

Socialism and Innovation (Long Version)

by David M. Kotz

Economics Department
Thompson Hall
University of Massachusetts
Amherst, MA 01003
U.S.A.

Telephone 413-545-1248
Fax 413-545-2921
E-mail dmkotz@econs.umass.edu

July, 2000

Preliminary draft; comments welcome

This is the long version of a paper which was written for a special issue of *Science and Society* on "Building Socialism Theoretically: Alternatives to Capitalism and the Invisible Hand." A shorter version of this paper was published in *Science and Society*, 66:1, spring 2002, 94-108. Research assistance was provided by Wu Jing.

1. Introduction

Several new models of a socialist economy have been proposed during the past fifteen years which, while rejecting the now-defunct Soviet version of socialism, seek to retain the idea of socialism as a distinct socioeconomic system from capitalism. Such models have a number of features in common, but three stand out: economic planning rather than market forces guides economic activity, democracy characterizes political and economic institutions, and wide participation in decision-making is to be fostered.¹ Full-blown models of what can be called democratic planned participatory socialism (DPPS) have been developed by Albert and Hahnel (1991), Cockshott and Cottrell (1993), and Devine (1988).

This literature has emphasized the potential superiority of DPPS at meeting human needs. Unlike in the neoclassical approach, which reduces human needs to utility from consumption, human needs are assumed to include satisfying work, egalitarian relationships, economic security, and an appropriate balance of public and private goods. However, despite the greatly broadened conception of human needs, the analysis of the economic performance of DPPS in the recent literature has retained a static focus. While attention is paid to reallocation of resources over time via a planning process, the most important dimension of the dynamic side of economic life has been largely omitted from these models: technical change and the process which brings it about – innovation.

Socialist models remain seriously incomplete without an account of how such a system would perform in the area of innovation. This is an elementary point if one accepts the Marxist theory of historical materialism. According to that theory, the decisive factor in social development is the tendency of human productive forces to develop. When a mode of production ceases to promote economic progress, it becomes susceptible to replacement by a new mode of production that is more favorable for economic development. Just as capitalism vanquished

¹ Another common feature, less emphasized than the above three, is social ownership of productive property.

Socialism and Innovation, by David M. Kotz, July 2000

earlier systems by virtue of its superiority at developing the forces of production, socialism/communism in turn was projected to eventually replace capitalism based on the same dynamic.²

Whether or not one accepts historical materialism as a fully accurate depiction of human social development, the potential innovation performance of DPPS must be an important part of any evaluation of the viability such a system. DPPS might live up to the full expectations of its proponents in the way that it uses currently available resources and technologies to meet human needs, but if it proved technologically stagnant, it would not be likely to survive. This is so partly because any realistic projection of the appearance of DPPS in the world must assume that, for a significant period of time, it would coexist with capitalism and hence be forced to compete with that system. While the claims of capitalism's virtuosity in the area of innovation are overblown, it does promote a rapid change in products and production processes, and a relatively stagnant DPPS would be unlikely to prevail over capitalism in such a competition. Even apart from a rivalry with capitalism, a strong case can be made that, given the current material condition of humankind, a significant rate of technical progress will be essential to human welfare for some time to come.

The previous challenge to capitalism -- that coming from state socialism -- was defeated for a complex set of reasons. The economic flaws of state socialism were only one factor, and, contrary to the now dominant interpretation, central planning never did collapse of its own internal contradictions.³ As far as economic performance was a factor in the defeat of state socialism, its most important dimension was the relative prowess of the two systems at

² No one expects history to march in a straight line toward ever greater human economic prowess – steps sideways, and even backward, obviously occur. Also, there is no pre-ordained timing to progress, and no theory can predict how long a retrograde social system might hang on before being replaced. However, historical materialism claims that, despite the twists, turns, and sometimes lengthy delays, eventually the imperative of economic progress asserts itself.

³ In the Soviet case, central planning was dismantled by political means, after which the no-longer-planned economy began to collapse. See Kotz and Weir, 1997, ch. 5.

Socialism and Innovation, by David M. Kotz, July 2000

promoting economic growth and technological advance.⁴ During 1928-75, when the Soviet system was outgrowing the US and gradually narrowing the technological gap (Kotz and Weir, 1997, ch. 3), it appeared that in the long run the Soviet system might win the contest, despite its many economic (and political) liabilities. Western economists stressed the static inefficiencies in the Soviet system, but these didn't seem to matter much as long as the Soviet economy leapt ahead year after year. It was the sharp slowdown in Soviet economic growth after 1975, to a rate below that of the US, and a reduction in the rate of Soviet technological innovation, causing the technological gap to widen instead of shrink, that set the stage for perestroika and the demise of state socialism (Kotz and Weir, 1997, ch. 3).

This paper analyses the expected innovation performance of a DPPS system. Section 2 presents a framework for analyzing the innovation process in general. Section 3 analyses the innovation performance of contemporary capitalism. It will be argued that, while capitalism promotes certain kinds of technological advance, it is a highly flawed process. Section 4 considers the innovation experience under state socialism, specifically for the Soviet case. The Soviet system was based on a form of social property and a type of economic planning, and there are important lessons to be learned from the Soviet innovation experience for a future DPPS, despite the many differences between the two types of systems. Section 5 takes up directly the expected innovation performance of a system of DPPS. It will be argued that, although the basic institutions of a DPPS system would provide a framework conducive to innovation, certain institutions and features would have to be added to the usual model to assure a fully effective innovation performance. Devine's (1988) version will be used as the template for discussing innovation under DPPS, although the similarities among the DPPS models are great enough that the analysis should be applicable, to a greater or lesser extent, to other models of DPPS as well. Section 6 considers the problem of innovation under DPPS in a future world of competing socialist and capitalist systems.

⁴ The importance of lagging innovation and growth performance in the Soviet demise has been noted by some of the more perceptive analysts both in the socialist and anti-socialist camps (Roemer, 1994, 42-44; Stiglitz, 1994, 139).

2. The Innovation Process

In the literature on innovation,⁵ two types are usually distinguished, process innovation and product innovation. The two are connected, in that most products in a modern economy are producer goods, and product innovation in a producer goods industry represents a process innovation in the industries which use the product. Most of the analysis by economists has focused on process innovation, which is easier to handle theoretically and also easier to measure (via increases in productivity or reductions in cost of production). However, while some innovation is undertaken as a process innovation by the using industry, it appears that much, and perhaps most, innovation is actually undertaken by the producer of the new product, be it means of production or a consumer good.

Various schemes for breaking the innovation process down into stages have been developed. The most useful one, based on the work of F.M. Scherer (1980, ch. 15), identifies four steps: invention, development, production, and diffusion. Invention here means originating the idea for a new product or process and working it out in rudimentary form. Development involves turning the rudimentary form into an economically viable product or process, capable of being produced/introduced within the existing economic system. Production is the step of actually first producing the new product or introducing the new production process. Diffusion is the spread of the new product to other producers or the new process to other users. Finally, progress in basic science, while not regarded as part of the innovation process proper, forms a crucial basis for innovation.

