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WORKERS AND TECHNICAL MANAGEMENT IN THE USSR

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Introduction

This paper deals with worker participation in technical decision-making in the U.S.S.R. It should be stated at the outset that such participation is limited: i.e., Soviet workers do not decide technical policy for the enterprise. The Soviet regime, however, does for political, ideological, and technical reasons attach significance to mass mobilization in the technical sphere. Such mobilization, as will be shown, implies limitations on the decision-making autonomy of enterprise management, and it is these constraints that define the scope of "worker participation" in the Soviet context.

Central to the inclusion of workers in managerial decision-making in the U.S.S.R. is a concept knwon as "mass" invention or as rationalization. As Soviet writers define it, rationalization is the "most mass form of creativity" [1] --i.e., the form most accessible to persons without specialized professional training. On a purely technical level, this concept refers to change-producing activity that does not meet the technical standards of invention: i.e., that is novel only by the standards of the enterprise in which it originates, and that involves mostly minor modifications of equipment and productive processes. On an organizational level, it implies commitments of administrative resources for evaluating suggestions and of technical and financial means for implementing ideas that are viewed as potentially valuable to the enterprise. The readers might well wonder at this point: What is the difference between Soviet rationalization and the employee incentive programs that are familiar to Western enterprises (epitomized by the so-called "suggestion box"). The

answer is that while "creative labor" may be a matter of company policy in some Western organizations, in the Soviet Union it is a manifestation of political assumptions and values that lie at the core of the Soviet system. Partly because of the political salience of rationalization in the U.S.S.R., its implementation requires administrative responses far broader than those required in implementing comparable "suggestion box" programs in Western industry.

This paper represents an attempt to explore mass technical innovation as a vehicle of "worker participation" in management in the U.S.S.R. It will discuss this theme in terms of several dimensions: the political assumptions underlying worker innovation, the technical environment of the Soviet enterprise, the constraints that rationalization imposes on managerial behavior, and the technical and sociological factors affecting the creative activity of the Soviet worker. An effort will be made at the end of the paper to explore--and to criticize--Soviet conceptions of how the "scientific-technical revolution" (STR) affects worker-management relations within the enterprise.

I. The Soviet Concept of Rationalization

A. Political and Ideological Assumptions

The modern Soviet concept of rationalization is built on several political assumptions that draw heavily from both Leninist and Marxist doctrine. These assumptions are not equally salient for all periods of Soviet history: nevertheless, they reflect a pattern of reasoning common to the Marxist-Leninist political tradition, and hence constitute the building blocks of current Soviet doctrine of "technological" participation by industrial workers.

One of these assumptions is that working class creativity on any substantial scale can occur only in countries liberated from bourgeois exploitation. The overthrow of capitalism, in this view, creates entirely new conditions for workers' expression of their inventive talents. An early spokesman of this view was Felix Dzherzhinski, who wrote in 1925:

> With the transition of the means of production into the hands of the worker-peasant government, completely new possibilities opened up for the use of the latent inventive talent of the worker at the machine. The worker knows that he is not working to strengthen the role of his class enemy: the capitalist; rather, he gives to his own class and his own state the possibility of raising the productivity of labor, increasing the amount of wealth produced, lightening burdensome work and improving working conditions....[2]

Modern Soviet writers further develop this position, arguing that technical creativity is determined "not just by practical needs but by the content of social interests and the demands of groups and classes."[3] While creative labor may exist under capitalist exploitation, the argument goes, it occurs in a restricted or "perverted"

form. Socialism, however, provides a broader community (obshchnost) of socio-economic interests and engenders new moral qualities--"unthinkable under capitalism" such as "communist principledness," "worker conscience," and the "feeling of moral responsibility to one's collective."[4] All of these developments tend to expand the "mass basis" of technical participation and to increase the tempo of invention and rationalization activity.

Another political assumption of rationalization derives ultimately from Leninist conceptions of state and society. In general, such conceptions distinguish between the electoral participation characteristic of Western democracies and participation in the actual administration of social and economic life--the latter being closer to "true" democracy in the Leninist view. What this distinction has come to mean in Soviet political practice is a mode of "political" participation which serves the function of developing and maintaining commitment to officially sanctioned goals. Under Soviet conditions, "Leninist democracy" could even be synonymous with taking a creative attitude toward one's work, as the following statement (made in 1929) suggests:

> Lenin's slogan: "any female cook can run the state," thrown out to the masses in the period of taking over the state apparatus, means /now/--when we have correctly moved toward the reconstruction of our state on a new technical basis--that each worker must exert the maximum effort to improve and to perfect the work of his machine and to raise the productivity of labor.[5]

Such a redefinition or reorientation of Leninist politics to emphasize the sphere of production is not stated so boldly

in modern Soviet writing; nevertheless, overtones of it appear occasionally in Soviet discussions of "democratic centralism" in economic management. As a typical statement notes: This principle encourages the "use of the creative activity of the masses--resolving production problems"--albeit under conditions of "strict discipline and subordination of lower to higher organs."[6] Mobilization of mass initiative in technical innovation creates a "critical force that activates the administration" of the enterprise and constitutes a "form of democratic mass participation in the leadership of production."[7] All such formulations, it may be argued, represent Soviet adaptations of the Leninist participatory style: adaptations that imply the use of creative labor as a surrogate form of political participation.

A third political assumption--or set of assumptions--underlying Soviet commitments to creative labor, derives from Soviet prescriptions for the transition to communist society. Mass innovation in the U.S.S.R. stands, in a sense, at the interstices of the technical system and the ideological "goal culture"--the normative order that legitimizes social change under the Soviet regime. Its relation to the "goal culture" reflects concerns that are political, sociological, and psychological in nature: these include the "social self-management" of production, the "intellectualization" of the working class, and the development of motivational patterns suitable for the performance of work in a communist society.

Social self-management of production, as articulated by Soviet theorists, is both a goal of communist development and a means of

"involving" factory employees in management functions in the period of communist transition. As a prospect for the distant future, it refers to "management that is both elected by and accountable to the collective;"[8] as a transitional phenomenon, it refers to a limited degree of "democratization" that affects primarily the sphere of production technology. In effect, social self-management, in Soviet thought, is an organized expression of the technological mode of participation discussed above; Soviet writers equate it with the infrastructure of so-called "social creative unions" in Soviet factories--a network of mass membership organizations concerned primarily with the sponsorship of technical innovation including rationalization, within the enterprise.[9] Worker participation in such unions, according to one writer, has "significantly broadened the arena of worker management in the modern era of building communism."[10]

The term "social," in Soviet parlance, means extra-bureaucratic or voluntary (also, to some extent, spare-time). Social creative unions are subordinate, not to the factory administration but to the mass organizations--the Trade Unions--and to a lesser extent the CPSU. Operational leadership of such unions is vested in two trade union affiliates: the All-Union Society of Inventors and Rationalizers (VOIR) and the Scientific-Technical Societies (NTO). The functions of these societies at the factory level, which include developing mass participation in technical problem-solving and defending innovation against managerial abuses, constitute a unique--by Western standards--set of constraints on managerial

resources. This theme will be explored in a later section of this paper; suffice it to emphasize here that the concept of social self-management strongly reflects the fusion in Soviet ideology of concepts of technical innovation, mass participation, and Communist transformation.

