BARRIERS TO TECHNOLOGY TRANSFER
AND
INNOVATION
IN
RUSSIAN INDUSTRY

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The Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of

Master of Arts

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Abstract

Since the collapse of the Soviet system there has been a shift from the transfer of equipment to the transfer of technical assistance. Technology transfer from the West to Russia has expanded beyond the import of foreign equipment and production processes to include the adaptation of Western know-how and managerial skills. There has been a growing demand for training in Western business skills, particularly in marketing, enterprise management, cost reduction and the development of sales and distribution networks. However, in order to successfully assimilate, adapt and build upon imported techniques, enterprises need to be conducive to change and must support innovative activities. The following chapters will examine the relevant issues surrounding technology transfer and innovation in the Soviet Union through to the transition period and assess whether or not Western training programs have been an effective vehicle for technology transfer.

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INTRODUCTION

The transfer of foreign technology to Russia was an important element of the East-West relationship even before the collapse of the Soviet system. During the Soviet period, Russians relied on Western technology, mainly in the form of imported equipment, to help with industrial development. Initially, the import of Western technology was seen as an asset to rapid industrialization. Later on, Soviet leaders sought foreign technology for it was perceived to be an effective vehicle for closing the technological gap. Now in the post-Soviet period, the Russians have been looking to the West to help them in their transition to a market system. Technology transfer has expanded beyond the import of foreign equipment and production processes to include the adaptation of Western know-how and managerial skills.

There are several issues that affect the benefits of the transfer of technology from one society to another. The projected benefits are often counter-balanced by political and cultural hindrances. The technology has to be compatible not only with the goals, but also with the industrial practices and the infrastructure of the recipient nation. Simply acquiring technology does not ensure that it will be diffused into society; it also has to be implemented, adapted and built upon. In order for industry to continue to develop and increase productivity, enterprises have to have the capacity to make continuous technological improvements that will allow the imported technology to meet the needs of the receiving firm.

In order to implement, adapt and build upon imported technology, firms not only need the necessary know-how and skills, but they also need to support innovative

activities. Research, development and innovative activities are very important to the diffusion and continued development of new technology. However, innovation is not only dependent on technical capability, but is also subject to environmental and human factors. Innovation requires strong links between research and development and production. Firms must play an active role in the innovation process in order for new innovations to be successfully introduced into production.

In the Soviet period, Russia was linked to the world economy through trade, with the import of equipment and licenses serving as the main vehicle of technology transfer. The transfer of technology came to mean the transfer of equipment; often recipients of the transfer had not acquired the skills and know-how that should accompany the technology. Therefore, from the outset, the industry's ability to assimilate the technology was hindered. Soviet civilian industry was only marginally successful at implementing the technology and, in most cases, the technology transfer did not stimulate the development of further innovations. Soviet enterprises tended not to build on or upgrade foreign technology, if they even installed it at all.

With the reforms instituted under perestroika, the vehicles for transferring technology to the Soviet Union changed. There was a shift in emphasis from simply transferring Western equipment to the transfer of technical assistance. In 1987, joint ventures were allowed to set up on Soviet soil and beginning in 1990 foreign direct investment (FDI) was permitted and became the preferred mode of entry. The transition to a market economy opened the door to all types of technology transfer. The transfers of Western capital, technology and know-how, including, managerial skills were expected to assist the development of the private sector in Russia.

When the Soviet system collapsed the drastic changes in the political and economic institutions caused a high level of uncertainty. Enterprises had to search for financial support, and the introduction of competition into the system threw industrial production into crisis. Production output declined, millions of industrial workers were put on reduced workweeks, and hundreds of thousands were irregularly paid or simply unemployed. Enterprises were still technologically outdated, they lacked the financial resources to upgrade, and the quality of products was generally poor.¹

Furthermore, in the post Soviet period, the Russian economy has had to deal with the consequences of institutional disruption. Market type institutions are still in the process of formation, management is still developing marketing skills, the necessary information flows are still missing or inadequate, the legal structure is ambiguous or confused and 'market culture' is lacking.² International financial institutions (IFIs) and Western countries have played a crucial role in the transition process by helping to improve the foreign investment climate, devising appropriate strategies, and acting as catalysts for the provision of financial resources.³

The main instruments of assistance have been the transfer of capital for macroeconomic stabilization, the transfer of technology and know-how, and the improved market access of Eastern experts to the West. The transition to a market

¹ James Bater, *Russia and the Post-Soviet Scene: A Geographical Perspective* (London: Arnold, 1996), 252.

² Alec Nove, "Economics of Transition: Some Gaps and Illusions," in *Economics of Transition: Structural Adjustments and Growth Prospects in Eastern Europe*, ed. Mark Knell (Cheltenham, UK: Edward Elgar Publishing Limited, 1996), 50-51.

³ Paolo Miurin and Andrea Sommariva, "Financial and Technical Assistance to Central and Eastern Europe: A Critical Appraisal of the Role of International Institutions," *The Washington Quarterly* 17, no.3 (1994): 99.

economy has required training in completely new commercial, financial, and management skills. In the Soviet system enterprise managers were not subject to market forces. They did not have to worry about profit and loss, supply and demand or implementing new innovations; they were simply responsible for ensuring that the plan was fulfilled. In the post Soviet period, however, managers have had to restructure enterprises in order to operate efficiently and the introduction of market mechanisms has put pressure on managers to innovate in order to remain competitive in their new environment. Consequently, there has been a growing demand for training in Western business skills, particularly in marketing, enterprise management, cost reduction and the development of sales and distribution networks.

The question then becomes whether or not these training programs have been an effective vehicle of technology transfer. Have they had a significant impact on productivity and innovation in Russian industrial enterprises? Given the impact of the uncertain economic and political environment on industrial development and production, have managers be able to use their new knowledge and implement changes within their enterprises? Moreover, have the training programs provided Russian managers with skills that are adaptable to the transition economy?

In the Soviet system the failure to assimilate foreign technology, the structure of the R and D sector, and managerial behaviour all acted as barriers to technology transfer and innovation in civilian industry. The planning system, the separation of R and D from industry and the lack of motivation for Soviet managers to implement innovations resulted in a low diffusion rate of new and imported technology. Do these barriers still exist now that the economic system has changed and market mechanisms have been

introduced? Moreover, have Russian managers been able to assimilate and use the knowledge gained from Western training programs?

The following chapter will outline the links between industry and innovation and explain how the Soviet system impeded innovation in civilian industry. The subsequent chapters will then examine the relevant issues chronologically from the Soviet period through the changes to the transition period by considering the failure to assimilate foreign technology, the domestic sources of research and development and Soviet managerial behaviour. The final chapter will explore the issues affecting management education in Russia and assess the success and relevance of the training to the Russian situation.

CHAPTER 1

INDUSTRY AND INNOVATION

The transition from a centrally planned economy to a market economy has brought changes to research, development and innovation in Russian industry. In the Soviet system there was no competitive process as the creation and closure of firms was determined within a hierarchical State structure. However, in the post-communist period, in order to compete in the world market, Russian enterprises need to meet international standards of productive efficiency and also have the capacity to make continuous technological improvements.

The development of the capabilities necessary to implement innovations and improve technology is dependent on environmental and human factors as well as technical ones. Enterprises require an institutional infrastructure and a set of managerial skills that are conducive to innovation and technological development. Moreover, strong links between research, development and production are required in order for innovations to be successfully implemented into society.

