The transformation of world economy due to technology

Paul Krugman calls 1913 the high-water mark of the First Global Economy. He notes, that over the preceding century, the world economy had been transformed by technology and the widespread acceptance of the belief that free markets, with secure property rights, were the best way to achieve economic progress. After 1913 the market atrophied — long-distance trade shrunk, private international movements of capital virtually disappeared, and a third of the world rejected private property. How does one explain this reversal? Perhaps, more importantly, how does one explain the even more astonishing reversal of fortune that, at the start of the 21st century, the world has returned to more or less the same ideology of free markets, small governments, and sound money that prevailed at the beginning of the 20th.

The answer to the first question must be that bureaucracies replaced alternative institutional arrangements, primarily markets in the first half of the 20th century because they outperformed them. How? Presumably, or so Alfred Chandler argues, because of technological innovations that led to massive economies of scale and/or scope. What were the changes in technology that caused bureaucracies to out-perform markets? Here the surprising answer is changes in organizational arrangements themselves. That is: changes in organizational design, personnel systems, operational engineering, accounting systems, and control technologies. This answer reflects the currently fashionable view among economists that the comparative advantage of institutional arrangements boils down to a question of information costs and that actual arrangements are solutions to information problems &emdash; the costs associated with search, bargaining, monitoring, and enforcement.

Hence, transformations in organizational arrangements must be largely driven by changes in information costs. Elsewhere, Gil Reschenthaler and I (1994) have argued that changes in organizational arrangements produced four major shifts in the comparative advantage of alternative institutions in the late 19th century. These are: 1. The efficacy of centralized allocation and ex-ante control increased relative to decentralized allocation of resources and ex-post control, which had the effect of increasing the payoff to scale. 2.

The efficacy of functional structures increased relative to process-oriented structures, which had the effect of increasing the payoff to scope. 3. The efficacy of hierarchically coordinated systems increased relative to self-organizing systems, which had the effect of increasing the payoff to vertically integrated systems of command and control. 4.

The relative efficacy of government provision and control increased, which had the effect of decreasing the payoffs to free markets, secure property rights, and minimal government intervention. Of course, if these shifts explain the rise of bureaucracy might not recent innovations in organizational design, operational engineering, accounting systems, and control technologies, by reversing these shifts, also suffice to explain its fall? Prussians perfected the bureaucratic model: Heinrich von Stein, Gerhard von Scharnhorst, August von Gneisenau, and Helmuth von Moltke during the 19th century. Their administrative innovations included detailed centralized materials requirements and logistical planning, control by rules, standard operating procedures, and the merit principle, functional administrative design, decomposition of tasks to their simplest components and narrow job descriptions, and sequential processing. The American contribution to this

system lay primarily in activity and cost measurement, in process engineering: standardization of components, processes, and products, and in the use of electric motors to reconfigure orkflow. These innovations made possible the moving, or continuous, assembly line, in which each assembler performed a single, repetitive task.

The moving assembly line was first implemented at Henry Ford's Model-T Plant at Highland Park, Michigan, in 1914, increasing labor productivity tenfold and permitting stunning price cuts — from $780 in 1910 to $360 in 1914. Ford made everything he needed for his cars from the raw materials on up. Of course, total vertical integration required the organization of huge numbers of activities and employees. Workers, staff specialists, and middle managers had to be recruited, sorted out, and fitted into a merit-driven hierarchical scheme — that is, bureaucracy. Not only did bureaucracy make large, complex organizations efficient, it also made them inevitable.

Only very large organizations could take full advantage of bureaucracy. Only they could afford to devote substantial amounts of resources to gathering and processing quantities of data for top management to use to coordinate activities and allocate resources. Hence, it seemed that bigger organizations were necessarily better. And, there seemed to be no natural limits to this conclusion. In the US the progressive movement created modern public administration. To a remarkable degree the progressive reforms — an executive, input-oriented budget, a professional civil service and merit-based public personnel administration, control by rules, standardization of procedures, task specialization, and a strict administrative hierarchy, with

clearly delineated staff and line functions — were based on the Prussian model.

In a few instances — the War Department under Elihu Root and the USDA Forest Service under Gifford Pinchot, the NYC Dept. f Sanitation under Col. George E. Waring, for examples — progressives proudly acknowledged the source of inspiration for their administrative reforms. Elsewhere, they expressed some discomfort at copying the governance institutions of an undemocratic, militaristic regime. One of the best-known apologies for this practice was Woodrow Wilson's argument that politics and administration are different functions, making it possible to borrow administrative practices from an authoritarian state without thereby threatening democratic politics — " If I see a murderous fellow cleverly sharpening his knife.

… Regardless of their source, progressive reforms led to dramatic improvements in the delivery of government services and in the productivity of public employees.

Anecdotes to this effect abound: significant reductions in disease following Col. Waring's reforms, the forest rangers' erstwhile reputation for efficiency, widespread replacement of government contracting out by in-house production, and, perhaps most telling, the early 20th Century enthusiasm for postalization (i. e. , running businesses like the US Post Office). Not all of the evidence is anecdotal, however.

Cross national comparisons show, for example, that total factor productivity growth in surface transport once tended to be higher in nationalized systems than where government regulated price and entry and higher in regulated

systems than in competitive ones. Similar evidence exists with respect to most so-called public utilities. Empirical evidence also exists as to the consequences of the wave of reform that transformed the governments of many U. S. cities in the last century.