Mass innovation is also supposed to serve the objective of Communist transition by contributing to what in Marxist doctrine is known as the "unification of mental and manual labor." Specifically, it is supposed to promote what might be called the "intellectualization of the working class." There are essentially two Soviet interpretations of how such intellectualization occurs. One stresses the role of the creative act itself in this process: by "broadening and deepening the creative side of work," one Soviet writer notes, rationalization contributes to eliminating the "distinctions between the labor of workers, on the one hand, and that of engineers and technicians on the other."[11] Another expression of the argument runs as follows:

> Now when a worker...creates even the smallest improvement in one or another machine, he ceases to be the blind executor of the orders of the engineer. Not ceasing to engage in physical labor, he simultaneously engages in mental labor. Thus begin to disappear the boundaries between the class of executors (ispolnitelei) and leaders.[12]

A somewhat different interpretation emphasizes that the worker becomes "elevated" to the level of the engineer within the context of collective forms of innovation--vehicles appropriate to the complexity of modern mechanized or automated production. Collective innovation is epitomized in so-called "complex brigades" of workers, engineers, and sometimes scientists, which, according to Soviet writers, are increasingly supplanting individual forms of creativity as the enterprise becomes technologically more advanced. Such brigades are viewed as building blocks of the goal culture: writers depict them as helping to eliminate differences between mental and manual labor by strengthening "psychological-social links" between workers and engineers, transmitting designing skills to

workers, and developing their theoretical knowledge.[13] Here, in other words, the social context of innovation rather than the creative process itself is the primary means of breaking down mental-manual distinctions within the enterprise--an argument that may reflect important changes in the nature or scope of worker creativity under conditions of technological advancement.

Creative labor, finally, contributes to Soviet ideological goals because it provides the psychological prerequisites for work in a communist society. This argument consists of three interrelated propositions: the first is that collective sentiments--"feelings of obligation to the society"--are not in themselves a sufficient basis for "communist" work motivation[14]; the second is that such motivation is closely linked to the development of the individual personality; and the third is that the worker becomes "individualized" as a consequence of performing labor that is not standardized or repetitive; in effect, he develops a "personality" based on his creative efforts (tvorcheskaya lichnost).[15] The relationship between creativity, personality, and communist labor is well expressed in the following paragraph.

> Social interest in the form of moral stimuli will continue to be one of the decisive influences on the labor of the members of Communist society--but personality (lichnost) does not dissolve in the collective; it will continue to express its distinctiveness from other people first of all in creativity, which carries the stamp of individuality and at the same time binds man to society.[16]

Creative labor in Soviet political thought is hence a crucial component of Communist individuality--a legitimate and necessary form of self-expression in an otherwise collectivized social order.

The linkages between mass technical creativity and the political or ideological assumptions of the Soviet regime may now be summarized as follows: first, mass innovation is defined as a hallmark of the post-bourgeois social order--i.e., it is supposed to flourish under conditions created by the overthrow of capitalism. Second, it derives from a Soviet adaptation of the Leninist participatory style; i.e., it constitutes a surrogate form of political participation in a state theoretically committed to advancing working-class interests. Third, it is linked to the Communist "goal culture" by serving as a vehicle for the reduction of social distinctions between workers and technical-managerial elites, and for the formation of a creative individuality that "is an essential motivational component of the future communist society. For all these reasons, articulated by Soviet writers over the years, mass innovation is no ordinary "incentive program"--on the contrary, it lies at the core of the legitimating political values of the Soviet system.

B. Technical Assumptions

Rationalization is viewed as significant in the U.S.S.R. for technical as well as ideological reasons. Most writers agree that it is not part of the R&D process per se; however, it constitutes a "link in the chain of preceding research activity" to the extent that the result of scientific achievement introduced in production "continues to be the object of further improvement" by the innovator in industry.[17] In general, rationalization is intended to do three things: (1) increase individual productivity at the work bench, (2) improve equipment and processes with a view to eliminating "bottlenecks" (uzkie mesta) in production, and (3) economize on

materials used in the production process. Rationalization activity is qualitatively distinct from invention in that it does not imply participation in designing new technology; its targets are those machines and processes that are already on the factory floor, and its purposes to "improve the use of new equipment" or to raise the effectiveness of equipment that is obsolescent.

As a mass form of technical creativity, rationalization serves as an important supplement to the functions of engineering-technical staff within enterprises. This relationship has often been described in terms of the "unity of theoretical and empirical knowledge"--a concept that (where rationalization is concerned) implies a continuous flow of information from the worker to the engineer regarding problems encountered in production. Soviet writers have in the past attempted to glorify empirical knowledge as being a source of innovation in its own right; or, as a writer in 1930 argued, the "inquisitive mind of the self-taught worker" is not "bound by the fetters" of specific "scientific propositions"--hence, the worker can show more daring in attacking production problems.[18] A less polemical explanation of the worker's innovative function, however, derives from where he is situated in the production process. Though engineers can design new machines and technology, the argument goes, workers "occupied directly at the machine participate directly in one stage or another of the production-technological process."[19] Hence, it is "easier" for workers than for engineers "to notice specific defects, and to make necessary and possible improvements in equipment..."

The aggregate importance of rationalization for Soviet industry is reflected in published figures showing that RPs create several billion dollars worth of savings for the Soviet economy; however, reflecting the fact that rationalization does not ordinarily include the creation of new technology--i.e., invention--the savings created by a single rationalization proposal average only 850 rubles per year--less than one-tenth that created by the average invention.[20] For workers proposals (i.e., those in which engineering-technical personnel have no authorship role) the figure is less: between 100 and 500 rubles per year.[21] The practical significance of these minor proposals has sometimes been questioned by some Soviet writers, who view rationalization both as a cause and as a symptom of serious problems in Soviet innovation mechanisms. One argument centers on the role of RPs in prolonging the life of obsolescent equipment; it stresses that this form of creativity, however laudable in itself, diverts attention from "substantive" technical solutions (inventions), reduces the rate of real technical change in the economy, and, ultimately, does "harm our general task of the building of Communism"[22] (obviously rationalization could also be a reflection of the slowness with which machines with improved technical characteristics appear in the Soviet economy). A second argument focuses more on the relationship of rationalization to technical assimilation: here the critics stress that rationalization--while positively affecting enterprise performance--is really symptomatic of the "low technical culture" of many enterprises. As one writer notes:

> What, indeed, is the contemporary RP? It is, more often than not, a correction of an ordinary engineering mistake in design or technology observed by the worker--but not by the engineer who incorporated the mistake into the technical process or product design.
>
> That means that worker RPs reflect not only on the creative activism of the collective, but also on the low technical culture of the enterprise. This is what everyone is boasting about![23]

Rationalization, in other words, is symbiotically related to engineering failures--to badly designed equipment and technology--an argument which implies that its targets are more often new than obsolescent machinery and equipment. Empirical work of Soviet sociologists tends to confirm this argument: various studies show that rationalization activity is inversely proportional to the period of functioning of new technology--i.e., an especially large number of proposals is submitted when a new machine or automatic line is introduced; however, after de-bugging occurs "it becomes harder ultimately to notice the need to modernize one or another assembly and to propose ultimately how to improve it;"[24] hence the volume of proposals decreases. Such trends may be characteristic of Western industry as well--i.e., rationalization activity may be a fairly universal characteristic of assimilation or "start-up" problems where new technology (machines and processes) is introduced in production. The critique of rationalization noted above, however, indicates a greater degree of dependency on rationalization in the Soviet context; specifically, it suggests a tendency in Soviet R&D to overlook designing errors in earlier stages of the innovation cycle, passing them on until they finally appear in the actual end-use of a new product or process.

