Households were able to adjust for a while by taking on increased consumer debt, which could be a fourth line on the chart, which would also reach its limits. There is some debate among economists as to whether the indexes in this chart

should also include deflators, but even if they did, the pattern would be the same. A gap widens, and eventually we hit a wall, with the concurrent collapse in product markets, financial markets, and labor markets.

I share this chart for two reasons. First, it speaks to the decline of good jobs and an effective system of labor relations in society. Prior to this meeting, former LERA president and former president of the Steelworkers Union, Lynne Williams, sent his regrets in not being able to be with us. As part of the e-mail correspondence, he stated, “The need to rebuild a successful manufacturing base in America becomes more pressing by the day. The role of a modern, democratic, empowering labor relations system is critical.”

I also share the chart to ask a larger systems question. The \$5 day and the annual improvement factor were both 20th-century innovations helping to align product markets with labor markets. My question centers on the 21st-century institutional arrangements that will bridge both product and service markets (which are not the same) with both labor markets and financial markets—all in an era of accelerating technological change. There are aspects of this that may seem, well, abstract, such as this painting by Lawrence Kupferman’s son, David Kupferman. But this work, which is part of his “Raga Series,” does reflect a complex interweaving and juxtaposition of images. That is how I would like to conclude my remarks, by interweaving the image and ideas covered in this address—each of which involves rethinking core assumptions.<sup>21</sup>

First, we focused on institutions—a defining dimension of our field and a topic of increased interest in a range of disciplines. If the rate of change in institutions is indeed governed by the rate of change in technology and markets, then we are entering an era where institutional arrangements will not necessarily span generations—we need to study and develop institutional models that provide needed stability, but that are flexible and adaptable in an era of accelerating rates of change. Further, we need to ask hard questions about the core values and assumptions embodied in the institutional arrangements.

Second, we looked at work—the central focus of our field. We saw that the knowledge-driven aspects of work are becoming increasingly salient and that models that value distributed knowledge across a workforce may become dominant in the 21st century. Further, the interweaving of the social and the technical is a long-standing story that takes on new significance in the present era.

Third, networks of stakeholders—aligned laterally and across levels in complex systems—represent an organizational form of new and increased importance. These systems are superseding individual organizations as the defining actors in our economy and our society. Indeed, these are becoming, in many ways, new institutional forms.

The stakes are high. If we don’t pioneer new institutional models, anchored in new approaches to work and organization, we risk failures in these systems. As we have already seen, failures aren’t merely bad—they can be catastrophic. At the same time, success isn’t just good—it can be transformational.

In conclusion, I share with you one final story. A number of years ago, my wife, Susan, and I were fortunate in providing some technical assistance to the South African Commission on Conciliation, Mediation and Arbitration (CCMA). More recently, a delegation from South Africa came to the U.S., and I was anxious to learn from them what was the main focus of labor-management relations in their country. The answer was simple and powerful: They said that they wanted to avoid being caught up in the global race to the bottom. As soon as they said that, I realized that some version of the American Dream can be found all around the world—increasingly, people everywhere want good schooling for their children and the hope that each generation can do better than the last. Ultimately, this gives hope and direction to the institutions we must build—institutions that combine good jobs with economic performance to make the American dream and its equivalent a reality around the world.

## Notes

<sup>1</sup> Joel Cutcher-Gershenfeld et al. 1998. *Knowledge-Driven Work: Unexpected Lessons from Japanese and United States Work Practices*. New York: Oxford University Press.

<sup>2</sup> John R. Commons et al. 1918–1935. *History of Labor in the United States*, Vols. 1–4. New York: Macmillan.

<sup>3</sup> Lee Beck and Josh Malks. 1996. *Auburn and Cord*. Osceola: Motorbooks International.

<sup>4</sup> Michael Piore and Charles Sabel. 1984. *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books.

<sup>5</sup> Note that this is not necessarily a simple causal relationship—clearly technology and institutions co-evolve, as suggested by Jon D. Wisman and James F. Smith in “American Institutionalism on Technological Change,” *Journal of Economic Issues*, Vol. 33, 1999.

<sup>6</sup> Foundational publications on new institutionalism in organizational behavior include these: Peter L. Berger and Thomas Luckmann. 1966. *The Social Construction of Reality*. New York: Doubleday; Paul J. DiMaggio and Walter W. Powell. 1983. “The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields.” *American Sociological Review*, Vol. 48, pp. 147–160. Two foundational books on the new institutional economics are these: Oliver E. Williamson. 1985. *The Economic Institutions of Capitalism*. New York: Free Press; Douglass C. North. 1990. *Institutions, Institutional Change and Economic Performance*. New York: Cambridge University Press.

<sup>7</sup> A notable exception is Elinor Ostrom, *Understanding Institutional Diversity*, Princeton, NJ: Princeton University, 1995. (See also note 19.)

<sup>8</sup> Presentation by Michael Piore was part of the LERA Distinguished Panel on *The Second Industrial Divide and The Transformation of American Industrial Relations: Looking Back and Looking Forward a Quarter Century Later*, Atlanta, Annual meeting of the Labor and Employment Relations Association, 2010.

<sup>9</sup> Thomas Kochan, Harry Katz, and Bob McKersie. 1986. *The Transformation of American Industrial Relations*. New York: Basic Books.

<sup>10</sup> This chart is from the UAW-Ford Chicago Stamping plant, circa 2002.

<sup>11</sup> Eric Trist. 1950. *The Relations of Social and Technical Systems in Coal-Mining*. Paper presented to the British Psychological Society, Industrial Section.

<sup>12</sup> Ray Kurzweil. 2005. *The Singularity Is Near: When Humans Transcend Biology*. New York: Viking.

<sup>13</sup> Note that this image was widely distributed just after the blackout with the notations on it suggesting it was an actual satellite image, but its authenticity has not been confirmed.

<sup>14</sup> Ian Waitz, Jessica Townsend, Joel Cutcher-Gershenfeld, Edward Greitzer, and Jack Kerrebrock. 2004. *Report to Congress, Aviation and the Environment: A National Vision Statement, Goals and Recommended Actions*. Washington, DC: FAA/NASA.

<sup>15</sup> Richard Walton and Robert McKersie. 1965. *A Behavioral Theory of Labor Negotiations*. New York: McGraw Hill.

<sup>16</sup> Richard Walton, Joel Cutcher-Gershenfeld, and Robert McKersie. 1994. *Strategic Negotiations: A Theory of Change in Labor-Management Relations*. Boston: Harvard Business School Press.

<sup>17</sup> Joel Cutcher-Gershenfeld and Chris Lawson. 2010. *Stakeholder Alignment in Complex Systems: Valuing the Commons*. Working paper.

<sup>18</sup> This interdependency parallels and reaches further than the alignment across levels highlighted in Thomas Kochan, Harry Katz, and Robert McKersie, *The Transformation of American Industrial Relations*. New York: Basic Books, 1986.

<sup>19</sup> E. Ostrom. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

<sup>20</sup> This is a version of the chart that I constructed for this address; data provided by Larry Mishel of the Economic Policy Institute.

<sup>21</sup> This is a consideration of core assumptions in the spirit of Douglas McGregor, *The Human Side of Enterprise (annotated ed.)*. Joel Cutcher-Gershenfeld, ed. New York: McGraw Hill, 2006.