The above five stages, including basic science, are quite different from one another. Basic scientific research is not a commercial endeavor, and it is carried out in both capitalist and socialist systems for aims other than economic progress and in institutions not directly concerned with economic progress. Invention, as defined above, is a very risky endeavor, since thinking of

⁵ Neoclassical economics has little useful to say about innovation, with its static focus and the assumption that technology is exogenously determined. The best work on innovation has come from the margins of mainstream Western economics, with the old institutionalist economics making major contributions.

Socialism and Innovation, by David M. Kotz, July 2000

an economically useful idea is difficult and most do not pan out. However, invention is not necessarily very costly in terms of resources required. Development, while also risky, is much less so than invention. However, the difficulty of converting a rudimentary form into an economically viable product or process makes this stage typically time-consuming and costly. First production/introduction is less risky still, and the cost varies considerably depending on the case. In the final stage of innovation -- diffusion -- the only remaining risks are commercial, not technical.

The above stages schema is helpful for analyzing how hospitable a particular institutional framework is to innovation. A system must be favorable for all stages of the innovation process if it is to exhibit good performance. To approach this analysis, we can ask three questions about a system:

1. Does the system provide strong incentives for innovation?
2. Does the system provide substantial means to carry out innovation?
3. Does the system generate innovative effort that contributes effectively to the improvement of human welfare?

The third question encompasses the allocation of innovative effort among different possible lines of application, but it involves broader considerations than just that, as we shall see.

The above three questions can be applied to an analysis of innovation under contemporary capitalism, under the now defunct system of state socialism, and in a future system of DPPS.

3. Capitalist Innovation

No more eloquent account of capitalism's technological virtuosity can be found than that of Marx and Engels (Marx and Engels, 1978; Marx 1967). In the mature formulation (Marx, 1967, Parts IV and VII), it is argued that the pressure of capitalist competition compels the cheapening of commodities through capital accumulation and the appropriation of the fruits of science in production. Capitalists must constantly innovate on pain of extinction in the battle of competition.

Socialism and Innovation, by David M. Kotz, July 2000

Mainstream Western economics also gives capitalism (or, as it called, a “market economy”) high marks for innovation. The basis of this is supposed to be the pursuit of maximum profit under perfect competition. Referring to the above three questions about innovation, contemporary Western economics provides three answers. First, concerning the incentive to innovate, the lure of profits -- indeed, the prospect of great riches from an important innovation -- spurs entrepreneurs to engage in invention, development, and production/introduction of new and superior products and processes. Competition and free entry compel rapid diffusion of superior products and processes. Second, concerning the means to innovate, the prospect of profits assures that entrepreneurs can obtain financing for the first three stages of innovation, as investors seek to get in on the rewards. Free entry assures that innovators can get into the market and get access to customers for the new product or introduce the new process. Third, since profit maximization drives the innovation process, innovative effort will be allocated optimally, given the assumption that profitability reflects the ultimate value to consumers of any economic activity.

On more careful inspection, capitalist innovation performance is not so straightforward as the textbook account would suggest. First, basic science is not part of the above picture. The capitalist process does not handle basic science well at all, since it is by nature not an activity that generates profits. Hence, in capitalist society it has been organized and financed almost entirely by state and private non-profit institutions. The level of scientific effort depends on different factors from those specific to the capitalist process.⁶

The incentive to innovate in a capitalist system faces three problems. First, the lure of profits is not so effective, or important, at the crucial stage of invention. Studies have found again and again that most major innovations do not originate in corporate research labs but rather are the product of independent inventors, university scientists, and government research

⁶ Historically, capitalism does deserve substantial credit for the birth of modern science, through a variety of indirect channels, such as the promotion of a rational approach to nature.

Socialism and Innovation, by David M. Kotz, July 2000

facilities.⁷ Major examples include the computer and the internet, both of which emerged from the U.S. Department of Defense, and the photocopy machine, which was invented by a lawyer frustrated by the difficulty of copying legal documents.⁸ Expected profit has not been the incentive for such research. Even for independent inventors, case studies of major economically important inventions by such individuals show that typically pecuniary considerations were not important. Such studies also show that the inventor typically gets swindled, as the rewards are seized by the large corporate institutions that step in after the invention stage has been completed.⁹

Second, there is little profit incentive for innovation unless the innovator can expect to gain some form of monopoly power over the innovation. In a real world competitive market, with relatively free entry, some gains can come from innovation, since imitation takes time and the first innovator usually has an advantage. However, the gains will be of limited size and duration, as imitators take advantage of the new knowledge painstakingly uncovered by the innovation pioneer. For that reason, innovative activity in modern capitalism takes place largely in industries with at least a moderate degree of concentration and possessing at least moderately high barriers to entry (Scherer, 1980, 430-38). Industries with no barriers to entry and/or very low concentration generally have almost no innovative activity at all. For example, the innovations in agriculture, the clearest case of a competitive industry, have come from concentrated supplier industries and the government.

Recognizing the importance of monopoly to innovation in a market environment,

⁷ The classic study covered 70 economically important inventions since 1990 (Jewkes et al., 1969). It found only 24 originated in industrial research laboratories, while over half came from either independent inventors or academic scientists. Other studies have found a similar pattern (Scherer, 1978, 416-17).

⁸ The transistor came from Bell Labs, a unique institution organized by ATT when it was a regulated monopoly and not subject to the pressures of competition or the requirement to make maximum profits. Cases abound of inventors of what later turned out to be important new products or processes who knocked in vain on the doors of potential corporate sponsors or funders. The inventor of xerography had to turn to a non-profit research institution for funding.

⁹ Tiny Seattle Computer had to sue Microsoft to seek adequate compensation for the DOS operating system it had sold to Microsoft for \$75,000 (Goldman, 2000).

Socialism and Innovation, by David M. Kotz, July 2000

governments in capitalist countries award patents, which are legal monopolies over new products and processes that last a substantial period of time (now 20 years in the U.S.). When patents are not sufficient, or not available, corporations often engage in brutal tactics to prevent effective competition with new products. Such tactics include threats to drive imitators out of business by price cuts, blocking rivals from access to markets by exclusive agreements, and filing of frivolous infringement suits.

This shows that the incentive mechanism that promotes innovation under capitalism is profoundly contradictory. Monopoly and barriers to entry are necessary for innovation, yet they also serve as obstacles to innovation. The monopoly power that assures a large reward for innovation, whether based on patents or predatory tactics, also elevates the price so that the use of the innovation is restricted. This is a particularly serious problem in the case of pharmaceutical products, where patent-based monopoly leads to prices that are often a large multiple of production cost.¹⁰ This same monopoly power necessary for innovation can also be used to directly block further innovation, which is the primary lesson of the Microsoft anti-trust case. Finally, barriers to entry interfere with the diffusion stage of innovation.