The technical environment of rationalization, as described by the critics, indicates that mass creativity performs important system-maintenance functions where the Soviet economy is concerned. The very criticisms of rationalization as diverting attention from invention, or reflecting the low technical culture of enterprises, are acknowledgements of its importance in the Soviet economic context. The slow pace of innovation and the errors in machine design or production technique are all related ultimately to a planning mechanism that emphasizes materials balances and output quotas at the expense of innovation. It would be no exaggeration to say that rationalization is a hallmark of a society that is not fundamentally innovative in the technical sphere--that it serves as a compensating mechanism for the failures and oversights of the planning system. Its technical raison dêtre, it may be argued, is perfectly compatible with its ideological one; i.e., mass creativity reflects mutually reinforcing commitments in the sphere of political values and in the sphere of economic organization.

II. The Impact of Rationalization upon Technical Management

Because it is linked closely both to the political values and economic assumptions of the Soviet regime, rationalization activity commands more administrative resources and much greater public visibility in the Soviet Union than in the West. The importance attributed to mass innovation in the Soviet context is reflected in both formal-legal and extra-bureaucratic levels: specifically, it is embodied in provisions of Soviet invention law, and in the intrusion--at the enterprise level--of mass organizations into the technical management process.

A. The Legal Framework

Soviet commitments to mass technical creativity are officially embodied in statutes regulating invention. Since 1931, Soviet legislation has provided legal guarantees for authors of relatively minor technical proposals that are novel and useful primarily for the enterprise in which they originate. The existence of national legislation covering such proposals is not, by and large, characteristic of Western societies: in the West, suggestion systems are ordinarily a matter of company policy--that is, an employer can decide whether or not to have an incentive awards program, and can even disregard the contents of his "suggestion box: if he so chooses. The Soviet manager, by contrast, is required to have a "mass innovation" program; moreover, the law carries the threat of punishment for "red tape and other manifestations of bureaucratism" in handling innovation proposals.[25]

Central to the legal concept of rationalization in the U.S.S.R. is an extensive catalogue of administrative obligations. Such obligations cover virtually all stages in the organizational life-cycle of technical proposals--and even extends to "pre-innovation" (mass mobilization) functions. The most important of these may be described as follows: first of all, the factory administration is obligated to furnish innovators with an adequate technical and organizational environment for making technical suggestions. This includes providing a full-time staff capability for handling the paperwork connected with suggestions (in the U.S.S.R. enterprises, this function is performed by the so-called Bureau of Rationalization and Invention), and "encouraging" innovators in various ways: by identifying weak links in factory production, arranging thematic "competitions" designed to elicit the best technical solutions for a given problem, and--perhaps most important--providing technical assistance to authors in formulating their proposals.[26] Second, the law prescribes time limits for administrative responses to technical suggestions: managers must communicate to authors within two weeks whether to accept a proposal outright, to accept conditional on the results of testing, or to reject the proposal.[27] Third, the administration is required to pay innovators a reward based on the economic value or "authentic" (non-economic) value of their proposals. Payment for proposals creating savings is required to follow these guidelines:

Sum of Yearly Ruble Savings	Reward for RP
to 100	17 percent of savings (but at least 10 rubles)
100-500	7 percent + 10 rubles
500-1,000	5 percent + 20 rubles
1,000-5,000	3 percent + 40 rubles
5,000-50,000	2 percent + 90 rubles
50,000-100,000	1 percent + 590 rubles
above 100,000	.5 percent + 1,090 rubles (but not more than 5,000 rubles)

A fourth constraint on managerial behavior imposed by Soviet invention law are provisions for appeal of administrative decisions on acceptance/rejection of proposals, and on the size or schedule of reward payments. In both cases, authors may submit complaints to a review board consisting of representatives, not only of the factory administration, but also of the local Trade Union Committee--in practice, usually members of the local VOIR soviet. Moreover, innovators, if dissatisfied with review board decision, can take their complaint beyond the factory level--to higher level organizations in the case of disputed rejections, or to the courts in the case of reward disputes.[29] Finally, Soviet invention law contains a kind of "freedom of information" provision for factory innovations; authors may request through the local VOIR soviet (or VOIR may request on its own initiative) all documentation indicating the scale on which their innovation has

been introduced,* and the bases for calculating authorship rewards.[30]

The array of administrative obligations on authorsip rights described above does find some analogues in Western managerial practices; for example, U.S. federal agencies and many companies have full-time "suggestion awards officers" equivalent to the Soviet Bureaus of Rationalization and Invention; and the needs for "pre-innovation" planning, for providing technical assistance to employees making suggestions, and for reducing time spent in administrative reviews are often mentioned in the U.S. literature on invention awards programs. These, however, are desired objectives of company policy and not matters of law; moreover, there are unique legal constraints on American managerial behavior where pre-innovation functions are concerned; for example, the Fair Labor Standards Act states that an American employer can specify general problems in planning innovation (e.g., reduce waste) but cannot specify specific tasks (e.g., improve the efficiency of drill press #6). "Thematic" plans in the U.S.S.R., by contrast, are often highly specific.[31] A further point of contrast concerns mechanisms for appealing administrative decisions on proposals--these are more formalized in the U.S.S.R. than they are in the U.S.; moreover, they involve extra-managerial (Trade Union) participation. It should be added that U.S.

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* Payment for RPs used in several enterprises in the same branch is made by the "higher-level organization" (Ministry, Association).

managers incur a contractual obligation to pay a reward when they accept a suggestion by an employee; however, decisions to accept or reject the suggestion, the reward scale used, and the basis for calculating an author's reward are generally within the sphere of administration as opposed to that of law. Finally, Soviet innovators have a stronger legal claim to "freedom of information" than do their U.S. counterparts--although, in the U.S., innovators might be given access to records on the use of technical suggestions as a matter of company (or agency) policy.

The scope of Soviet legislation covering non-patentable technical suggestions (RPs) is attributable to the fact that rationalization, in the U.S.S.R., in linked to officially-articulated political and social goals; in the U.S., by contrast, its primary function is to serve the interests of management by improving the economy and efficiency of operations (and, indirectly, by improving employee morale). The formal-legal obligations that rationalization imposes on Soviet managers, however, should neither be viewed as all-encompassing nor treated entirely at face value: for example, employees have a number of legal "outs" vis a vis innovators; for example, they can shelve proposals under the excuse of "acceptance for testing"; or reject them on grounds that planned purchases of machinery and equipment (at some unspecified time) will make the proposals unnecessary. Moreover, Soviet managers, like managers everywhere, are faced with production targets and deadlines; since these take precedence over observance of legal structures or processing innovation proposals, bureaucratic violations of authorship rights are common,

and, except in flagrant instances, do not evoke punishment in the legal sense. As a result, the main constraints on managerial behavior toward factory innovators are largely extra-legal; they are embodied in the various social control and social creative organizations existing at the enterprise level (and above) for the sponsorship of technical creativity. To this subject we will now turn.