The literature on technology, technology transfer and innovation illustrates that the science and technology policy and the institutional structure in the former Soviet system impeded innovation. Scientific activities were controlled by the party and bound by the hierarchical structure and the plan. Moreover, the Soviet innovation model did not encourage spontaneous innovation in the enterprises themselves; the development of new technologies followed a linear path from the research and development institutes down the hierarchical structure to the enterprises. Consequently, the separation of research and

development from industry and the lack of motivation for innovation for Soviet managers resulted in a low diffusion rate of new and imported technology.

1.1. Soviet Industry

In the former Soviet system enterprises were oriented to the mass output of limited profit products. There were a great number of large production plants and for many goods only one or a small number of producers. Primary processing dominated society, with an intense focus on heavy industry. Services for both firms and individuals were scarce and of poor quality, and modern banking, insurance or financial institutions were unknown. Moreover, the degree of commercial utilisation of scientific research was extremely low.⁴

At the same time, however, Western industries were shifting from labour, material and energy intensive industries to technology and capital intensive production. The role of services drastically increased and their range expanded. Front-line technology, modern infrastructure and managerial skills became major competitive advantages and knowledge became a leading export commodity.⁵

In the Soviet system, the enterprise did not produce for the market but rather according to the plan. Production was dictated by the plans that the enterprises negotiated and received from the centre. Enterprises then had to report back on plan fulfillment, and the implementation of most innovations remained outside of the plan requirements. Innovative processes were determined not by the plan but by other

⁴ Andrei Kuznetsov, *Foreign Investment in Contemporary Russia: Managing Capital Entry* (New York: St. Martin's Press, 1994), 16.

⁵ Ibid.

regulators, which made the provision of the necessary material, equipment and other resources extremely complicated. Consequently, many directors and chief specialists considered innovation to be an activity of secondary importance that was not demanded of them.⁶

The literature explains that the planning bureaucracy in the former Soviet Union, that is the ministry, was the 'home office' of the enterprises. It was the planning bureaucracy that evaluated the enterprises, determined the bonuses of managerial personnel, and promoted or retarded the careers of directors. Therefore, it was the planning bureaucracy that governed the decisions of the enterprise.⁷

Both planners and managers acted as barriers to innovation. Linz explains that the Soviet environment was one of taut plans, uncertain input supply, and a bonus structure that provided relatively high rewards for fulfilling current production targets and minimal rewards for innovation.⁸ Moreover, Soviet managers did not control what they produced, the prices that would be charged, or how they would be marketed. They faced a chronic imbalance between the supply of raw materials and the demand for manufactured goods. There was an abundance of poor quality products and consumer needs were not considered in the innovation and production process.⁹

⁶ Leonid Kosals, *Why Doesn't Russian Industry Work?* trans. John Crowfoot, Igor Poluyan, and Valeriya Sedova (London: I.B. Tauris Publishers and Co. Ltd., 1994), 83-84.

⁷ Joseph Berliner, *Soviet Industry from Stalin to Gorbachev* (New York: Cornell University Press, 1988), 204-205.

⁸ Susan J. Linz, "Innovation Strategies in Centrally Planned and Transition Economies," in *Technology, Culture and Development: the Experience of the Soviet Model*, ed. James P. Scanlan (Armonk, New York: ME Sharp Inc., 1992), 67 and 72.

⁹ Noel Hibbert, "Training Soviet Managers," *Industry and Higher Education* (December 1990): 232.

The prosperity of the enterprise depended on its ability to negotiate a favourable plan with the Ministry. Clarke explains that enterprises were not responsible for costs, nor did they benefit from the services they provided and money did not play a regulatory role in production or reproduction. The transfer of products between enterprises was in the form of purchase and sale and monetary balances were adjusted correspondingly. However, the transactions were only nominal as all transfers were directed by the plan and 'money' was strictly money of account, which could not be converted into cash. Enterprises' bank balances, whether they were in credit or deficit, were also nominal.¹⁰

Only wage payments involved transfers of purchasing power, but the amount of money to be paid out was dictated by the enterprise's wage-fund. Direct income did not serve as a production incentive as it does in capitalist economies. On the other hand, power and prestige were highly prized and material benefits, such as rationed goods and services, were highly sought after. Workers were limited in what they could buy and many goods and services were provided directly through the enterprise.¹¹

The pricing mechanism also acted as a disincentive to innovation. In the Soviet system prices were to be adjusted to reflect planned costs of production, modified to the extent of planned subsidies, and the addition of a mark-up corresponding to the surplus to be appropriated by the centre.¹² The theory was that enterprises that met their plan targets would achieve a monetary balance at the end of the year. Subsequently, there was to be a similar macro-economic balance in the economy as a whole. In practice,

¹⁰ Simon Clarke, "The Contradiction of 'State Socialism'," in *What About the Workers?: Workers and the Transition to Capitalism in Russia*, ed. Simon Clarke et al. (London: Verso, 1993), 10-11, 13.

¹¹ Daniel Gros and Alfred Steinherr, *Winds of Change: Economic Transition in Central and Eastern Europe* (London: Longman Group UK Limited, 1995), 46.

¹² Clarke, "The Contradiction of 'State Socialism'," 11.

however, price adjustments were technically and politically extremely difficult to implement and monetary imbalances arose within the system. The introduction of taxes, levies and subsidies eliminated these imbalances.¹³

Gros and Steinherr talk about the strengths and weaknesses of ideological incentives. They point out that “for many years party members acted with complete faith in their socialist utopia.” However, when the belief in the political and moral values of the system waned, performance dropped. They explain that the purpose of the system of penalties and incentives served primarily to stiffen discipline rather than improve performance; subsequently, it enforced a ‘satisfactory’ level of performance rather than generating better results.¹⁴

Furthermore, enterprises tended to conceal their resources and potential from the ministries. Both Clarke and Dyker explain that the ministries pressured enterprises by taut planning and ratcheting which in turn encouraged enterprises to negotiate favourable allocations and conceal resources. In the command system managers knew that any information that they let known about their production possibilities would affect the level of future plan targets. Dyker argues that managers were audacious about supply needs and modest about output potential.¹⁵ Ministries’ and enterprises’ statements could not be relied upon for accurate production capabilities; consequently, planners used past input and output trends to set the new plan targets.

¹³ Ibid.

¹⁴ Gros and Steinherr, *Winds of Change*, 46-47.

¹⁵ Clarke, “The Contradiction of ‘State Socialism’,” 13 and David A. Dyker, *Restructuring the Soviet Economy* (London: Routledge, 1992), 24-25.