Controlling for city and time effects, bureaucratic reform led to significantly increased rates of infrastructure investment and economic development (Rauch, 1995). Overall, by the middle of the last century, despite far higher employment growth, value added per worker remained 40 percent greater in the public sector than in the private. My point is that bureaucratic arrangements once successfully provided security, jobs and economic stability, ensured fairness and equity, and delivered the “ one size fits all” services needed during the era that lasted from the turn of the last century to the mid-1960s. In the meantime, however, the organizational arrangements invented at the dawn of the industrial era have become increasingly anachronistic. What Goes Around, Comes Around Centralization, executive, input-oriented budgets, standardization, and direct supervision of the flow of raw materials and components through the production process were eventually rendered obsolete by innovations in organization pioneered by General Motors under Alfred P.

Sloan. The best known of these is the multi-product, or M-form, organizational structure, in which each major operating division serves a distinct market segment, retains considerable autonomy, and keeps its own books, and is evaluated using the DuPont system of financial measurement. Short run coordination between GM’s consumer goods divisions and the divisions making components was achieved via buyer-seller relationships —

quasi- arm's length transfer pricing arrangements. Longer run coordination was achieved via the first modern capital budgeting system used in the US. GM's organizational innovations were widely emulated by American businesses during the 1950s and sixties. Improvements in educational levels and advances in automation have reduced the relative efficacy of bureaucratic personnel systems: control by rules and standard operating procedures, task specialization, and sequential processing.

Indeed, these have been superceded in many industries by modern, people-based human resources management practices: self-managed teams, control built into job design, and decentralization of decision-making as basic principles of organization, highly selective hiring of new personnel and employment security, extensive training, comparatively high compensation based on organizational performance, reduced status distinctions and barriers across levels, and extensive sharing of financial and performance information throughout the organization (Pfeffer, 1998). The consequences of these high performance HR practices include faster organizational learning and innovation, greater flexibility, skill acquisition, and productivity, and ultimately improved customer service. More recently American businesses have abandoned functional compartmentalization along with vertical integration. Arguably, these trends are being driven by reductions in communications, logistics, and information processing costs — reductions stimulated if not caused by the introduction of computers and by our increasing ability to use them. These reductions are breaking down economies of scale and scope built upon functional specialization and vertical integration. As a result, even large companies are mimicking their

smaller competitors: shrinking head offices, removing layers of bureaucracy, and concentrating on core businesses.

This has led to flatter as well as smaller organizations, organized around a set of generic value-creating processes and specific competencies. Some single-mission organizations are now organized as virtual networks, some multi-mission organizations as alliances of networks. Philip Evans and Thomas Wurster (1997) refer to both of these kinds of organizational arrangements as hyperarchies, after the hyperlinks of the World Wide Web. Evans and Wurster assert that these kinds of organizations, like the Internet itself, the architectures of object-oriented software programming, and packet switching in telecommunications, have eliminated the need to channel information, thereby eliminating the tradeoff between information bandwidth (richness) and connectivity (reach).

How far hyperarchy will go is an open question. Evans and Wuster claim that it will destroy all hierarchies, whether of logic or power, “ with the possibility (or the threat) of random access and information symmetry. ” These changes have already influenced business to a greater or lesser degree. They have had almost no effect on the production and delivery of public services. As a result, productivity growth in the public sector has lagged productivity growth in the private sector by a remarkable degree.

Indeed, low government productivity almost wholly explains the gap between value added in manufacturing and in services. Evidently, value-added per worker is only 5 percent lower in private services than in manufacturing, but government productivity lags manufacturing productivity

by a third. The 20 percent of the American workforce employed by government generates less than 15 percent of total output. This means that, if government workers were as productive as nongovernmental workers, GDP would be five percent higher.

More dramatically, had value-added per government worker increased at the same rate as in the goods sector from mid-century on, GDP would have been thirteen percent higher than in 2003 ($1. 4 trillion, about three-fourths of total federal, state, and local expenditures). Moreover, we now live in an economy where workers demand autonomy and citizens/customers demand superior service and more choice. Old-fashioned business bureaucracies cannot meet these demands; neither can old-fashioned government bureaucracies.

What the new public management calls for is the adoption of the organizational designs and practices that are transforming business: decentralized, flatter, perhaps smaller, organizations, organized around sets of generic value-creating processes and specific competencies, high performance HRM practices, modern information technology, balanced responsibility budgeting and control systems, and loose alliances of networks (Jones & Thompson, 1999). An example of what I am talking about is the New Zealand Post, which under its CEO, Elmar Toime, transformed itself from a typical bureaucracy to a profitable state-owned enterprise and the most efficient postal service in the world. This entailed a 30 percent reduction in workforce, but because of changes in organizational design and HRM practices, “ these reductions were accomplished without leaving the organization weakened by a distrustful and unmotivated workforce” (Pfeffer,

1998: 186). Ultimately, we favor these things not only because we want to make the public sector more productive, but also because we want it to be more democratic.

Old style bureaucracy is authoritarian and hierarchical, those attributes never comported well with democratic values. Moreover, the requirements of directing giant, vertically integrated, functional organizations has tended to overwhelm the capacity of the public and its elected representatives to attend to the general welfare. Limiting the scope of the public sector to the provision of services that truly are infused with the common interest cannot but enhance the efficacy of democratic governance mechanisms.