B. Social Control

1. Definition and Scope

The term social control in Soviet parlance refers mainly to participation by extra-bureaucratic or voluntary organizations in promoting, implementing, and diffusing new technical ideas. Organizations engaged in social control activities include the Communist Party, the Komsomol, and--most important--the Trade Unions, their major affiliates (VOIR and NTO) and organs subordinate to them. Virtually every part of the social control network includes some workers as members--hence, it is hailed by Soviet writers as a means of increasing participation of workers in technical management functions. Major functions of social control include monitoring and influencing managerial responses to technical initiatives of enterprise employees and broadening the mass basis of technical innovation and problem-solving. These functions may be termed, respectively, advocacy and mobilization--the one being

directed at management and the other at the broad masses of potential innovators within the enterprise.*

The advocacy function implies an adversary relationship between "state" and "social" organizations; it includes sponsoring particular inventions or rationalization proposals for inclusion in enterprise (ministry) plans, defending the rights of innovators against "bureaucratic" abuses (e.g., delays in reviewing proposals or inadequate compensation for authors), participating in reconsideration of rejected RPs, publicizing instances of "bureaucratism" in local and national media, seeking "release time" for innovators, and establishing facilities for testing technical novelties--the shortage of which is a major bottleneck for innovation within the enterprise. The mobilization function, by contrast, is concerned with heightening mass interest in and capabilities for technical problem-solving. It includes what Soviet writers call "organizational-mass" activities: specifying technical problem areas for innovators ("thematic planning"), providing technical support, educational guidance, and legal advice to would-be innovators, popularizing technical creations of factory employees, arranging mass "competitions" around specific technical themes, arranging exhibitions and conferences, and sponsoring technical "komandirovki" and

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* The focus of this discussion is on the enterprise: however, the social control network also monitors bureaucratic behavior and promotes technological change at the branch, and even inter-branch, levels.

"exchanges of experience" between factories. To a large extent these activities duplicate the assigned responsibilities of factory administrative offices (e.g., Bureaus of Technical Information)--offices not equipped to handle the volume of "organizational-mass" tasks entrusted to them (in some enterprises, such staff capabilities are lacking entirely). In this respect, the mobilization function is less a corrective of formal administration--like innovation advocacy--than an extension of it.[32]

Insofar as it aims at stimulating mass technical initiatives and improving managerial responses to these initiatives, social control may be viewed as a kind of "lobbying" mechanism designed to support technically creative--as opposed to routine--functions. The analogy to interest group behavior is valid only to the extent that social control serves interests that are distinct from and--to some extent--in conflict with those of the planning-managerial bureaucracy. The "innovation lobby" may better be described as a political device and as an adjunct to the planning system; on the one hand, it serves the regime"s participatory goals: workers, as members of social control organizations, increase their awareness of the technical environement of the enterprise; as targets of mass mobilization they increase their participation in changing this environment--all of which promotes the "social self-management of production" mentioned earlier. On the other hand, social control is a direct product of the Stalinist heritage in economic organization, and serves important "system maintenance" functions for the economic system. It must be distinguished from pressure for fundamental changes in the planning system that might improve overall performance in innovation--

e.g., fewer planned indicators for the enterprise, better horizontal links among enterprises. Basically, it is a conservative force in the sense that it accepts the inevitability of state planning and tends to assess the constraints on innovation (including mass innovation) in Soviet society primarily in terms of "bureaucratism"--instances of administrative resistance or apathy toward technical novelty. Because its role, in fact, is partly to combat bureaucratism, its relation to the planning mechanism is essentially symbiotic; hence, the "innovation lobby" represents no real force for change in Soviet economic organization. Moreover, although it includes (as will be shown) a specialized structure of interest articulation --one that serves a "constituency" of innovators--it cannot be viewed as an interest group in the Western sense; if anything it underscores Soviet commitments to maintaining political and economic centralism.

2. The Social Control Network

The organizational infrastructure of social control in Soviet enterprises--the "innovation lobby"--exists essentially on two levels: one includes primary party organizations, Komsomol organizations, and local Trade Union affiliates: VOIR and NTO soviets. The other includes a broad variety of so-called "social creative unions," most of which are subordinate either to VOIR or to NTO. The difference between the two--aside from the hierarchical one--centers on the locus of advocacy functions: these are vested generally in the "parent" organization rather than in the "social

creative unions" (organizational-mass work is performed at both levels). The different dimensions and functions of the social control network will be explored in the following paragraphs.

The cornerstone of the entire social control network in Soviet society--its political and ideological mainspring--is the Communist Party. CPSU organizations at all levels are formally committed to "promoting in every way the development of invention and rationalization work in all areas of national construction" and to combatting bureaucratism and sluggishness in technical management.[33] The party apparat as a whole monitors the performance of ministries and enterprises in introducing new technology and developing mass technical participation; moreover, above the enterprise level, raikom, gorkom, or obkom "technical-economic soviets" or "commissions for assistance to technical progress" are fairly active in organizational-mass work: arranging lectures, conferences, exhibitions, and the like. Primary party organizations (PPOs), however, tend to maintain a fairly low profile where technical policy is concerned; beyond sponsoring particular items of new technology and requiring managers to report occasionally on the general state of invention and rationalization work, PPOs seem content to leave operational social control to the Trade Union affiliates (and, to a lesser extent, the Komsomol). This was not always the case: in the late 1950s and early 1960s, PPOs--reflecting in part the ideological tone of the Khrushchevera and in part the then embryonic stage

of development of VOIR* --became directly involved in innovation-related activities. Special Commissions to deal with invention and rationalization work, invitations to rationalizers to discuss complaints regarding the administrative processing of proposals became common features of PPO work in this period; moreover, primary organizations sponsored and guided the work of a broad infrastructure of "social creative unions" oriented toward mass mobilization in the technical sphere. Today, such activism is scarcely visible; the commissions have apparently evaporated; party organs seldom get involved in conflict resolution over innovation (this is now a legally-defined activity of VOIR), and authority over the network of factory "social creative" activities has formally passed to VOIR and the NTO. Party influence is, of course, by no means absent at the primary level, but is intermittant and when exercised, tends to supplement the regular work of the Trade Union affiliates.[34]

Responsibility for mobilizing the creative energies of youth at the factory level is vested in the local chapter of the Communist youth organization (Komsomol). Komsomol units occasionally participate in monitoring technical management--e.g., by making "raids" (spot checks) on administrative performance in processing technical proposals. However, their primary function is agitation and propaganda among youth, and the publicizing of technical achievements of young innovators--typical vehicles being "youth

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* VOIR was founded--or, in a sense, reconstituted--in 1959. It had a predecessor, the All-Union Society of Inventors (VOIZ) which existed between 1932 and 1937.

soviets of scientific-technical creativity," "schools of young rationalizers," and exhibitions of technical creations of young people.[35] The Komsomol's oreientation to mobilization as opposed to advocacy functions reflects the smallness of its constituency--not youth but youthful innovators. Statistically speaking, the vast majority of worker innovators is over thirty--as is also the majority or worker participants in social "forms of production management." This situation largely reflects a "socio-technical" parameter of innovation--the fact that considerable work experience (11 to 20 years according to most estimates) is required for successful participation in technical change.[36] Whether or not the Komsomol can become a really effective part of the social control structure depends on the extent to which the importance of this constraint can be modified by "agitprop" tactics.