Dyker explains that each new plan provision was calculated on the basis of a mark-up on the achieved level of the previous plan period. He states that the “ratchet” principle induced output limitation, as enterprises tended to under produce to ensure that the new target would not increase by much:

Just as perception of the command principle induces capacity concealment, so perception of the ratchet principle induces output limitation. The best way to ensure that the target for period $t + 1$ is not too demanding is to make sure that not too much is produced in period t . And of course if a fairly easy target is obtained for period $t + 1$, it is vital that it should not be overfulfilled by too much, for fear of what might happen in period $t + 2$.¹⁶

Dyker concludes that the use of the ratchet principle encouraged managers to place primary emphasis on modest levels of plan fulfillment.¹⁷

Dyker also explains that Soviet managers were driven by the “Micawber” principle. The incentive system meant that fulfillment of the plan target would bring a substantial initial bonus, while each percentage point of overfulfillment would bring incremental bonuses. However, underfulfillment by just 0.1 percent would result in no bonuses at all and probably a reprimand or even a demotion if the pattern was repeated.¹⁸

The plan not only stipulated the quantity of each product to be delivered month by month, but also defined the sources and quantity of supplies, the size of the wage fund, the allocation of financial resources and the size and skill of the labour force. Clarke argues that the irrationality of the planning system meant that the supply of parts and materials was the principle barrier to achieving plan targets because the priority of the enterprise administration was to secure supplies.¹⁹ Clarke further states that by the early

¹⁶ Dyker, *Restructuring the Soviet Economy*, 25-26.

¹⁷ Ibid, 26.

¹⁸ Ibid.

¹⁹ Clarke, “The Contradiction of ‘State Socialism’,” 15-16.

1960s, the technological and bureaucratic-administrative constraints were resulting in disproportionalities in supply, particularly of machinery, intermediate products and manufactured consumer goods.²⁰

Clarke also explains that it was easier for enterprises to fight for looser plans with the Ministry (and for the shop chief to fight for more resources), to distort the figures or to force the workers to intensify their labour, than to take direct control of the process of production.²¹ Enterprises were task-oriented rather than long-range planners and their primary tasks were to negotiate the plan and deliver its plan targets. The main barrier that enterprises faced was the shortage of supplies of labour and means of production.

Clark further argues that the response to the collapse of the Soviet planning system was to work within the existing framework of production. Enterprises altered their product mix in order to increase revenue, diverted output from state orders to the free market as much as possible and sought to secure supplies by developing direct connections with their suppliers. Although the transition to a market economy was to be based on the development of contractual links, there were no effective mechanisms for the enforcement of contracts. Suppliers were not willing to enter into monetary contracts as money alone was not sufficient for them to secure supplies. Moreover, there was no basis on which to set prices due to the lack of competition and disproportionalities of the former system.²²

²⁰ Simon Clarke, "The Crisis of the Soviet System," in *What About the Workers?: Workers and the Transition to Capitalism in Russia*, ed. Simon Clarke et al. (London: Verso, 1993), 34.

²¹ Clarke, "The Contradiction of 'State Socialism'," 15-16.

²² Simon Clarke, "Privatization and the Development of Capitalism in Russia," in *What About the Workers?: Workers and the Transition to Capitalism in Russia*, ed. Simon Clarke et al. (London: Verso, 1993), 233.

The initial barrier to the development of effective market mechanisms was the persistence of the controls imposed by the administrative command system. Clarke states that in the Soviet system the three principle priorities of enterprises were to secure supplies, to secure a monopoly position in order to maintain profitability by applying the principle of cost-plus pricing and to maintain sufficient cash flow to pay wages.²³ Subsequently, when the system collapsed, enterprises were not oriented towards profitability, but towards cash flow and maintaining supplies.

Furthermore, in the early 1990s, enterprises still sought to secure their supplies by reinforcing vertical integration within the enterprises and engaging in barter relationships with other enterprises. With the raw materials, intermediate products and consumer goods acquired through barter, enterprises began engaging in property, financial and commercial speculation. They sought to diversify production, cover risk and maximize market opportunities. However, although there was some reorientation of production, most of it was inefficient small batch production that used inappropriate labour and equipment, and was designed to secure cash flow at any price.²⁴

1.2. Science and Technology

Dyker explains that the relationship between scientific and design activity and institutions is an interactive one; science and technology policy must be framed within the context of each given countries' unique institutional structure.²⁵ The concept of

²³ Ibid, 234-235.

²⁴ Ibid.

science and technology (S and T) includes scientific and technical education and services as well as research and development (R and D).²⁶ Gault and Hansen explain that S and T activities include the execution of R and D, the discovery and commercial use of inventions, the diffusion of new technologies and the development and allocation of the necessary human resources.²⁷

Thomas argues that the basic factor affecting Soviet S and T performance was the pervasive party control. Scientific activities were directed and controlled according to the plan fulfillment. New technologies were not usually spontaneous developments that occurred in the enterprises, but were designs passed down through the hierarchy from R and D and specialist institutes.²⁸ Moreover, the Soviet S and T system was built on the 'science-push' principle. There was an underlying assumption that new technologies developed in specialist institutes would automatically be assimilated by producing enterprises. Consequently, there was a failure to understand the importance of tacit

²⁵ David A. Dyker and Jacques Perrin, "Technology Policy and Industrial Objectives in the Context of Economic Transition," in *Technology of Transition: Science and Technology Policy for Transition Countries*, ed. David A. Dyker (Budapest: Central European University Press, 1997; distributed in the US by Oxford University Press), 10.

²⁶ Leonid Gokhberg, Merton J. Peck, and Janós Gács, introduction to *Russian Applied Research and Development: Its Problems and its Promise*. ed. Leonid Gokhberg, Merton J. Peck, and Janós Gács (Laxenburg, Austria: The International Institute for Applied Systems Analysis, 1997), 8.

²⁷ Fred D. Gault and Wendy Hansen, "Knowledge Flows in the S and T System," in *Innovation and Structural Change in Post-Socialist Countries: A Quantitative Approach*, ed. David A. Dyker and Slavo Radošević (Dordrecht, the Netherlands: Kluwer Academic Publishers, 1999), 411.

²⁸ John R. Thomas, "US – Soviet and Technology Exchanges as an Aspect of East-West Technology Transfer: Review and Lessons of Experiences in the 1970s," in *Selling the Rope to Hang Capitalism: the Debate on West-East Trade and Technology Transfer*, ed. Charles M. Perry and Robert L. Pfaltzgraff, Jr. (Washington: Pergamon-Brassey's International Defence Publishers, 1987), 112.

knowledge in the innovation process and the role of hands on contact as a way of transferring tacit knowledge.²⁹

Lundvall argues that a practical approach should be taken when shaping technology policy rather than the ideological constraints of a pure planned economy or a pure market economy. He argues that the learning economy needs a mixed economy where markets function in a social context and are supported by organizational elements.³⁰ Along these lines Fritsch and Werker argue that the Russian technological strategy should first try to catch up with the technological level of western competitors by absorbing the relevant knowledge and implementing process innovation. Then their firms can enter interregional markets mainly with new products instead of competing in markets for goods that are in the final stages of their life cycle.³¹

Technology

The literature generally agrees that technology encompasses more than just equipment and machinery. Hanson defines technology as a set of skills, procedures and technical information that amount to the capability to produce a particular process in

²⁹ David A. Dyker, "Foreign Direct Investment in Transition Countries: A Global Perspective," in *Foreign Direct Investment and Technology Transfer in the Former Soviet Union*, ed. David A. Dyker (Cheltenham, UK: Edward Elgar Publishing Limited, 1999), 10.

³⁰ Bengt-Åke Lundvall, "Technology Policy in the Learning Economy," in *Innovation Policy in a Global Economy*, ed. Daniel Archibugi, Jeremy Howells and Jonathan Michie (Cambridge: Cambridge University Press, 1999), 25-26.