The third problem with the innovation incentive system of capitalism is that the rewards it generates are much larger than necessary. The monopoly power which an innovator may attain, by patent or competitive tactics, can, in the case of a widely used innovation, generate enormous profits, whether the innovation is essential to human welfare or of the frivolous variety. A strong case can be made that rewards to innovation that are relatively modest, compared to those generated by the contemporary capitalist process, would elicit the maximum desirable level of innovative effort in the economy as a whole, even assuming that the sole incentive to innovative effort is expected financial reward. This suggests that unnecessarily large inequalities result, along with unnecessarily high prices for new products and processes.

¹⁰ Pfizer's patented drug fluconazole, which cures cryptococcal meningitis, a deadly side-effect of AIDS, sells for \$18 a pill, placing it beyond the reach of AIDS sufferers in Africa. A generic version produced in Thailand, outside the reach of Pfizer's patent, costs 60 cents a pill (*New York Times*, July 9, 2000, 8).

Socialism and Innovation, by David M. Kotz, July 2000

Capitalism also has problems with the means available for innovation. One can identify three problems in this area. First, the very high risk, and long time horizon, associated with the crucial first stage in the innovation process -- invention -- makes capitalist investors reluctant to fund such activity. Capitalist investors are both risk averse and tend to want returns to materialize soon. This explains why so much of the funding of the invention stage comes, not from profit-seeking investors, but the government and non-profit institutions such as universities and foundations.¹¹

Second, the development stage of innovation, while less risky than invention, still has significant uncertainties and is often very costly. This makes development in many instances beyond the reach of small enterprises and requires a large, or even giant, corporation that is able to raise the funds, bear the still significant risks, and stay with a lengthy and complex project through to completion.¹² While large firm size and monopoly power are not identical, the favoring of large and even giant firms in the innovation process reinforces the tendency toward monopoly power, which has contradictory implications for further innovation, as discussed above.

Third, as was noted above in the discussion of incentives, the elements of monopoly power necessary for a strong incentive to innovate run contrary to assuring that the means are available for the last step in the innovation process, diffusion. Twenty years is a long time, and a patent holder can seriously delay the diffusion of an important innovation during that period, while maximum profits are extracted by keeping the supply restricted and the price high. Modern capitalism has significant entry barriers in much of the economy, which can delay significant innovations for long periods of time. It took decades before front wheel drive was finally introduced into the US auto industry. Capitalism poses an unresolvable paradox here: innovation

¹¹ This also explains why corporate research labs produce a small minority of the major inventions. They tend to focus on the lower risk, although higher cost, development stage.

¹² In addition to the advantages cited above, a large firm has greater potential benefit from an innovation, by being able to spread the fixed cost of development over a large number of units sold.

Socialism and Innovation, by David M. Kotz, July 2000

under capitalism requires barriers to entry for the incentive system to work but requires free entry for the spur of competition to work as advertised and produce a rapid rate of diffusion of new products and processes.

The greatest flaw in the capitalist innovation process has to do with the third question, that of the contribution of innovative activity to human welfare. This flaw is due to the unfounded assumption that profitability reflects the contribution of an activity to human welfare. There are many facets to this problem, of which we will briefly mention six. First, since capitalism produces a high level of inequality in income distribution, and profit-seeking innovation activity disproportionately seeks to develop products and processes aimed at upper income consumers, often ignoring the needs of low-income people.¹³ Second, major innovations always confer large external benefits, which are beyond the reach of even the most skillful patent lawyer or erector of tactically-based entry barriers, which implies a misallocation of innovative effort.¹⁴ Third, public goods are largely ignored by the capitalist innovation process,¹⁵ since there is no profit incentive to produce new and improved public goods, which includes areas such as education, public recreational facilities, mass transit, law enforcement, clean air and water, etc.¹⁶ Fourth, the capitalist innovation process fails to take account of negative externalities, which leads to many serious harmful effects from innovation on workers, communities, and the environment.¹⁷ Fifth, the monopoly power required to stimulate innovation under capitalism

¹³ For example, U.S. pharmaceutical companies, with billion of dollars in R&D funds and legions of highly trained scientists at their disposal, do virtually no research aimed at developing new drugs to cure diseases such as tuberculosis and malaria, which kill tens of millions of (low-income) people every year in the Third World. They find research on new remedies for acne or toenail fungus, which can be sold to high-income consumers, much more lucrative.

¹⁴ That is, the privately appropriable benefits of a major innovation are far smaller than the total social benefits. This suggests that the capitalist innovation system tends to devote too little resources to major innovations.

¹⁵ If public goods are produced by private firms and sold to the government, subject to competitive bidding, this creates an incentive for process innovation in their production.

¹⁶ The capitalist innovation system concentrates innovative effort on the production of private goods, which distorts the outcome, since the quality and quantity of public goods available has a major, not a marginal, impact on human welfare.

¹⁷ Negative environmental effects from new technologies are not purely accidental, in that the availability of the

Socialism and Innovation, by David M. Kotz, July 2000

leads to high monopoly prices for the resulting product, limiting the use of the new innovation and hence reducing the benefit from it.

The sixth flaw may be less familiar. Much innovative effort under capitalism is wasted, being devoted to activities that do not contribute at all to human welfare. This results from the nature of competition in oligopolistic industries, where most innovation takes place. For example, firms that have patented a new product often devote considerable resources to developing and patenting closely related versions of the product, which, while separately patentable, have no use-value advantage over the original version. This is done to prevent a rival from cropping up.¹⁸ The Microsoft case produced a clear example of wasting innovation resources for competitive advantage, when a subpoenaed document found a top Microsoft executive ordering that Microsoft's internet browser be bundled into Windows in order to defeat the rival Netscape browser.¹⁹ This shows how considerations of competitive advantage, even running directly counter to technological advance and improvement of products from the consumer's point of view, can play a decisive role in the capitalist innovation process.

One can conclude that, while capitalism does promote the development of the forces of production, it does so in a manner that is severely flawed. Capitalism can promote innovation only if the state and other non-capitalist institutions play an active role in organizing and financing not only basic science but also the innovation process itself, particularly the invention stage. It can do so only with significant monopoly power and barriers to entry that

environment (air, water, etc.) as a free resource makes new technologies that pollute those resources tend to be more profitable than non-polluting ones in general. It also seems likely that there is a systematic tendency for technological change to degrade workers' life on the job, since any technological change that increases capital's power over workers thereby contributes to higher profits, and in general such changes make workers' job life less satisfying.

¹⁸ In the pharmaceutical industry there is even a name for such new products – congeners, which refers to drugs with a slight molecular variation from the original version that allows a separate patent but may have no advantage over the original.

¹⁹ James E. Allchin, a senior Microsoft executive, was quoted in the document as follows: "I do not believe we can win [against Netscape Navigator] on our current path... We need something more: Windows integration" (*New York Times*, June 9, 2000, C8).