Most important, in terms of operational responsibility for social control at the enterprise level, are the Trade Union affiliates, NTO and VOIR soviets--and the "social creative unions" subordinate to them. Advocacy functions are performed by the soviets: both VOIR and NTO attempt to protect innovation functions from absorption into routine production (e.g., by establishing experimental facilities, seeking release time), and both are active in sponsoring items of new technology for adoption by the factory. A possible difference here is that VOIR is more likely to pressure the administration to adopt technical proposals that have a strictly local application, whereas NTO is more oriented to the introduction of new technical items of branch or inter-branch significance. The major difference between the two, however, involves the protection

of authorship rights: VOIR, not NTO, is the principal watchdog of administrative behavior toward factory innovators. As noted above (see section on legal constraints), the VOIR soviet has a legal mandate to review disputes between authors and the factory administration. Moreover, different sections of the Soviet are responsible for monitoring administrative review and reward practices on a day-to-day basis; e.g., the "control-legal" section uncovers bureaucratic violations and brings them to the attention of top management (also to the Trade Union and Party organizations); the "information-publication" section may publish examples of administrative abuses in the factory newspaper. A publicity tactic, sometimes used by VOIR to counter delays in processing proposals is to set up electrified "stands" showing--for all to see--the bureaucratic life-cycle of technical proposals: its progress (or lack of it) through various stages of review and implementation, and the administrators responsible for each stage.[37]

Both NTO and VOIR soviets perform some "organizational-mass" functions such as planning innovation, arranging competitions for innovators, or publicizing locally technical creations of factory employees (this being primarily a VOIR function). However, in many factories, the bulk of organizational-mass activities is performed by a broad variety of "social creative unions" loosely subordinate to local NTO or VOIR organs. These may be categorized according to their systemic affiliation: under NTO supervision, for example, are these "unions": Social Bureaus of Economic Analysis (OBEA), Social Bureaus of Technical Information (OBTI), and

so-called Worker Research Institutes (IRI). OBEA--"social" counterpart to factory economic offices--perform primarily pre-innovation or planning functions: they study the cost-effectiveness of production processes and identify areas of inefficiency or waste that can serve as targets for factory innovators. Occasionally they may also monitor the calculations of savings from proposals as the only advocacy function performed by "social creative" organizations.[38]

Also providing input into the planning process are OBTI; these organizations, created where staff information services are undermanned or absent, orient innovators to technical novelties reported in ministry information bulletins or in other literature that are relevant to factory production problems. OBTI also popularize factory technical achievements in branch and territorial media and arrange "exchanges of experience"--involving visits and technical demonstrations--with other enterprises. Such measures, needless to say, are designed to raise morale of factory innovators and, in general, to provide maximum visibility and encouragement to creative effort. The third "social creative union" attached to NTO, the Workers Research "Institute" is essentially a vehicle for raising the technical qualifications of workers, although it also serves as a planning mechanism. Worker researchers compile careful records or "diaries" of their daily productive activity, and attempt to generalize from this material by technical study and consultation with engineering staff. The systematic collection (and analysis) of "enormous empirical information" on the physical characteristics of machines in operation obviously helps to target

problem areas in factory production--as well as to improve the researchers' capability for successful innovation.[39]

The VOIR system of social creative unions stresses technical assistance, both in creating and applying new technical ideas. Possibly the most important of these bodies are so-called "social design bureaus" (OKB)--adjuncts to staff designing organs set up initially to overcome the "contradiction between rapidly developing technical creativity of workers and the possibilities for timely formulation and embodiment in technical documentation." OKBs perform a variety of functions related to technical modernization (complex mechanization and automation) in the enterprise; as a link in the social control infrastructure, however, they perform the big role of providing technical assistance to workers in formulating their proposals. Also performing assistance functions--on a somewhat different level--are so-called Social Patent Bureaus (OPB). These bodies--substitutes for or extensions of staff patent bureaus--help draft invention claims for submission to the State Committee on Inventions and Discoveries and also review technical solutions created by factory innovators--originally submitted as rationalization proposals--for possible upgrading to the level of inventions.[40]

Other parts of the VOIR system that may be mentioned here are Social Universities of Technical Creativity and Councils of Innovators. The former are essentially set up to teach technical (and to some extent legal) aspects of rationalization to factory

workers; to receive a "diploma" from the school one must successfully formulate an RP. Councils of Innovators (SNs) contribute to "raising the productivity of labor on the basis of the broad introduction of valuable technical novelties." They constitute, in a sense, a final link in the chain of popularization--i.e., by instructing workers in the use of technical innovations developed within and outside the factory: a metal-cutting technique developed in Leningrad, for example, might be taught to factory workers in Khabarovsk enterprises by local SNd. Though not, strictly speaking, designed to teach workers how to innovate, the study and popularization of new technology done by SNs heightens overall awareness of technical innovation and contribute to mass technical mobilization within the enterprise.[41]

3. Evaluation of Social Control

The array of social control institutions in Soviet factories and the advocacy or mobilization functions which they perform are summarized in Chart 1. The chart indicates clearly that social control is oriented primarily toward the technical system of production, and that it's largely concerned with providing a favorable environment for mass technical innovation. As a form of "Communist" technical rationality it finds little counterpart in Western enterprise, and reflects approaches to labor organization that go well beyond the "job enlargement" concepts familiar in Western managerial literature. Crucial questions remain, however, regarding the practical effectiveness of social control. For example, how much

does it increase worker participation in technical management? How greatly does it influence managerial responses to innovation? How well does it carry out technical mass mobilization? These problems will be discussed in the following paragraphs.

As far as participation is concerned, the general pattern in Chart 1 indicates that workers are excluded from top leadership posts in the first echelon social control organizations (Party or Komsomol bureaus, NTO and VOIR soviets). In general, the higher the position, the less the worker representation; for example, factory party and Komsomol organizations have many workers as members, but few in secretarial posts. Workers may be members of local NTO organizations (5 to 15 percent, according to official statistics), but NTO soviets are usually comprised of technical staff.[42] In the case of VOIR, workers make up a little over 50% of the factory membership of the Society, and sometimes a respectable proportion of the VOIR soviet (perhaps up to 40%); however, 95 percent of the leadership positions (presidents, vice-presidents) are held by engineering-technical personnel.[43] As far as "social creative unions" are concerned, workers have at least some membership in all of them, though this is probably pro-forma where the functions involved include sophisticated operations such as designing, cost calculation, or interpreting technical literature--i.e., workers probably participate mainly as observers in the work of OKB, OPB, OBTI, and OBEA. The overall picture that emerges from the membership is that the social control mechanism indeed brings workers into a closer relationship to technical management--but that actual control functions are performed mainly be engineering-technical personnel.