³¹ Michael Fritsch and Claudia Werker, "Innovation Systems in Transition," in *Innovation and Technological Change in Eastern Europe: Pathways to Industrial Recovery*, ed. Michael Fritsch and Horst Brezinski (Cheltenham, UK: Edward Elgar Publishing Limited, 1999), 15.

production.³² Schaffer is more specific for he defines technology as useful knowledge, a product as something that embodies technology, know-how as disembodied technology or practical knowledge and invention as the creation of new technology.³³

Holliday expands the definition further and states that “technology denotes knowledge or information of how to perform tasks, solve problems or produce products and services.”³⁴ He defines industrial technology as product design, production techniques and managerial systems and explains that production techniques are essentially the capability of transforming technical documentation, labour, machines, and materials into finished products.³⁵

Metcalf argues that technology can be treated in terms of knowledge, skills and artefacts with different variety-generating mechanisms, selection processes and institutional structures in each case. He then defines technology as the ability to carry out productive transformations and states that “It is an ability to act, a competence to perform, translating materials, energy and information in one set of states into another, more highly valued set of states.”³⁶

The literature divides technology into two categories: hard technology, the technology of process and product, and soft technology, the technology of management.

³² Philip Hanson, *Trade and Technology in Soviet-Western Relations* (London: The MacMillan Press Limited in Association with the Centre for Russian and East European Studies, University of Birmingham, 1981), 7.

³³ Mark E. Schaffer, introduction to *Technology Transfer and East-West Relations*, ed. Mark E. Schaffer (London: Millennium Publishing Group, Croom Helm Limited, 1985), 3-4.

³⁴ George Holliday, *Technology transfer to the USSR 1928-1937 and 1966-1975: The Role of Western Technology in Soviet Economic Development* (Boulder, Colorado: Westview Press, 1979), 10.

³⁵ *Ibid*, 11.

³⁶ J.S. Metcalfe, “Technology Systems and Technology Policy in an Evolutionary Framework,” *Cambridge Journal of Economics* 19 (1995): 25 and 34.

organisation, sourcing and marketing.³⁷ Bell and Pavitt further explain that technology is embodied in plants and equipment, including operational technologies involving equipment, process characteristics, product specifications and work organisation.³⁸

The literature also makes the distinction between codifiable knowledge and tacit knowledge. Metcalfe argues that this distinction is an important part of understanding the innovation process, as the communication of knowledge is such a central element to it.³⁹ Lundvall separates the two by illustrating that statistical facts and mathematical formulae have been translated into universal codes that can be produced and communicated. He explains that tacit knowledge is associated with any kind of professional activity and can generally be acquired by means of an apprentice-master relationship and by practical experiences gained in interaction with colleagues.⁴⁰

Bell and Pavitt argue that innovation requires more than codified knowledge. They state that the operation of existing technologies and innovation require tacit knowledge of particular products, processes, firms, and markets as scientific laws and models cannot fully predict the performance of new products and processes. They state that highly specific tacit knowledge can only be acquired through trial and error and the accumulation of experience in particular contexts.⁴¹

³⁷ For further explanation refer to Dyker, "Foreign Direct Investment in Transition Countries," 9.

³⁸ Martin Bell and Keith Pavitt, "The Development of Technological Capabilities," in *Trade, Technology and International Competitiveness*, ed. Irfan-ul-Haque (Washington: The World Bank, 1995), 74.

³⁹ Metcalfe, "Technology Systems and Technology Policy," 34.

⁴⁰ Lundvall, "Technology Policy in the Learning Economy," 23.

⁴¹ Bell and Pavitt, "The Development of Technological Capabilities," 73-74.

Technology Transfer

Innovation is carried out through various forms of technology transfer (acquisition), both embodied (machines and equipment) and disembodied (patents, licenses, know-how, technological services, etc).⁴² Hanson and Pavitt state that since most technology is specific in its application and is partly tacit rather than completely codified, transfer involves costs in training and learning by doing, and reproduction involves cost in adaptation.⁴³

International technology transfer as defined by OECD in Zaleski and Wienert 1980 is “a process whereby innovations (new products or know-how) obtained in one country are then transmitted for use to another.”⁴⁴ Hanson takes the definition further and states that international technology transfer is any process “whereby the productivity of resources in one country can be increased by the transmission from other countries of information or of products and processes embodying information.”⁴⁵

Holliday outlines two key phases in the technology transfer process. First of all there is the initial planning and purchase of technology which involves the choosing of the technology, the selection mechanism, the negotiation of a contract and securing the financing. Secondly, there is the absorption of the technology, which involves design and

⁴² Leonid Gokhberg and Irina Kuznetsova, “Specificities of Innovation Activity in Russian Industry,” in *Innovation and Structural Change in Post-Socialist Countries: A Quantitative Approach*, ed. David A. Dyker and Slavo Radošević (Dordrecht, the Netherlands: Kluwer Academic Publishers, 1999), 292.

⁴³ Philip Hanson and Keith Pavitt, *The Comparative Economics of Research, Development and Innovation in East and West: A Survey* (Chur, Switzerland; New York: Harwood Academic Publishers, 1987), 42.

⁴⁴ Eugene Zaleski and Helgard Wienert, *Technology Transfer Between East and West*, (Paris: Organization for Economic Cooperation and Development, 1980), quoted in Michael Kaser, “The Impact of Technological Change on East-West Economic Relations,” in *Technology and Change in East-West Relations*, ed. F. Stephen Larrabee (New York: The Institute for East-West Security Studies, Boulder Colorado, 1988; distributed by Westview Press), 148.

⁴⁵ Hanson, *Trade and Technology*, 14.

adaptation, construction and installation, training, the operation of plants and machinery and domestic diffusion.⁴⁶ Barz illustrates these two phases in a diagram of the technology transfer process. [See Appendix 1] The first stage translates the services, skills and knowledge of the exporting country being transferred into the specific equipment, know-how and managerial capabilities to generate change. The second stage, the ability of the recipient country to absorb the technology, depends on the country's indigenous capacity to generate technological change.⁴⁷

There are both active and passive channels of technology transfer. Active forms involve the direct interaction between the seller and the buyer of technology, such as the training of personnel or active guidance in operating a turn-key plant. Passive forms are 'one-way' channels and involve the simple transfer of technology with no active assistance from the owners.⁴⁸ Some examples of technology transfer include the reading of foreign technical literature, industrial espionage, the purchase of individual foreign products to be 'reversed engineered', the purchase of foreign products for direct use, and the purchase of turn-key plants including the purchase of foreign licenses, know-how and training.

Furthermore, technology can be transferred through both international commercial and non-commercial transactions. The most common non-commercial

⁴⁶ Holliday, *Technology transfer to the USSR*, 24.

⁴⁷ Michael Barz, "Foreign direct investment and technology transfer in Eastern Europe: the case of Russia", doctoral thesis, University of Sussex, 1996, as adapted and extended from Wei Liu, "International technology transfer and development of technological capabilities: a theoretical framework", *Technology in Society*, vol. 17, no.1, 1995: 103-120, in Margaret Sharp and Michael Barz, "Multinational Companies and the Transfer and Diffusion of New Technological Capabilities in Central and Eastern Europe and the Former Soviet Union," in *Technology of Transition: Science and Technology Policy for Transition Countries*, ed. David A. Dyker (Budapest: Central European University Press, 1997; distributed in the US by Oxford University Press), 97.