Socialism and Innovation, by David M. Kotz, July 2000

simultaneously promote and hinder technical progress. It can do so only at the cost of distributing unnecessarily large rewards to some of the participants in the innovation process, often excluding the most worthy of them. And it produces a severely distorted innovation process that, after a certain stage of development, may subtract as much from human welfare as it contributes, or even more.

It would appear that capitalism did bring significant and meaningful progress for at least a geographical segment of humanity, for a certain period of capitalist history. Through the mid 20th century, capitalism greatly raised living standards over time for a large part of the population in North America, Europe, and Japan. This can be measured by objective criteria such as living space per person, quality of diet, etc. The increase in longevity and the large reduction in work time since the early 19th century suggest significant net benefits.

However, it is not clear that capitalist innovation is still making a net contribution to human welfare. Diminishing returns may have set in for private consumption by a large part of the population in advanced capitalism. Much of contemporary capitalist innovation is directed to producing new consumer goods that make a doubtful contribution to human well-being. The drive to sell the cornucopia of new consumer goods has contributed to several serious problems in contemporary society. These include a historic shift from declining to increasing work time (at least in the US), as people try earn the money to pay for the never-ending stream of new consumer goods, and a growing imbalance between public and private consumption, as the overworked and financially hard-pressed population resists paying the taxes necessary to finance public goods. Last, but not least, the environmental effects of the capitalist innovation process pose a growing threat to the very survival of the human species.

4. Innovation under State Socialism

The Soviet system was, at best, a highly flawed and distorted version of socialism. The authoritarian and repressive state, the existence of a privileged elite that ran the system, the absence of political rights, the highly centralized form of planning, and the hierarchical relations at the workplace caused many to doubt whether this was a form of socialism at all. However, the

Socialism and Innovation, by David M. Kotz, July 2000

Soviet economic system did have some socialist features, including public ownership of productive property, coordination of the economy by economic planning, and a kind of production for use.²⁰ It represented the first large-scale effort to build a modern economy based on such institutions. For this reason, the experience of the Soviet economy in the area of innovation is relevant to our concerns here.

Spokespeople for the Soviet system claimed that, as a socialist system, it would, and did, outperform capitalism in promoting technical progress. The key advantages cited were the absence of commercial secrecy, the avoidance of the wasteful duplication of R&D effort of capitalism, and the ability to directly incorporate technological advances into the central plan rather than having to rely on the indirect incentive of profitability. It was assumed, at least in the early days of the Soviet system, that incentives would not be a problem, as scientific and technical workers carried out their mandate to develop new products and processes and enterprises quickly adopted them to benefit society. Adequate means for innovation would be assured in the central plan. Innovation would effectively promote human welfare, since it would be directly aimed at that end rather than maximizing private profit. In addition, a large and well-endowed basic science research system would assure a good scientific base for innovative activity.

The Soviet leadership soon discovered that innovation was not as straightforward a process as had been assumed. In the postwar decades the system was frequently adjusted and reformed to improve innovation performance. The mature Soviet system had four main locations of innovative activity: 1) R&D Institutes, which had innovation as their sole mission; 2) certain government agencies, such as the State Committee for Innovation and Discovery; 3) the industrial ministries, each of which had a technical department to manage innovation in its industry of responsibility; and 4) the individual enterprises, which typically had a design

²⁰ This view of the Soviet system is presented in Kotz and Weir (1997, pp. 26-31). Other socialist features included full employment, substantial rights and benefits for workers on the job, a relatively egalitarian distribution of income, and the provision of many public goods and basic necessities free or at a very low price.

Socialism and Innovation, by David M. Kotz, July 2000

department for new product development and, often at larger enterprises, a research laboratory. Major planned new technologies were incorporated into the central plan by Gosplan each year. However, the main sites of innovative activity were the R&D Institutes and the enterprises.

The Soviet system did have significant strengths in innovation performance, as the leading U.S. specialist on Soviet innovation, Joseph Berliner (1976, 1981), has noted.²¹ The Soviet Union created a large and very able scientific establishment, based on the Academy of Sciences research institute system and excellent science and technical education in the schools and universities. The R&D Institutes were staffed with well-trained and dedicated researchers and were reasonably well funded, and they and the enterprises did produce many important innovations. The success was best known in military and space technology, but it extended to some civilian industrial technologies. For example, the Soviet Union was at the world technological frontier by the 1970s in eye surgery equipment, seamless rail laying machines, and certain metallurgical processes. Output per labor hour in the Soviet economy grew rapidly until 1975, much faster than in the U.S. during that period.²²

Berliner (1976) argues that the expected benefit from the absence of commercial secrecy did actually materialize to some extent. An enterprise that developed a new method or product was required to inform other enterprises about it and even to hold workshops to show representatives of other enterprises how to produce the new product or use the new process. However, Soviet innovation performance never lived up to expectations. Understanding the problems encountered in the Soviet innovation process -- and the institutional sources of those problems -- are relevant to evaluating the potential innovation performance of a DPSS system, including potential problems that it might encounter.

First, there was a serious incentive problem in the Soviet innovation process. The

²¹ This section draws upon the pathbreaking research of Berliner on innovation in Soviet industry (Berliner, 1976, 1981).

²² During 1960-75 output per hour in the Soviet non-farm business sector grew at 3.2 percent per year based on Western estimates, compared to a rate of 2.1 percent for that sector of the US economy (Kotz and Weir, 1997, Table 3.4, p. 46).

Socialism and Innovation, by David M. Kotz, July 2000

incentive problem was not a factor at the R&D Institutes but rather at the enterprises, which were the potential source of many innovations and the site at which all innovations had to be introduced. Within the enterprises, relatively minor innovations did not present a serious problem. Soviet engineers and designers did regularly find ways to make small improvements in production processes and adjustments in products, and they received both material and “moral” rewards for such innovations.²³ Such small improvements add up over time and probably help account for the relatively rapid Soviet productivity growth.

The incentive problem involved larger changes in the production process and the development of new products that differed substantially from what had been produced before. The problem was that the Soviet enterprise director, in whom decision-making power for the enterprise was concentrated, faced a context of relatively low rewards for successful innovations while the risks attendant upon major innovations were quite high. This tended to make Soviet enterprise director conservative about innovation, with reluctance to develop new products or processes or to introduce those that emerged from the R&D Institutes.²⁴ The successful introduction of new products and processes formed one of the factors that determined the bonus earned by an enterprise director. However, the upside potential for this was relatively modest, and incentive pay schemes focused on fulfillment of the enterprises’ output quota. Thus, one problem was low valuation of innovation by the planners who devised the incentive pay schemes.

The risk of innovation was not just the result of the inevitable delays and unforeseen costs that arise when trying something new. The key factor was the difficult supply relations in the Soviet planning system. Enterprises always worried about whether sufficient supplies would be

²³ In the 1970s and early 1980s those enterprise employees who contributed to the development of a new process or product would often be given shares of the estimated extra value created by the innovation.