Chart I

THE SOCIAL CONTROL NETWORK*

	Innovation Advocacy	Technical Mobilization	Administrative Counterpart	Worker Representation
Komsomal	Monitoring implementation of proposals.	Organizing youth innovation groups; popularizing youth creations.	None	Some representation in bureau but unlikely at top leadership level.
CPSU	Sponsoring new technology supervising general state of invention and rationalization work.	Little or none (at enterprise level).	None	Same as above.
NTO Soviet	Sponsoring new technology Seeking facilities for innovators.	Thematic planning. Organizing contests for innovators.	None	Little or none in Soviet.
VOIR Soviet	Same as NTO; also, monitoring review and implementation of proposals; calculating authors' rewards; publicizing instances of bureaucratism.	Same as above; also providing intra-factory publicity for innovators.	None	Minority representation in Soviet (under 50%). Only around 5% of leaders of VOIR organizations are workers.
OBEA	(Occasionally) confirming administrative calculation of savings from proposals.	Identifying waste and inefficiency in production.	Staff economic offices.	Minority representation.
OBTI	None	Linking factory innovation to technological developments in other enterprises; popularizing factory technical achievements.	Staff information services	Minority representation.
IRI	None	Raising technical qualifications of workers; accumulating empirical evidence of defects in equipment.	None	Majority representation (researchers are workers.
OKB	None	Providing technical and designing assistance to worker-innovators.	Staff designers.	Minority representation.
OPB	None	Formulating invention claims; upgrading rationalization proposals.	Staff patent services.	Minority representation.
Social Universities	None	Teaching rationalization to workers.	None	Majority (student) representation.
SN	None	Introducing technical novelties.	None	Majority representation.

*One element of the VOIR system has been excluded from the chart and also from the discussion: so-called social norm bureaus; these are [illegible] rational use of labor time--hence are only peripheically related to technical creativity in the enterprise.

More serious questions arise regarding the actual impact of social control on the technical environment of the enterprise. The agencies most responsible (NTO, VOIR, and their subsidiaries) do not--except in the rare case of a paid staff head of a primary organization--exist apart from the enterprise collective (VOIR and NTO do have apparats above the enterprise level). On the contrary, they hold formal positions in the collective, usually in the technical offices, or on shop technical staffs, of the enterprise. This has two implications for the effectiveness of social control: first, where innovation advocacy is concerned, those who monitor administrative behavior may work in the same shops or offices as those making technical decisions. Not being truly independent of the factory administration, the monitors--aside from interacting professionally with the decision-makers--may share with them some general managerial perspectives: concern with production and profits, and unwillingness to commit many technical or administrative resources to administration. Second, social control work may amount to an involuntary prolongation of the working day. This seems to be particularly true of "social creative unions" that have counterparts in formal administrative offices. Some factory studies have shown that most such unions work on a spare-time basis, and that most participants (particularly engineering-technical personnel) did not want to join. The studies have also attributed this situation partly to the fact that employees see little connection between "voluntary work" and professional--or such non-monetary advantages as better housing, or access to day-care centers for children.[44]

Such figures undoubtedly reflect on the enthusiasm with which organizational-mass work is pursued in some enterprises.

The conclusion seems warranted that social control may, in some enterprises, be reduced to a set of moral strictures and empty institutional forms. In others, however, it may help to activate change-producing activity, and to increase managerial responsiveness to innovation. Effectiveness of social control would seem to depend primarily on two factors: one is the degree of interest displayed by Party organizations--both PPOs and higher-level organizations--in invention and rationalization work in the enterprise; this would be reflected in efforts to hold enterprise managers accountable for poor performance in reviewing or implementing new technical ideas, or in stimulating mass technical participation. Another is the availability of "company" time for those engaged in social control work--or of reasonable incentives for those who must perform such work in their spare time. Added to these factors are such intangibles as the courage and commitment of participants. To the extent that some or all of these factors are present within the enterprise, social control may provide some useful "extra-bureaucratic" input into the technical management of the enterprise.

III. The Limits of Ideology: The Socio-Technical Context of Mass Innovation Within the Enterprise

Soviet writers frequently emphasize that the level of mass technical innovation in enterprises is affected by the social relations of production (capitalist or socialist) and also--in socialist societies--by the quality and extent of voluntarist measures aimed at mass mobilization in the technical sphere. Beyond the general social context of innovation, and the social control measures adopted to stimulate worker initiatives, however, a number of factors are identified as being important determinants of worker participation: these include a number of social or demographic variables: educational level, number of years on the job, rank (razryad), sex and age, and three technical ones: the content of labor, the length of time that a particular technical system has been in operation, and the level of automation. Soviet sociological work in this area is a statistical nightmare; it consists of tables showing co-variance of two or (very occasionally) three variables--compiled from different factories and shops--but never multiple correlations for a group of shops or factories. For example, the data may show the relation between age and percent worker participation in Voronezhselmash, the relation between work experience, mechanization, and participation in one shop of Krasnoye Sormovo (Gorki), and the relation between rank and participation in another shop of that factory--but it is never sufficient to do multi-variate analyses. If the Soviets have performed any statistical work (regressions or factor analyses) in this area--on the basis of more extensive

data than that appearing in the literature (including dissertations)--they have not released the results.[45]

Such difficulties notwithstanding, Soviet sociological studies of mass innovation are a valuable counterweight to official rhetoric on how the Soviet system opens "vast possibilities" for workers' participation in technical creativity, or how such participation has been "mobilized" by the agencies of social control in the factory. Such studies take technical creativity at least partly out of the realm of ideology, and attempt to develop a "socio-technical" profile of the Soviet worker; that is, they attempt to determine what kinds of workers are most likely to innovate under what conditions. Even though the published data is fragmentary, it provides some empirical basis for studying the dynamics of worker creativity within the Soviet enterprise. On this assumption, an effort has been made in Chart II to draw conclusions about directions of co-variance for a number of social, demographic, technical, and participation variables. The effort is extremely crude: it represents simply an abstraction from a number of (usually two-variable) tables compiled by Soviet sociologists in a variety of factories; however, it can serve as a general framework for analyzing the constraints on mass innovation at the enterprise level.

The variables shown in the matrix in Chart II can be divided, for our purposes here, into independent and dependent ones--the former being indicators of the worker's industrial profile (the worker on the job) and the latter of technical participation. Not all of the correlations shown in the matrix will be discussed here; the

Chart II

DETERMINANTS OF MASS INNOVATION

	Educ Level	Service	Rank	Age	Sex	Content of Labor	Time of Technology in Production	Automation Level	Likelihood Worker Participation	Employee/ Proposal	Value Proposal	% Worker Initiated Proposals
Educ Level		◊	◊			◊		◊	(◊)[1]	◊	◊	
Service			◊						(◊)			
Rank						◊			◊			
Age									◊			
Sex									◊ M - F			
Content of Labor								◊◊[2]	◊		◊◊	
Time Technology in Production									-			
Automation Level									◊		◊◊	--
Likelihood Worker Participation											-	
Employee/ Proposal											◊	
Value Proposal												-
% Worker Initiated Proposals												

[1] ( ) = relationship is curvilinear.

[2] Double sign = estimated strongest correlation

principal emphasis will be on determinants of participation. Here many of the relationships are what one might expect, for example, educational level, service, rank, age are all positively correlated with participation, though where age and service are concerned the relationship is really curvilinear; that is, workers are most creative after 11-20 years of service and between the ages of 30 and 40.[46] Where sex is concerned, within the same job categories women tend to be less creative than men--though the evidence here is extremely fragmentary. Also, education is related not simply to the likelihood but also to the type and impact of participation; engineering-technical staff are more likely to engage in collective creativity than are workers and--where it is possible to differentiate proposals according to engineering or worker class origin--the former create more economic value for the enterprise.