⁴⁸ Schaffer, *Technology Transfer and East-West Relations*, 6.

channels are published information, the movement of persons, education and training at foreign universities or technical schools and the exchange of information through technical cooperation programs of international organizations. The most frequently used channels of commercial transfer include the export of products, licensing agreements, management contracts, technical assistance agreements and foreign direct investment (FDI).⁴⁹

Dyker and Radošević argue that technological integration into the world economy depends on whether FDI is integrated into the respective national economies. They argue that the critical question with regard to FDI is whether individual investments will spread into the larger environment through the development of local supplier linkages or remain confined to the level of intra-firm productivity improvements.⁵⁰

FDI improves the economic performance in the host country by aiding in integration into the global economy, increasing the aggregate rate of investment, generating transfers of both hard and soft technology and inducing patterns of networking and subcontracting with other firms.⁵¹ FDI in transition economies has resulted in improved management of technical change, of sourcing, and of marketing. Moreover, the transfer of FDI has also involved the automation of services, the improvement of management of training and capability enhancement, the introduction of new products,

⁴⁹ Holliday, *Technology transfer to the USSR*, 19-20.

⁵⁰ David A. Dyker and Slavo Radošević, "Technological Integration and Global Marginalization of Central and East European Economies: the Role of FDI and Alliances," *Science Policy Research Unit*, September 1996, 14. <http://www.succex.ac.uk/spru/publications/imprint/steepdps/34/steep34.doc> (November 2001).

⁵¹ Dyker, "Foreign Direct Investment in Transition Countries," 9.

upgraded 'old' products, assimilation to Western standards, packaging, rationalisation of existing production lines, and (partial) automation of existing production lines.⁵²

Important issues in the discussion of technology transfer also include the nature of the technology being acquired, the 'appropriateness' of the technology and the assimilation of the technology. Hanson explains that technology transferred as know-how, blueprints, etc., without the actual hardware that embodies the technology, requires a substantial contribution from the domestic R and D sector before the new product can actually be produced or the new process used. Hanson also explains that purchasing hardware alone will result in limited gains, as machinery by itself does not give full and immediate information on how to make that machinery.⁵³

Furthermore, Balabanova and Grudzinskii explain that the concept of transfer of technology includes knowledge in areas of production, marketing and management and is not strictly limited to the scientific or engineering fields. They stress the importance of the transfer of managerial know-how in the transition to a market economy, as the efficiency of operations is defined not simply by technical factors, but by economic results as well.⁵⁴

The technology transfer process is shaped by the interaction of social and technical issues. Bugliarello states that a number of factors affect the process of technology transfer, including, the nature of the entities between which the transfer

⁵² Ibid, 16.

⁵³ Philip Hanson, "International Technology Transfer from the West to the USSR," in *Soviet Science and Technology: Domestic and Foreign Perspectives*, ed. John R. Thomas and Ursula M. Kruse-Vaucienne (Washington: The National Science Foundation, 1977), 354-355.

⁵⁴ Evgeniia Balabanova and Aleksandr Grudzinskii, "Institutsional'nye usloviia transfera tekhnologii," *Sotsiologicheskie issledovaniia*, no.4 (2001): 40.

occurs, the kind of technology being transferred and the social climate under which the transfer occurs.⁵⁵ Moreover, Heller argues that technology has values built into it as it is part of the supplier society's culture and it subsumes technical, economic, social, cultural, psychological, and political priorities.⁵⁶

The literature emphasizes the importance of the effect of political background, economic conditions and innovative climate on the technology transfer process. Gaponenko argues that the degree of development of market infrastructure and national scientific, innovation and structural-technological policy also determine trends in technology transfer.⁵⁷ Balabanova and Grudzinskii agree and state that the compatibility of the foreign technology with the technological, economical and cultural infrastructure is one of the paramount conditions for successful international exchange.⁵⁸ Moreover, Campbell and Marer state that "...the effectiveness of technological transfer must be studied in the context of the organizational and management system of the borrowing country and the political-cultural environment in which it operates."⁵⁹

Heller argues that appropriate technology selection is vital for the transfer of technology to be successful. The technology must take into account local technical, economic, labour, social, cultural and psychological conditions in order for the

⁵⁵ George Bugliarello, "Technology Transfer: A Paradigm," in *East-West Technology Transfer: New Perspectives and Human Resources*, ed. George Bugliarello et al. (Dordrecht, the Netherlands: Kluwer Academic Publishers, 1996), 1-2.

⁵⁶ Peter B. Heller, *Technology Transfer and Human Values: Concepts, Applications and Cases* (Lanham, US: University Press of America, 1985), 28.

⁵⁷ N. Gaponenko, "Innovatsii i innovatsionnaia politika na etape perekhoda k novomu tekhnologicheskomu poriadku," *Voprosy ekonomiki*, no.9 (1997): 92.

⁵⁸ Balabanova and Grudzinskii, "Institutsional'nye usloviia transfera tekhnologii," 42.

⁵⁹ Robert W. Campbell and Paul Marer, *East-West Technology Transfer: an Agenda of Research Needs* (Bloomington, Indiana: International Development research Centre, Indiana University, 1974), 5.

technology to be diffused into society. Although opportunities and constraints define possible choices, physical and human environmental considerations determine the 'best' possible option.⁶⁰

Heller further explains that when transferred technology is not diffused into society it may be because it is unsuitable to the existing technological or economic base. The technology may be psychologically unsuitable by leading to a fear of the unknown, of destabilizing change or it may challenge the existing value system. Consequently, the adoption of transferred technology implies that the new technology can become part of the dynamics which characterize the operations of the systems of the new setting. Transferred technology must mesh with both the operational systems and the technological, economic, social, cultural and psychological fabric.⁶¹

Important institutional factors for successful assimilation of transferred technology include a developed infrastructure (transportation/communication), a skilled workforce, domestic R and D capabilities, domestic or foreign sources of raw materials and domestic or foreign markets for goods produced with the imported technology. A managerial system that provides incentives to innovate, minimize costs and take risks is also important. The organization of domestic industry should promote diffusion of imported technologies throughout the economy, provide information about the technological advance in foreign industries, have a reliable supply system, effective patent services, quality standards and technical documentation centres. Moreover,

⁶⁰ Heller, *Technology Transfer and Human Values*, 65.

⁶¹ Ibid, 10 and 74.

financial institutions are needed to assist in establishment of new industries or access to foreign credits.⁶²

The acquisition of foreign machinery embodying new technology and of related know-how does not automatically result in dynamic efficiency in industry. Dynamic efficiency depends on domestic technological capabilities. Technological capabilities include the ability to generate and manage change in technologies used in production. These capabilities are based largely on specialised resources (such as a highly skilled labour force) that are not automatically derived from capital goods and technological know-how. Countries concerned with improving their international competitiveness need to address these issues in both management and policy design.⁶³

Technological Capabilities

Although in the Stalinist growth model imports of machinery contributed to the process of overcoming technological backwardness, international technology transfers were not integrated into the process of domestic technological accumulation. Imports of technology played a major role in the expansion of production capacity but they only had a minor role in developing local technological capabilities.⁶⁴

Technological capabilities refer to the skills, technological knowledge and organisational structures that are required in order to operate a technology efficiently and

⁶² Holliday, *Technology transfer to the USSR*, 36.