²⁴ While the financial reward/risk calculation worked against innovation, some Soviet enterprises had directors who were personally committed to innovation, and in such cases the problematic incentive structure did not deter them. Such individuals sometimes had very successful careers, if their innovative efforts were successful. Nikolai Ryzhkov rose to become the Soviet prime minister partly on his reputation as an innovative industrial manager.

Socialism and Innovation, by David M. Kotz, July 2000

delivered on time to enable the enterprise to meet its goals. This was a result of the policy of “taut planning,” aimed at achieving the maximum possible output from available inputs. Innovation necessitates unforeseen changes in required inputs, and the taut planning system made it difficult to change the input mix in mid-plan. The hierarchical relations of Soviet planning meant that enterprises did not have close relations with their suppliers, which compounded the problem. These conditions made innovation seem very risky, with a likelihood of interruption of the enterprise’s regular production, resulting in financial punishment for the director.

Another incentive problem was an absence of penalties for failure to introduce available new technologies. A laggard enterprise with outmoded technology might find its costs rising above the industry average, but the ministry tended to protect its enterprises and made subsidies available. Although there was a bankruptcy procedure on the books, it was never invoked. Thus, an enterprise director who, for one reason or another, was very slow at introducing new technologies, faced little pressure to change.

There were also problems of the means available for innovation. Three problems arose of this type. First, innovations that involve radically new products typically entail either the entry by an existing enterprise into a new line of production or the creation of new enterprises. Such new entry was not a strong point of the Soviet system. The Soviet planning system had relatively rigid boundaries between industries, and entry into a different line by an existing enterprise was discouraged, as poaching on the territory of others. New enterprises were created from time to time, and there were specialized construction firms whose responsibility was to build new factories and new enterprises. However, such new enterprise creation was limited and usually faced opposition from existing enterprises that feared encroachment on their territory.

Second, there was a problem of financing the development and production stages of the innovation process. Those stages require resources, and enterprises often had to finance what Berliner calls pre-production costs out of working capital, which could harm existing production,

Socialism and Innovation, by David M. Kotz, July 2000

or from bank credits, causing rising enterprise debt.²⁵

Third, even in a centrally planned economy, one would expect that individual inventors could potentially play an important role in conceiving and working out new products and processes. This was recognized in the Soviet Union. There was an All Union Society of Inventors and Innovators intended to encourage such activity. Most enterprises had a Bureau of Rationalizations and Inventions charged with making small-scale facilities available at the enterprise for aspiring inventors to do research, testing, and construction of mock-ups. However, it is believed that this system was not effective at enabling creative individual inventors to contribute much in the way of important inventions. The passivity bred into individuals by the repressive, centralized, hierarchical Soviet system probably discouraged individual inventive activity.

In the matter of the effectiveness of innovative activity at advancing human welfare, the Soviet system did avoid some of the problems of capitalist innovation. There was no bias against innovation in public goods. For example, substantial resources were devoted to developing an effective mass transit system, including, in the Moscow metro, a time clock in each station counting the time elapsed since the last train had departed. There was no problem of monopoly pricing of new products and processes, with the attendant limitation of their use.

However, the Soviet system had significant weaknesses in the effectiveness of innovative activity. We will cite three problems in this area. First, while irrational profit criteria largely guide the allocation of innovative effort in a capitalist system, in the Soviet system the “planners’ preference” guided this allocation. This was of course not a democratic participatory system, and production for use meant production based on the priorities of the top leadership. These priorities dictated the allocation of innovative effort. They favored certain sectors, particularly the military, space exploration, and certain industrial sectors that had powerful ministries at their heads. Consumer goods occupied a lowly place in these priorities, and as a result, the resources

²⁵ This obstacle to innovation was reduced to some extent in 1960 by the establishment of a New Products Fund, to which enterprises could apply for a subsidy for pre-production costs (Berliner, 1981, 117).

Socialism and Innovation, by David M. Kotz, July 2000

available for innovation in consumer goods – both in the form of incentives and in the form of funding and research personnel – were very restricted. Unlike the capitalist tendency to value private over public goods, the Soviet system tended to do the reverse. Private consumer goods are relevant to the public welfare, and this important sector was clearly undersupplied with innovative effort, as countless complaints about the quality of household consumer durable goods made apparent.

Second, there was an important source of waste of innovative effort in the Soviet system. While not afflicted with the forms of waste generated by the search for commercial advantage in a capitalist system, there was a problem stemming from the poor relations between the two key institutions involved in innovation, the R&D Institutes and the enterprises. The R&D Institutes had the best researchers and facilities, and they produced a large volume of plans for new products and processes. However, their relations with the enterprises, which had to produce the new product or introduce the new process, were difficult. Enterprises complained that plans arrived that were incomplete, unrealistic, or unworkable. R&D Institutes complained that enterprises were uninterested in their proposals. The result was that much innovative effort failed to bear fruit. This seemed to be one more problem of a system in which the relations were predominantly hierarchical, with relations between institutions at the same level of the hierarchy very poorly structured.

Third, and perhaps most serious, innovation in the Soviet system generated major external costs, particularly for workplace and environmental health. Workers were regularly subjected to unsafe and unhealthy working conditions, and major environmental destruction was done by Soviet development. This was not purely a matter of innovation performance – it involved a broader issue of valuation of worker and environmental health in allocation decisions. However, this problem did involve innovation, as new techniques and products were developed and introduced without regard to their health impact. The reason for this in the Soviet case was not the pursuit of profit as in capitalist innovation but 1) the single-minded emphasis on growth in output, and 2) the undemocratic and repressive character of the system which prevented the

affected parties from defending their health interests.

It was mentioned above that Soviet innovation performance, which always fell short of the claims, worsened after the mid 1970s. No one is sure why this happened. The following factors may have played a role. First, as the Soviet economy moved closer to the Western level, the opportunities to copy and adapt Western technology lessened, and the role of finding entirely new processes and products became more important. It may be that the Soviet system was not as good at that type of innovation.²⁶ Second, the growing size and increasing complexity of the Soviet economy may have made the hierarchical and highly centralized system less adept at fostering innovation. Third, as the distortions, inequalities, and hypocracies of the Soviet system became more apparent to the population, the “socialist” incentive to work effectively in order to contribute to society may have weakened, and this would affect the incentive to innovate along with the incentive for other kinds of work.

5. Innovation in a Democratic Planned Participatory Socialist System

What kind of innovation performance would be expected under a DPPS system, by comparison to that of capitalism and state socialism? We consider a system along the lines described in detail in Devine (1988). Three features of DPPS, as laid out in Devine (1988), are relevant to innovation performance. First, the main features of the overall economic plan would be determined by a democratic process. That is, the major economic decisions, such as the shares of private consumption, public consumption, and investment in national product, would be made, not by market forces, or by a self-appointed Politburo, but by some kind of democratic decision-making process on a national scale.²⁷

Second, the planning and coordination of the economy would take place, not through

²⁶ As was noted above, the Soviet system was relatively good at basic science and at turning out new ideas from the R&D Institutes. However, it may be that the poor coordination between R&D Institutes and enterprises, along with the failure to effectively mobilize the efforts of individual inventors, became more serious problems as the Soviet economy approached the world technological frontier.