Turning to the technical variables, the matrix show "content of labor" are positively related to participation; by content, Soviet writers mean the degree to which a worker's job design includes "intellectual" functions, spatial mobility, and long production cycles. Epitomizing the (potentially) creative worker are two categories: the so-called "naladchik" or supervisor of automatic lines who are relatively mobile and perform many non-manual tasks (essentially monitoring equipment) and the "slesar" or fitter who combine mobility with highly non-routine--albeit mainly manual--work. Epitomizing the worker who is likely to be relatively uncreative is the "stanochnik" or machine operator who is confined to a single work post and performs repetitive and intensive manual labor.

A negative relationship, on the other hand--one that bears on our previous discussion of the technical purposes of rationalization--exists between the likelihood of participation and the length of time that a particular production process has been in operation. Both (Soviet) interviews with factory employees and figures on the incidence of rationalization, indicate that activity is highest in the period just after the introduction of new equipment and tapers off somewhat thereafter. The following table (from a ball-bearing factory in Saratov) shows this relationship.[47]

Percent of Rationalizers Among All Workers in Occupational Category

	1963	1964	1965	1966	1967
Engineering-technical personnel	72.7	62.5	60.8	40.7	31.2
Maintenance workers (slesary)	83.5	63.6	40.6	31.2	28.6
Electricians	28.5	28.5	42.8	35.7	28.5
Naladchiks	25.0	41.5	33.3	25.0	16.6

In regard to automation, Soviet writers cite a number of consequences for participation. Automation, in the words of one writer, leads innovation from "partial, spontaneous, empirically-derived changes to the planned, complex improvement of production on the basis of new scientific achievements."[48] Aside from the increasing incorporation of science into production, automation also results in the increasing inter-connectedness of productive operations. These processes have several consequences: first, technical creative activity is increasingly confined to groups, not individuals--

specifically to task forces or "complex brigades" representing different factory skills. Second, such creativity requires increasingly the participation of enguneering-technical staff--i.e., the percentage of purely worker-initiated proposals goes down. Third, and easily deducible from the above consequences, automation tends to "narrow the basis for minor corrections;"* [49] i.e., to the extent that, in the modern factory, a technical change affects the entire productive system, it creates a higher economic effect, on the average, than does a change under mechanized or semi-mechanized conditions.

At the same time, according to Soviet writers, increasing automation has the effect of raising the incidence of worker participation in rationalization. This consequence is, in effect, "mediated" through two intervening variables (described as independent variables above): the content of labor and the educational qualifications that a particular job design presupposes. This argument is best illustrated by reference to two worker roles described briefly above: that of the "naladchik" or supervisor and that of the "stanochnik" or ordinary machine operator. The latter perform narrowly specialized and intensively manual functions "connected with introducing the blank to the machinery point, removing it, and passing it on." Naladchiks, by contrast, are broad-profile workers, who encompass "the professions of all the workers who originally serviced the individual machines now included in the line." Their functions, as

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* To quote Aaron Vinocur, a participant in this conference.

described in Soviet accounts, are largely "mental" in the sense that they involve more observation of than direct participation in a production cycle and require "scientific" knowledge of instrument design, thermal treatment, and interaction of equipment during the processing stages.[50]

Soviet sociologists have conducted a variety of studies that attempt to show (1) that naladchiki, because of the relatively substantive nature of their functions, are several times more likely to participate in rationalization than are stanochniki (in any given shop); and (2) that the scientific-technical revolution has the net effect of improving the "creative profile" of the labor force by promoting the numerical ascendancy of innovative professions over non-innovative ones. As an extensive study of technical participation among naladchiki, stanochniki, and other groups in Gorky factories summarizes the argument: "The incidence of rationalizers is greatest among those professional categories of workers which increase under the influence of technical progress."[51]

Soviet sociologists often refer to the so-called "bourgeois" conception that there is an inverse relationship (obratnaya suyaz') between mass technical creativity and scientific-technical progress. Such a relationship, they argue, is true only of capitalist and not of socialist societies. Their scholarly efforts obviously reflect a concern--shared by some writers in the West--with the consequences of technical advance for democratic forms of industrial management. That the Soviets depict these consequences as essentially optimistic

is hardly surprising, given the egalitarian pretensions of their goal culture. Whether the scientific-technical revolution makes innovation more complex and more science-based, but--under socialist conditions--also more open to mass participation, however, is certainly debatable. Questions arise, for example, concerning the adequacy of "complex creative brigades" as vehicles for mass involvement in the technical sphere. One of these may be a matter of definition: Soviet writers sometimes compare the modern factory with the cruder technical conditions of the 1930s and 1940s under which the entire creative process from the birth of the idea to its practical implementation was realized by the inventor or rationalizer himself. Whether "team" innovation can offer creative satisfaction to its worker-members is an empirical question--one that cannot be resolved on the basis of available evidence; nevertheless, the danger exists that a complex brigade may merely express in formal terms the separation between mental and manual labor--concentrating creative functions in the hands of engineers, and consigning workers to the role of embodying new ideas in metal.

A further difficulty arises in relation to the assertion that the STR, at higher levels of complex mechanization and automation, promotes the ascendancy of "creative" functions over less "creative" ones. A more likely outcome of automation, in this writer's view, is the removal of the workers too far from the production cycle to be concerned with creativity--at least at the level of production technology. The Soviets' preoccupation with the naladchik may reflect their limited experience with automation thus far; the typical

worker of advanced automation may be not the naladchik but the control panel operator, whose job would seem to offer little opportunity for technical participation (and whose functions, ironically, can be considered largely mental). The ultimate implications of automation for creativity seem to be grasped by some commentators, as one notes: "Extensive automation, the introduction of "thinking" machines for analysis and calculation, in many cases reduces the role of the individual to that of pushing buttons and monitoring instruments."[52] Another argued, in a recent dissertation, for broadening the legal definition of rationalization to include as its "objects" not only hardware and technical processes but also algorithms and computer software.[53] Most writers, however, ignore such trends, preferring to view mass-technical creativity as a hallmark--indeed, a triumph--of Soviet social organization, and as a vehicle for the realization of ideological goals. What mass innovation may really reflect--aside from the proletarian elements of official doctrine--is the low level of automation in many Soviet factories. In sum, efforts to "reconcile" worker creativity with the scientific-technical revolution in industry are unconvincing. This is not to say, however, that the Soviet "goal culture" will not continue to impel efforts to make labor more creative--or that creative labor is impossible under conditions of high automation.

Conclusion

A. Summary

A starting point for the discussion of workers and technical management in the U.S.S.R. has been the concept of rationalization--relatively small-scale and empirically-based technical change that is accessible to the ordinary factory worker. Worker participation in the technical sphere has--almost since the inception of the Soviet regime--been vested with an enormous political and ideological significance: on the one hand, it has been described as a hallmark of societies liberated from capitalist exploitation, and as an embodiment of the "Leninist" participatory style--a style that stresses (under Soviet conditions) developing and maintaining commitment to officially sponsored goals. On the other hand, it has been depicted as contributing to three types of ideological goals: democratic management or the "social self-management of production," the intellectualization of the working class (the "unification of mental and manual labor") and the formation of personality traits and motivational patterns that are conducive to work in a Communist society.