⁶³ Bell and Pavitt, "The Development of Technological Capabilities," 71-72.

⁶⁴ Ibid, 95-96 and Alan Smith, *Russia and the World Economy: Problems of Integration* (London; New York: Routledge, 1993), 59.

carry out any process of technological change.⁶⁵ Bell and Pavitt argue that generating and managing technical change often require technological capabilities that differ substantially from those needed to operate existing technical systems. They explain that technological capabilities include constantly improving techniques through actively engineered technical and organisational change and not simply 'learning by doing'. They explain that 'learning by doing' yields increased proficiency in operating given techniques because of increased production experience but also state that generating change requires domestic innovation.⁶⁶

Technological capabilities are developed through continuous investment by enterprises in specialized, change-generating activities including product design, production engineering, quality control, training, and linkages to foreign sources of technology and expertise.⁶⁷ Katz argues that economic agents, resources and public policies shape the development of technological capabilities. Moreover, characteristics of the individual enterprise such as its size, its field of activity, type of production organization, degree of product standardization, and type of ownership are also determining factors in the development of indigenous technological capabilities.⁶⁸

⁶⁵ Pietrobelli, Carlo, 'Emerging Forms of Technological Cooperation: the Case for Technology Partnership', United Nations Conference on Trade and Development, Science and Technological Issues (UNCTAD/DST/13) (Geneva, United Nations, 1996), 10 in Petra Opitz and Thomas Sauer, "Strategic Technology Alliances: A Way to Innovate Enterprises in Russia?" *Post-Communist Economies* 11, no.4 (1999): 488.

⁶⁶ Bell and Pavitt, "The Development of Technological Capabilities," 78-79, 94.

⁶⁷ Ibid, 100.

⁶⁸ Jorge M. Katz, "Domestic Technological Innovations and Dynamic Comparative Advantages: Further Reflections on a Comparative Case-Study Program," in *International Technology Transfer: Concepts, Measures and Comparisons*, ed. Nathan Rosenberg and Claudio Frischtak (New York: Praeger Publishers, 1985), 130-131.

Opitz and Sauer argue that the building of technological capabilities in Russian enterprises may benefit from international technology partnerships according to their own absorptive capacity. They define absorptive capacity as the firm's ability to identify, assimilate and exploit knowledge from the environment and state that is determined by the nature and amount of the firm's own R and D investment.⁶⁹

Absorptive Capacity

Absorptive capacity is an organization's ability to identify new knowledge and apply it to its own means. Cohen and Levinthal argue that the ability to evaluate and utilize outside knowledge is a function of the level of prior related knowledge. They explain that this prior knowledge includes basic skills and shared language, but may also include the most recent scientific and technological developments.⁷⁰ Based on Cohen and Levinthal's model, Fritsch and Werker argue that an organization's absorptive capacity is based on its internal stock of knowledge, including both human and physical capital, the extent and the nature of its innovative activities and the amount of resources devoted to monitor outside developments.⁷¹

Cohen and Levinthal emphasize that an organization's absorptive capacity refers not only to the acquisition or assimilation of technology but also to the organization's ability to exploit it. Consequently, an organization's ability to communicate and

⁶⁹ Opitz and Sauer, "Strategic Technology Alliances," 488.

⁷⁰ Wesley M. Cohen and Daniel A. Levinthal, "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly* 35 (1990): 128.

⁷¹ Fritsch and Werker, "Innovation Systems in Transition," 8.

cooperate with its sub-units and its external environment is important.⁷² Opitz and Sauer state that the internal production capacities in Russian enterprises seem to be an impeding factor for the propensity to cooperate, especially for research institutes. They cite the obsolete structure of Russian production assets, the lack of internal demand and/or the problems of securing reliability and quality of production as possible explanations.⁷³

1.3. Research, Development and Innovation

It is important to understand the distinction between basic and applied research. Basic research is activity aimed at obtaining new knowledge without any particular application or objective in mind. It can be either experimental or theoretical, and usually originates from existing scientific literature.⁷⁴ Pavitt explains that basic research influences technology through the transfer of trained researchers with problem-solving skills.⁷⁵ Applied research, on the other hand, although also aimed at acquiring new knowledge, is directed toward a specific practical aim or objective.⁷⁶

The literature emphasizes the importance of a solid link between R and D, innovation and industry. Schaffer defines R and D as an organized process of innovation.⁷⁷ Smith argues that although the large R and D sector was a major source of

⁷² Cohen and Levinthal, "Absorptive Capacity: A New Perspective," 131-132.

⁷³ Opitz and Sauer, "Strategic Technology Alliances," 491.

⁷⁴ Gokhberg, Peck, and Gács, *Russian Applied Research and Development*, 8.

⁷⁵ Keith Pavitt, "Transforming Centrally Planned Systems of Science and Technology: the Problem of Obsolete Competencies," in *Technology of Transition: Science and Technology Policy for Transition Countries*, ed. David A. Dyker (Budapest: Central European University Press, 1997; distributed in the US by Oxford University Press), 47.

⁷⁶ Gokhberg, Peck, and Gács, *Russian Applied Research and Development*, 8.

⁷⁷ Schaffer, *Technology Transfer and East-West Relations*, 3-4.

domestic innovation in the Soviet system, the sector was inefficient at generating innovations and diffusing them throughout the civilian economy, as R and D were separated from production.⁷⁸ Moreover, the successful implementation of innovations is a key component of successful industrial activity. Gokhberg and Kuznetsova argue that innovations are a prerequisite for manufacturing competitive products, retaining traditional markets and conquering new ones, diversifying production and increasing its efficiency.⁷⁹

Schumpeter defined an innovation as the implementation of a new combination. Fritsch and Werker explain that this not only comprises product and process innovation but organizational innovations and the access to new markets of suppliers or consumers as well. Consequently, this broad concept of innovation includes imitation of a product or production process as that requires a modification to the specific environment of the enterprise and often comprises the implementation of new combinations.⁸⁰

Other authors are more specific in their definition of innovation. Gokhberg, Peck and Gács define innovation as the transformation of an idea into a new or improved product introduced to the market, or to a new process used in industry and commerce. Bell and Pavitt agree that innovation is the development and initial commercialization of

⁷⁸ Smith, *Russia and the World Economy*, 71.

⁷⁹ Gokhberg and Kuznetsova, "Specificities of Innovation Activity in Russian Industry," 292.

⁸⁰ Joseph A. Schumpeter, *Capitalism, Socialism and Democracy*, 6th ed. (London: Unwin Paperbacks, 1987), 100 quoted in Fritsch and Werker, "Innovation Systems in Transition," 5.

new technology. Schaffer makes the distinction that innovation refers to the first practical application of an invention.⁸¹

Kosals and Dyker take the definition further and argue that innovation is goal-oriented. "Technology can only progress through the design and construction of new technical objects, or the transformation of existing technical objects brought into play a function of predefined objectives."⁸² Consequently, as there is no such thing as technology for its own sake, the 'innovative process' is limited to the changes with a conscious aim that are implemented to attain particular benefited results.⁸³

In market economies innovation is driven by a combination of market and technological factors. Innovators may perceive an unmet demand in the market, which they believe can be met by the application of new technology. On the other hand, an inventor may also be inspired by a new scientific development that sparks an idea for a new process or product.⁸⁴ Successful innovation occurs when a firm produces a new product that finds a significant niche in the larger technological environment. The 'usefulness' of a new technology is not dependent on the degree of technical novelty, as important innovation can occur from finding new uses for older things. However, the degree of novelty is important for the development of competitive advantage.⁸⁵

⁸¹ Gokhberg, Peck, and Gács, *Russian Applied Research and Development*, 8, Bell and Pavitt, "The Development of Technological Capabilities," 74 and Schaffer, *Technology Transfer and East-West Relations*, 3-4.