²⁷ In Devine’s model, “Broad social priorities and changes in strategic direction are decided through the democratic political process on the basis of alternative plan variants prepared by the national planning commission” (1988, p. 190).

Socialism and Innovation, by David M. Kotz, July 2000

market forces or top-down central planning, but through a process that Devine calls “negotiated coordination” (Devine, 1988, ch. 8-10). Resource allocation decisions would be decided by boards -- industry boards and local and regional negotiated coordination bodies -- that have representation of all affected constituencies, including representatives of workers, consumers, suppliers, the local community, and even “cause” groups such as environmentalists, job safety activists, feminists, etc. These bodies would arrive at decisions through compromise among the interests represented on them.²⁸ Information from market exchanges -- concerning sales, inventories, profits -- would be utilized along with other information -- from workers, consumer representatives, other producers of a product, etc. -- in the process of making reallocation decisions. In addition, the basic units of social production, or enterprises, are considered social property and have governing boards that include representatives of all groups affected by the activity of the enterprise, including workers, consumers, suppliers, and the local community.

Third, each individual would be expected to spend part of her/his work life in each of the main types of labor, which Devine defines as planning and managing labor, creative labor, nurturing labor, skilled labor, and unskilled/repetitive labor (Devine, 1988, 171). This would eliminate the social division of labor, while preserving the technical division of labor with its efficiency advantages.

In analyzing the innovation performance of such a system, we should be on the lookout not just for potential strengths but also for potential weaknesses. Of particular interest is whether any potential weaknesses uncovered can be plausibly remedied by “adding” specific institutions or policies to the model, or whether weaknesses would seem to be inherent in the basic structure of DPPS. Any institutional or policy modifications would have to be consistent with the structure and functioning of a DPPS system.

In the absence of competitive pursuit of profits, or a Politburo demanding innovation,

²⁸ It is argued that the system would be structured so as to encourage representatives on decision-making boards not to simply defend the narrow self-interest of their constituencies but to weigh the legitimate needs of all groups in society as well as those of the constituency they represent.

Socialism and Innovation, by David M. Kotz, July 2000

what would be the source of innovation under DPPS? First, the democratic, participatory institutions of that system would empower the population to demand innovations aimed at its own benefit. Under such a system, people would stand to benefit from innovation, in the three roles that people occupy – that of consumer, worker, and community member. Consumers can benefit from new, better, and cheaper products. Workers can benefit from a lighter load and a more satisfying experience at work. Members of the community can benefit from products and work processes that improve, rather than harm, community life.²⁹

DPPS, like every economic system, can also tap a second potential source of innovation. That is the species trait of human beings of having a propensity to look for ways to change and improve their methods of doing things. Entirely apart from any desire for more goods or less labor, human beings tend to invent better ways of producing things and new things to produce. This drive, present in most people, although not in equal measure in all, represents a separate source of innovative behavior, if the economic system allows it to operate freely.

How would a DPPS economy translate the potential benefits of innovation into actual effective innovative activity? How would it encourage, within the economy, the expression of human beings' natural tendency to create new things? To answer these questions, we turn to the same framework used above for evaluating the innovation performance of capitalism and state socialism.

First, the populace, through its political decisions on the society-wide level, would presumably choose to devote considerable resources to basic science, both for its own sake and as a necessary basis for economic progress. Performance in this area would presumably be at least as good as that of state socialism.

If the populace wants innovation, they would have to build into the system significant incentives for those who are in a position to carry it out. The method of rewarding enterprise

²⁹ Innovation under DPPS would not mean production of an endlessly growing volume of new consumer goods, if the assumption is correct that such a process makes a doubtful contribution to improving human welfare. See below for further discussion of this point.

Socialism and Innovation, by David M. Kotz, July 2000

managers would have to reflect such a social priority. Not only managers, but everyone who participates in any of the stages of innovation, should be eligible for rewards for successful innovation. It is not sufficient to assume that decision-makers will automatically innovate -- it must be communicated to them, via a reward system, that society values innovation.

Such rewards would be needed regardless of the mix of material versus moral incentives. It may be that, in its early stage, DPPS would rely significantly on individual material rewards. If so, such pay incentives need not be huge to elicit innovative behavior, as long they are large enough to bring a noticeable consumption benefit to the innovator. In any event, moral rewards – i.e., forms of recognition – would probably be more effective for stimulating invention even in the early stage of DPPS.

As the Soviet experience indicates, a planned economy increase the risk of innovation, deterring innovative activity. However, DPPS should not suffer from the problems of uncertain supplies and inflexibility that characterized Soviet planning. In contrast to the centralized, hierarchical planning of state socialism, the basic institutions of DPPS should produce close relations between supplier and customer enterprises. With representatives on one another's decision-making boards and with opportunities to communicate on negotiated coordination bodies, there should be reliable and flexible relations between suppliers and customers. To make this possible, it would be necessary to eschew the Soviet policy of taut planning, and operate the economy with sufficient excess productive capacity to accommodate the unforeseen changes in inputs that innovation requires.

Without the spur of competition to compel laggard enterprises to adopt the best technology in the industry, could an enterprise management, perhaps backed up by a workforce unenthusiastic about change, simply refuse to make improvements? As was noted above, an enterprise under DPPS is not the sole property of its workers but is social property, upon which constituencies outside the enterprise have a legitimate claim. The enterprise board reflects this, as does the board representing the industry of which the enterprise is a part. Industry boards would have to keep track of laggard enterprises, and consumer representatives on both industry

Socialism and Innovation, by David M. Kotz, July 2000

and enterprise boards would have to be powerful enough to exert pressure to make appropriate changes, imposing financial penalties where necessary.

In order for this system to work effectively, it would be desirable to have more than one enterprise in each industry, except in cases of natural monopoly.³⁰ The purpose is not to impose a market form of competition in which the cheapest producer drives out the rest, a process which yields socially irrational outcomes. Rather, the purpose is to permit the gathering of comparative information about enterprise performance, from market exchange as well as other sources, so as to make informed decisions about what changes enterprises should be asked to make. It would not always turn out that the higher-cost producer is the one asked to change; the lower-cost producer might be found to have achieved low costs by anti-social practices rather than superior technology.

Long ago Adam Smith complained that the detailed division of labor tends to make workers stupid. The DPPS practice of assuring everyone participation in the highest types of labor should have the opposite effect. This practice, along with the widespread participation in decision-making fostered by a DPPS society, should encourage the creative, innovative behavior that is natural to our species. DPPS should create conditions for a substantial outpouring of creativity from the population, some of which would take the form of innovation in the economic sphere.