Rationalization, moreover--as the most mass form of innovation--is seen as an important link between science and production. As one Soviet writer asserts: "the working class of our country is an active force of scientific-technical progress." He justifies this proposition by referring to a 25th Party Congress Document which states that the "success of the scientific-technical revolution" depends increasingly upon "the involvement in this historical process of all participants

in social production, at all levels of the economic mechanism."[54] Though one of its purposes is to prolong the life of obsolescent equipment, the main function of rationalization is to promote the assimilation in production of new machines and technical processes. In so doing, however, it may--as some Soviet critics suggest--be symbiotically related to defective engineering work in factory offices or R&D institutes. A high level of rationalization activity, as one writer remarks, may simply indicate a "low technical culture" in engineering and production design. Rationalization, hence, may be viewed as a kind of corrective to an economic mechanism that fails to ensure adequate qualitative standards in the design and development of new technology.

The close relationship of rationalization to the political values of the Soviet regime, on the one hand, and to the inadequacies of the planning mechanism, on the other, has given mass innovation a distinctive status in Soviet society. In effect, it constitutes an indirect form of mass participation in technical management. Such participation is reflected in constraints on managerial behavior in the U.S.S.R. that are far-reaching by Western standards. These are of two types: legal and "social." The former is reflected in the extension of Soviet legal coverage to include not only inventions but also minor technical proposals. Soviet invention law provides an extensive catalog of authorship rights and administrative obligations that cover every phase of the organizational life cycle of the rationalization proposal: subm ssion, administrative review, implementation in production, and payment of authors' rewards. The latter is reflected in the concept of "social control"--referring to extra-bureaucratic efforts to influence administrative responses to

technical initiatives of factory employees, and to mobilize mass enthusiasm for technical creativity. An extensive social control network exists in Soviet factories: this includes broadly the primary Party and Komsomol organizations, Trade Union-affiliated bodies: specifically the Scientific-Technical Societies (NTO) and Societies of Inventors and Rationalizers (VOIR)--and so-called "social creative unions" under the loose supervision of NTO and VOIR. The effectiveness of social control as an instrument of developing mass participation in technical management, however, is limited: First, although social control organizations include workers as members, they are staffed and, especially, led predominantly by engineering-technical personnel. Second, the "controllers" themselves--though formally subordinate to the mass organizations--do not exist apart from the enterprise collective (particularly the technical-managerial hierarchy). This reflects on their effectiveness both in monitoring bureaucratic behavior and in performing "organizational-mass" or propoganda work designed to stimulate mass creativity. Organizational mass work, in particular, appears to be a spare-time activity--one that may represent, for many participants, an involuntary prolongation of the working day. Such problems have prompted many Soviet writers to argue that effective social control requires both close Communist Party supervision and a proper structure of incentives for participants.

The importance ascribed to mass innovation in the Soviet Union is reflected in a number of published studies and dissertations that attempt--albeit crudely--to describe the relationship between

rationalization activity and what might be called the "socio-technical profile" of the individual worker. These studies, despite their statistical inadequacies, provide a useful counterweight to official rhetoric about how worker creativity flourishes under socialist as opposed to capitalist conditions; that is, they say something about what kinds of workers are most likely to innovate under what conditions. However--in this writer's opinion--they may err in showing a positive relation between increasing automation and increasing mass participation in technical creativity. At its higher levels, automation may not promote the ascendency of potentially "creative" functions in the factory over potentially "uncreative ones. If so, Soviet ideologists will experience increasing difficulty in reconciling the scientific-technical revolution with progress toward more democratic forms of technical management.

B. A Footnote on China

Throughout this paper comparisons have been made between mass innovation in the U.S.S.R. and the employee incentive programs characteristic of Western (or at least American) organizations. Although the goals of the two undoubtedly overlap--e.g., the goal of increasing productive efficiency--they occur in different political and economic contexts, and have different implications for managerial behavior. A better comparison might be between styles of technical participation in the U.S.S.R. and elsewhere in the Communist world. To take a case in point, mass innovation does not place nearly the same constraints on management in the U.S.S.R. as it does

(or has) in Communist China. This writer has already explored the China case in a Ph.D. dissertation and in several articles, and does not intend to discuss it in detail here;[55] however, a few points of comparison may be noted here.

As in the U.S.S.R., mass innovation in China has served both ideological and technical purposes. Ideologically, it has been described as a vehicle for promoting the "unification of mental and manual labor" and for broadening the basis of technical management--a process that the Chinese refer to as "technical democracy." Technically, it has been viewed as a means of reconstructing (rehabilitating) "old"--i.e., pre-1949--equipment and, particularly since 1958, as a means of assimilating new technology. Important differences exist, however, between the Soviets and the Chinese in both these areas. First, the Chinese ascribe to the "unification of mental and manual labor" an instrumental significance that is relatively lacking in Soviet (or for that matter Marxist) writings. Specifically, they view it as a mandate to send intellectuals "down" to the production line to "learn" from the masses and to perform manual labor. Mass innovation, in Maoist doctrine, is thus viewed as a vehicle less for elevating the worker to the level of the engineer than for eradicating elitism among technical-managerial cadres. A second difference concerns the meaning of technical assimilation in the Chinese context. The Chinese leadership during certain periods has enthusiastically accepted dependency on Western (especially Soviet) industrial models, and on

massive imports of technology and equipment; in other periods, it has adopted a posture of technological chauvinism or "self-reliance" with regard to technology acquisition. The latter periods (especially the Great Leap Forward of 1958-60, and the years from the beginning of the Cultural Revolution to the purge of the "Gang of Four") have been characterized by intense emphasis on mass technical creativity and on critical assimilation of foreign technological inputs. In fact, "the masses" were looked upon as the guardians of China's independent road of technological development and technical elites as "slavish worshipers" in varying degrees of foreign technical stereotypes--hence, as hindering adaptation and absorption of foreign techniques. The combined result of "self-reliance" postures and the strong egalitarian thrust of Maoist ideology was to bring Chinese workers into the technical decision-making process on a scale unparalleled in the U.S.S.R. (or anywhere else).

Both Chinese and Western comparisons have been introduced in this paper to provide a broader perspective on mass technical creativity in the U.S.S.R. Obviously the idea of worker participation in technical change is not uniquely Soviet or even uniquely Communist; however, the purposes and scope of mass innovation vary greatly between the Western and Communist world, on the one hand, and among Communist societies on the other. Such variations, it may be argued, provide useful material for comparing the political objectives and the economic mechanisms of societies with different social systems and at different stages of industrial development.

NOTES

1. P. A. Sedlov, "Economics and the Management of Invention and Rationalization," Voprosy Izobretatelstva (VI) 2 (1975: p. 3.

2. Quoted in B. I. Yeremeev, Socio-Economic Problems of Technical Creativity in the USSR. (Moscow "Thought" 1967) p. 55.

3. Ibid. p. 54

4. Ibid. p. 55

5. Editorial, "Answer to Professor Martens," Izobretatel' no. 1, 1929, 1. 33.

6. Yakov Stul'. Creative Labor and Socialist Industry. (Chelyabinsk South Urals Publishing Company, 1970) p. 202-203.

7. Ibid.

8. Yu. E. Volkov. Thus Is Born Communist Self-Management. (Moscow "Thought" 1965) pp. 175-176.

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14. R. I. Kolosanov, Communist Labor--Nature and Stimuli (Moscow: 1968), p. 185.

15. Stul'. op. cit. p. 184

16. Kolosanov. op. cit. p. 185.

17. V. V. Volkov. "Automation and the Creative Production Activity of the Soviet Worker." Candidate Dissertation (Philosophical Sciences) N. G. Chernyshevsky University (Saratov) 1964, pp. 184-185.

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