⁸² Dyker and Perrin, "Technology Policy and Industrial Objectives," 9.

⁸³ Kosals, *Why Doesn't Russian Industry Work?* 61.

⁸⁴ John H. Moore, "Science, Technology and Russia's Future: Two Legacies," *Communist Economies and Economic Transformation* 9, no.1 (1997): 48.

⁸⁵ John K Smith, "Thinking about Technological Change: Linear and Evolutionary Models," in *Learning and Technological Change*, ed. Ross Thomson (New York: St. Martin's Press, 1993), 78.

The goals of innovation are dependent on the nature of the system. The state of supplies of materials and equipment and the degree of independence in economic decision-making affect innovation. According to Kosals, the most important indicators of the innovative process are the number and exact type of innovations introduced, the economic and social costs and the results of their implementation, and the overall consequences of such change.⁸⁶ He argues that the actions involved in the innovation process include the planning of implementation, the organization of such processes and the formation of the means for implementing the innovation. The means of implementation include the resources of raw materials, equipment and finance, both economic costs and social expenditure, as well as the organizational and procedural provision for innovation.⁸⁷

McAuley separates innovation into three related processes: invention, development and diffusion. Invention, as he defines it, is the idea for a new product or a new way to produce an existing one. Development is the realisation of inventions, and diffusion is the introduction of a new product or process into successive plants and its spread throughout the industry. Furthermore, he states that diffusion can spill into dissemination, which he defines as the devising of new uses for products in other industries or adaptation of processes to other materials.⁸⁸

⁸⁶ Kosals, *Why Doesn't Russian Industry Work?* 61.

⁸⁷ Ibid, 79-80.

⁸⁸ Alastair McAuley, "Central Planning, Market Socialism and Rapid Innovation," in *Technology Transfer and East-West Relations*, ed. Mark E. Schaffer (London: Millennium Publishing Group, Croom Helm Limited, 1985), 32.

Other authors also include dissemination in their definition of diffusion. Bell and Pavitt define diffusion as a process of choosing, acquiring, and adapting existing technologies. They further explain that diffusion also incorporates a process of continuing technical change that adapts technology for use in a range of specific situations and modifies it to improve on the original performance standards.⁸⁹

Moreover, Pavitt argues that the rate of diffusion of a superior technology depends on the strength of the incentive to imitate it.⁹⁰ In accordance with this Linz argues that imitation brings firms closer to state-of-the-art production techniques and consequently contributes to economic growth.⁹¹ In market conditions, the competitive environment is often incentive enough for keeping up with the best-practice technology. In centrally planned systems however, there was a lack of competitive pressure and the ability to appeal to patron institutions to bail out failing enterprises.

McAuley explains that the Soviet claim to superiority in innovation was based on three presumed advantages of central planning and state ownership. First, wasteful duplication in research was eliminated and the plan ensured that sufficient resources were available. Secondly, since all enterprises were state-owned the dissemination of relevant information would not be obstructed by commercial secrecy. Thirdly, it would be easier to make rational decisions about new technologies since production was for social need rather than private gain.⁹²

⁸⁹ Bell and Pavitt, "The Development of Technological Capabilities," 75.

⁹⁰ Pavitt, "Transforming Centrally Planned Systems," 50.

⁹¹ Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 81.

⁹² McAuley, "Central Planning, Market Socialism," 33.

However, in practice in centrally planned economies the output of innovation activities was relatively low in relation to the resources that were devoted to R and D. Fritsch and Werker state that except in defence and space technology, these countries were technological followers, not leaders.⁹³ Moreover, successful innovation requires the development of internal and external networks. Moore argues that in the West innovators have developed networks of both internal and external sources to aid in their research. However, the isolation of Russian scientists and engineers from each other and the external world impeded the development of such networks.⁹⁴

Berliner outlines centrally planned economies' strengths and weaknesses in the innovation process. He notes that there was a high level of expenditure on technical and scientific education and on R and D and that the high rate of investment allowed for the continuous incorporation of new technology. However, the pricing and economic calculation discriminated against new products, there were inadequate incentives for innovation and the system was plagued with organizational problems. Some major obstacles included the separation of R and D institutes from production, user resistance to new products, and the legal and social problems associated with labour-saving innovation.⁹⁵

Gomulka also outlines some generalities about innovation in centrally planned economies. First of all he argues that innovating firms were motivated by the need to overcome supply difficulties. Enterprises were constrained by resources rather than demand and therefore took little initiative in exploiting new technological opportunities.

⁹³ Fritsch and Werker, "Innovation Systems in Transition," 10.

⁹⁴ Moore, "Science, Technology and Russia's Future," 54.

Moreover, the financial incentive for undertaking innovation was weak and despite the fact that R and D personnel had considerable decision-making freedom, the resources available to enterprises for implementing inventions were limited. Enterprises tended to be large in scale and traded off choice and quality for quantity.⁹⁶

Linear innovation model

In the former Soviet system innovation was organized along the lines of the linear model of innovation. Fritsch and Werker explain that according to the linear model the logical steps of the innovation process (invention, development, innovation and diffusion) pass successively one after another.⁹⁷ The major shortcoming of the linear model is that it neglects the feedback process and the impact of 'later' phases of the innovation process on 'earlier' stages. For example, it does not take into account the users' or buyers' preferences on the research activities.⁹⁸

Radošević further explains that the linear model assumes that R and D is the main generator of technological innovation and assumes that users, engineering and other activities are irrelevant to technological advance. Moreover, in the former Soviet system technology was perceived as a commodity that once developed could be introduced into

⁹⁵ Joseph Berliner quoted in Campbell and Marer, *East-West Technology Transfer*, 12-13.

⁹⁶ Stanislaw Gomulka, "The Incompatibility of Socialism and Rapid Innovation," in *Technology Transfer and East-West Relations*, ed. Mark E. Schaffer (London: Millennium Publishing Group, Croom Helm Limited, 1985), 15-18.

⁹⁷ Hariolf Grupp, *Foundations of the Economics of Innovation: Theory, Measurement and Practice* (Cheltenham, UK: Edward Elgar Publishing Limited, 1998) and Werner Meske, "Institutional Transformation of S and T in CEE" (paper presented at the 2nd SPRU-TSER workshop July 3-4, 1997) quoted in Fritsch and Werker, "Innovation Systems in Transition," 10.