In the matter of the means for innovation, DPPS could encounter the problem of insufficient financing for the development and production stage of innovation which occurred under Soviet planning. However, Soviet reform experience (mentioned above) shows that this would not be difficult to solve via building such “pre-production cost” financing into the planning system.

However, DPPS would face other, more serious, and more difficult to resolve problems in assuring adequate means for innovation. The basic institutions of DPPS would not necessarily

³⁰ Devine (1988, 220) makes a similar argument.

Socialism and Innovation, by David M. Kotz, July 2000

provide sufficient opportunities for creative individuals to work out new economically relevant ideas. More generally, there would be a danger that the decision-making boards of DPPS would tend to represent existing ways of doing things and offer resistance to innovation.

The citizens of a DPPS society could solve this problem by establishing an Innovation Facilitation Board (IFB), dedicated to the promotion of innovation throughout the economy.³¹ The IFB would be given substantial financing from the central treasury. It would take applications from enterprises, informal groups, or individuals that wanted to work on inventing a new product or process or to engage in the development stage of an innovation. It would be able to make grants covering a long enough time period to provide a chance of success, up to five years or so.

Determining the membership of the IFB represents a potentially serious problem for DPPS. Suppose that, following the basic principle of a DPPS system, the IFB included representatives of all the constituencies that are affected by innovation. This would be likely to subvert the intended function of the IFB. Major innovations typically have victims, and the potential costs may be more apparent than the potential benefits when the innovation is still at an early stage.³² A simple application of the principle of wide representation might block the development of new products and processes before their potential benefits even became apparent.

In order to be capable of carrying out its mandate, the IFB would have to depart from the usual principle of full representation of affected constituencies. It would have to be an independent board, perhaps made up of consumer representatives and experts of various kinds. Such a departure from the usual practice would be consistent with the underlying principle of DPPS, as long as the final decision to implement an innovation rested with a representative

³¹ The IFB would not necessarily be a single body but would likely have a structure of regional and local boards and possibly boards that specialized in particular kinds of innovations.

³² Worker (or industrial) members might resist new ideas that seemed to threaten the product or process to which they were currently connected. Regional representatives might object to innovations that would appear to undermine the current economic base of their region.

Socialism and Innovation, by David M. Kotz, July 2000

board. The IFB would facilitate and encourage the invention and development stages for new products and processes. At these early stages, it is not yet possible to identify very accurately the potential social benefits and costs of an innovation. It seems justified to protect the early stages of innovation from a final social decision, until it has been developed to the point where a well-informed judgment can be made about benefits and costs.

However, the decision to implement an innovation should have to pass the test of the system's core process of evaluation by, and compromise among, all affected constituencies. This calls for a second institution, an Innovation Approval Board (IAB). It would be constituted in the usual way, with representation of all relevant interests. Its role would be to determine whether a proposed new product or process, which emerged from a grant from the IFB, should be given the green light for production/introduction.³³

This process may appear similar to what takes place under state-regulated capitalism, where capitalist enterprises develop new products and processes, but the state reserves the right to regulate the result in the public interest -- and citizens can sue if they are harmed. However, the threat of later regulation or lawsuits does not have much impact on the capitalist innovation process itself, which is conducted based on the criterion of maximum private profit. Regulation or lawsuits come later, after great profits have already been gained, great damage has already been done, and the cost of altering a socially harmful course of innovation has grown very large.

Unlike the after-the-fact regulation of state-regulated capitalism, the above system of innovation under DPPS would place social interests at the heart of the innovation process. While the research and development stages of a project would not be subject to being blocked by opponents, the project could not be implemented, and the costs actually imposed, without social approval. Furthermore, those engaging in invention or development on an IFB grant would know the criteria by which the implementation of the innovation would eventually be judged by the

³³ For this process to be viable, the IAB would have to be granted adequate funding and staffing to process applications for approval soon after they are submitted. In capitalist societies state boards of all kinds are famous for delaying decisions, but this is not inherent in public bodies.

Socialism and Innovation, by David M. Kotz, July 2000

IAB. This should have a positive impact on the direction of invention and development, since those working at the early stages would have to take account of the eventual social calculus that would be applied to the final product of their labor.

A remaining problem is the possible need to allow an existing enterprise to enter a new line of production, or to permit the founding of a new enterprise, in order to implement a major innovation. This might encounter resistance from existing interests. To avoid this problem, once the IAB has given its approval, the innovators should have the right to request permission to start a new enterprise, or enlist an existing enterprise to move outside its previous line of work, in order to implement the innovation. A decision to grant such a request might require a joint meeting of the IFB and the IAB.

It seems reasonable to assume that the polity of a DPPS system, if it desires innovation, would be willing to create and finance an independent board like the proposed IFB. After all, it is not difficult to see that innovation is a unique activity, involving both great uncertainty and the expression of human creativity. This process needs some freedom from social constraint in its early stages.³⁴ However, social control is appropriate in the final stages, so as not to produce unwanted social consequences.

The social effectiveness of innovation under DPPS should be free of each of the six problems of capitalist innovation cited above. Innovation would not be directed disproportionately to satisfy the rich, since there would be no rich class, nor would profits from sale guide innovation. External benefits should be considered in innovation decisions by the boards making the decisions about new technologies and products. The balance between innovation in public and private goods should reflect the citizenry's priorities, since representative bodies would allocate innovation resources between the two types of goods, and the incentives for innovation should be equally strong for the two. Potential negative externalities should be fully weighed by the decision-making bodies which have worker and community

³⁴ A policy might be considered of allowing every individual the right to at least one grant in a lifetime from the IFB, to undertake an innovation project without having to justify it.

Socialism and Innovation, by David M. Kotz, July 2000

representatives on them, and such bodies will not face the pressure of competition and profit-seeking. There would be no problem of monopoly pricing restricting the application of innovations and no waste of innovative effort due to oligopolistic competition.³⁵

The three problems that undermined the effectiveness of innovation under state socialist planning should be absent from DPPS. No Politburo officials would dictate priorities for innovation, imposing their view on society and starving some essential sectors. Instead, democratic decision-making would determine the amount and allocation of innovation. The waste-generating disconnection between R&D Institutes and enterprises should not be present in DPPS, since horizontal relations among institutions would be strong. If R&D Institutes were designed as part of the innovation system of DPPS, then cross representation between them and the enterprises, in a system not dominated by vertical power relations, should permit an effective interface between the two types of institutions. Last, the causes of the severe external costs of innovation under state socialism – a single-minded focus on growth of output and a lack of democracy – should not characterize DPPS.

Our conclusion is that the basic defining institutions of DPPS are generally favorable for innovation, but these institutions alone would not be sufficient to guarantee successful innovation performance. By adding the set of additional institutions and policies mentioned above, DPPS should display an innovation performance far superior at meeting human needs to that which either capitalism or state socialism is capable of achieving. The necessary additional institutions and policies are the following: 1) rewards for those who participate in innovative activity; 2) a policy of maintaining excess productive capacity; 3) the maintenance of multiple sources of supply wherever possible; 4) an independent Innovation Facilitation Board charged with encouraging and financing early-stage innovative activity. Of course, such a system would not guarantee that innovation would always contribute to human welfare. It is not always

³⁵ DPPS would not have an allocation system that purports to “optimize” allocation of resources directed to innovation, a process that is supposed to be achieved by the pursuit of profit in competitive markets. In reality no such “optimum” can be achieved, or even defined. The best allocative result that can be achieved is one reached by a reasonable process of negotiation and compromise among the affected parties.

Socialism and Innovation, by David M. Kotz, July 2000

possible to predict in advance what the eventual consequences of a new product or process will be. However, such a system would be far superior to earlier systems at making such decisions.

It must be admitted that the innovation performance of a DPPS system would not be likely to be problem free, even under the best of circumstances. One problem is that there is no socially optimal rate of innovation, and there might be sharp political struggles over what the rate ought to be. Some groups, such as older people and those of conservative personal bent, might clash with the young and those who delight in novelty and change. Whatever rate of innovation emerged from the political struggle, some would be unhappy with the outcome.

A second problem is the difficulty of weighing the benefits and costs of any major innovation. The costs and benefits tend to fall on different groups and individuals. Sometimes the benefits are widely spread while the costs are concentrated on a relative few whose skills may become outmoded or way of life disrupted. There is no easy way to make a decision in such matters. The different groups represented on the boards charged with making such decisions will have to find a way to compromise, which might not be easy. It is possible that those favoring no change may have an advantage over those favoring change, when the sides are relatively evenly matched.

Third, the process of negotiation and compromise of DPPS takes time. When this process is brought into play to decide whether to approve an innovation, an element of delay is introduced. Such a delaying step in the innovation process is not present in capitalism for most products.³⁶ Sufficient resources should be devoted to the IAB to prevent the development of a large backlog of projects seeking approval. This would not eliminate the delay, but some delay is justified if society is to avoid socially harmful innovation decisions.³⁷

6. Competition between Democratic Planned Participatory Socialism and Capitalism

³⁶ However, capitalist innovation has delays of its own, due to entry barriers and lack of adequate funds for risky invention projects.

³⁷ In real world capitalism, certain kinds of innovations are in fact delayed by such a process, as in the case of new drugs. While the companies often complain, such regulation seems to be popular with the public.

Socialism and Innovation, by David M. Kotz, July 2000

DPPS is unlikely to emerge everywhere in the world at once. It will presumably emerge in one or more countries, while capitalism remains the dominant system for a period of time in other countries. A period of rivalry between the two radically different social systems would pose problems for DPPS.

The advantages of DPPS in the effectiveness of innovation at improving human welfare may constitute a handicap in a competition with capitalism. A full weighing of the costs and benefits of major innovations under DPPS may result in the rejection of some technologies that capitalism readily adopts. For example, this may be true of technologies that cause large external costs. Particularly when the external costs would be imposed on the entire world, responsible decisions under DPPS to reject such innovations might make the lifestyle of people living under DPPS appear more constrained than that under capitalism. For example, people in capitalist society may be driving around in SUV's while people in DPPS societies people take the train or ride in small electric cars. Although DPPS makes the right decision based on all costs and benefits, the result may be to make life in capitalist society appear more enticing.

Transportation decisions are not the only examples. In general, the rapid pace of innovation under capitalism is, in an important sense, driven by its social inefficiency. The negative effects do not enter into the innovation decision, and there is no weighing of costs against benefits. Those harmed by an innovation have no voice and no way to stop it. Work life and community life, which are not valued in the capitalist innovation process, are in a sense more difficult to see than the private consumption which capitalism promotes and favors. Although capitalist innovation may systematically harm the population at work and in their communities, it may be possible for capitalism to effectively promote itself through the consumer society it creates, in a way that appeals even to the citizens of DPPS societies, who may not readily see the costs of consumer society. It may not be easy for DPPS to win the competition with capitalism.

Yet, if DPPS is as effective at meeting human needs as it appears, it may be possible for DPPS societies to wage an effective struggle against the false lure of the capitalist consumer paradise. Perhaps a campaign to invite people living under capitalism to spend a year living

Socialism and Innovation, by David M. Kotz, July 2000

under DPPS would bring home its advantages in a way difficult to see in the media images. Once a future Jesse Helms has to resort to banning travel to DPPS societies, the road to world-wide victory of DPPS may be near at hand.

It is uncertain whether human society will always engage in rapid innovation. If a future advanced DPPS some day achieves a comfortable living standard, satisfying work of limited duration, and the economic supports necessary for a fulfilling community life for all, then its citizens might decide that they prefer a stable, sustainable economic level without continuing change in economic life. At that point, the human creative impulse might turn entirely to non-economic pursuits. However, such a choice would not be likely as long as pockets of poverty and material deprivation persist, nor would it be feasible as long as DPPS is compelled to compete with capitalism.

Socialism and Innovation, by David M. Kotz, July 2000

References

- Albert, Michael, and Robin Hahnel. 1991. *The Political Economy of Participatory Economics*. Princeton: Princeton University Press, 1991.
- Berliner, Joseph S. 1981. Technological Progress and the Evolution of Soviet Pricing Policy. Pp. 105-125 in Steven Rosefielde (ed.), *Economic Welfare and the Economics of Soviet Socialism: Essays in Honor of Abram Bergson*. Cambridge: Cambridge University Press.
- _____. 1976. *The Innovation Decision in Soviet Industry*. Cambridge, MA: The MIT Press.
- Cockshott, W. Paul, and Allin Cottrell. 1993. *Towards a New Socialism*. Nottingham: Spokesman.
- Devine, Pat. 1988. *Democracy and Economic Planning: The Political Economy of a Self-Governing Society*. Boulder: Westview Press.
- Goldman, Jacob E. 2000. "Innovation Isn't the Microsoft Way." *The New York Times*, June 10, A15.
- Jewkes, John, David Sawers, and Richard Stillerman. 1969. *The Sources of Invention*. New York: Norton.
- Kotz, David M., with Fred Weir. 1997. *Revolution from Above: The Demise of the Soviet System*. London and New York: Routledge.
- Marx, Karl. 1967. *Capital*. Volume I. New York: International Publishers.
- _____, and Friedrich Engels. 1978. Manifesto of the Communist Party. Pp. 469-500 in Robert C. Tucker (ed.), *The Marx-Engels Reader*, 2nd Edition. New York: W. W. Norton.
- Roemer, John E. 1994. *A Future for Socialism*. Cambridge: Harvard University Press.
- Scherer, F.M. 1980. *Industrial Market Structure and Economic Performance*, 2nd Edition. Chicago: Rand McNally.
- Stiglitz, Joseph E. 1994. *Whither Socialism?* Cambridge: The MIT Press.