⁹⁸ Fritsch and Werker, "Innovation Systems in Transition," 10.

production without the need for continuous adaptation and improvement. Consequently, production alone was not seen as an important source of technological innovation.⁹⁹

National innovation systems

A system of innovation is a set of interconnected institutions that create, store and transfer the knowledge and skills that define new technologies. Metcalfe defines a national system of innovation as a set of distinct institutions that contributes to the development and diffusion of new technologies. This set of institutions also provides the framework within which governments form and implement policies to influence the innovation process.¹⁰⁰ Bell and Pavitt specifically outline successful management, links between technology imports and local capabilities, training by business firms, and the contributions of R and D institutes as key features of national systems of innovation.¹⁰¹

Metcalfe argues that governments play an important role in the operation of national innovation systems by supporting science and technology. He concludes that national innovation systems are pluralistic in nature. They are strongly based on the division of labour and their component institutions make complementary contributions to the innovation process. However, they differ significantly with respect to motivation and to a commitment to dissemination of the knowledge that they generate.¹⁰²

⁹⁹ Slavo Radošević, "Patterns of Preservation, Restructuring and Survival: Science and Technology Policy in Russia in the Post Soviet Era," *Centre for the Study of Economic and Social Change in Europe*, School of Slavonic and East European Studies, University College London, January 2002, 1.
http://ssees.ac.uk/publications/working_papers/wp7.pdf (March 2002).

¹⁰⁰ Metcalfe, "Technology Systems and Technology Policy," 38.

¹⁰¹ Bell and Pavitt, "The Development of Technological Capabilities," 92.

¹⁰² Metcalfe, "Technology Systems and Technology Policy," 40.

Pavitt further explains that the main deficiencies in national systems of science and technology have been in terms of the competencies necessary to generate and implement continuous change and to formulate and execute supporting public policies.¹⁰³ Efforts can be made to acquire the capabilities to improve the technology, generate new components and promote technological independence, even when technological change depends on imported technology. However, innovation in the Soviet system was a matter of applying R and D results from institutes according to the government plan rather than an ongoing activity of product and process improvements.¹⁰⁴

1.4. Concluding Remarks

It is important to understand that since the fall of the Soviet Union, there has been a shift from the transfer of equipment to an increased emphasis on the transfer of technical assistance. Keeping in mind all of the above definitions, technical assistance is a form of technology transfer. The main instruments of technical assistance have included the transfer of capital for macroeconomic stabilisation, the transfer of know-how and improved market access of Russian experts to the West. Russia's ability to absorb, diffuse and build upon newly acquired knowledge from the West is important in its transition to a market economy.

The literature on the Soviet system illustrates the organizational and systemic barriers to innovation within the Soviet Union. The authors emphasize that in the transition to a market economy, there is an increased need for a national S and T policy

¹⁰³ Pavitt, "Transforming Centrally Planned Systems," 43.

¹⁰⁴ Leonid Gokhberg and Merton J. Peck, "The Decline of the Russian R and D Sector and the Prospects for Its Revival," *Most-Most* 2 (1997): 99-100.

that encourages innovation in industry. However, institutional and policy change are only part of the transition, there is also a need for managerial change in industrial enterprises. Innovation was not a priority for enterprise managers in the Soviet system since industrial enterprises were not subject to market forces. Consequently, in order to function in a market economy, Russian enterprise managers are being trained in Western management skills.

CHAPTER 2

THE ASSIMILATION OF FOREIGN TECHNOLOGY

During the Soviet period, government policy was not conducive to innovation in the civilian sector. The lack of competition, the structure of R and D and the planning system itself acted as barriers to the development process. The introduction of a market economy in Russia has meant that enterprises have had to face competition, thereby forcing them to develop their technological capabilities. Moreover, in a larger context, the Soviets did not compete within the world market. Today, however, the Russian government is encouraging industry to develop and become competitive in the world arena.

Soviet leaders were constantly introducing planning reforms in order to induce Soviet producers to raise product quality, cut costs and improve product mix. However, despite these reforms, enterprise managers were reluctant to introduce innovations into production. As a result, they were not producing new technologies nor improving existing technologies. The increase of technology transfer during the 1960s reflected the fact that Soviet planners were dependent on both imports of technology that were not produced domestically as well as foreign products of higher quality. At this time, a number of Eastern European countries increased their imports of capital goods from the West. Moreover, Brezhnev began to express an interest in developing non-equity forms

of long-term 'industrial cooperation' with foreign partners, for the purpose of acquiring and assimilating technologies that had not been developed in the USSR.¹⁰⁵

The contribution of Western technology to Soviet economic growth appears to have been mixed. Between 1958-1973 the transfer of Western technology made a significant contribution to Soviet economic growth. Carson attributes the Soviet Union's growth recovery after 1965 to the high rates of investment and accelerated technology transfer rather than domestic reforms.¹⁰⁶ However, during the 1970s the import of technology did not stop the decline of the rate of Soviet economic growth.¹⁰⁷ Technology transfer from the West was subject to trade restrictions, Western protectionism, the level of Soviet exports, Soviet hard-currency earning capacity and the level of Soviet debt.¹⁰⁸

2.1. The Kosygin Reforms

In September 1965 Kosygin issued a number of reforms in an attempt to stimulate industrial performance. Their main purpose was to improve managerial incentives and promote innovation and the efficient use of resources within enterprises. The reforms granted enterprises greater autonomy, expanded direct contacts between producers and

¹⁰⁵ Carl McMillan, "Foreign Investment in Russia: Soviet Legacies and Post Soviet Prospects," in *Foreign Investment in Russia and Other Soviet Successor*, ed. Patrick Artisien-Maksimenko and Yuri Adjubei (Houndmills, Basingstok, Hampshire: MacMillan Press Limited, 1996), 43.

¹⁰⁶ Richard L. Carson, *Comparative Economic Systems* (Armonk, New York: ME Sharp Inc, 1990), 172-173 and for further discussion of the reforms of this period see Bruce Parrot, *Politics and Technology in the Soviet Union* (Cambridge, Massachusetts: The MIT Press, 1983).

¹⁰⁷ Victor Basiuk, "Soviet Systemic Change, Technology Transfer, and U.S. – Soviet Relations," in *Selling the Rope to Hang Capitalism: the Debate on West-East Trade and Technology Transfer*, ed. Charles M. Perry and Robert L. Pfaltzgraff, Jr. (Washington: Pergamon-Brassey's International Defence Publishers, 1987), 91.

¹⁰⁸ Philip Hanson, "Soviet Responses to Western Trade," in *East-West Trade and the Atlantic Alliance*, ed. David A. Baldwin and Helen V. Milner (Houndmills, Basingstoke, Hampshire: MacMillan Press Limited, 1990), 47.

suppliers, and reinforced contracts between enterprises.¹⁰⁹ Furthermore, between 1965 and 1969, planning institutions, procedures and criteria relating to innovation were extensively modified, and so were incentive arrangements for implementation of research and the introduction of new products and processes.¹¹⁰

Structural changes centralized the regional economic ministries (sovnarkhozy) created under Khrushchev by replacing them with Union ministries. These ministries brought all enterprises in a particular branch of industry under the supervision of a single ministry. The purpose of this was to eliminate bureaucratic layers and streamline the operation of the enterprise. The Union ministries were meant to grant enterprises enough autonomy to carry out the innovation and productivity goals of the Kosygin reforms.

Toumanoff argues that these reforms were a contradictory mixture of centralizing and decentralizing features. He states that although industrial managers were expected to demonstrate more initiative on investment decisions, innovations, supply links and cost-cutting measures, in practice they were subject to close scrutiny of plan targets.¹¹¹ Plan fulfillment continued to be an impediment to innovation. Despite the new incentives for innovation, industrial managers were still not inclined to interrupt production for the introduction of an innovation for fear of not fulfilling the plan target. Carson states that recentralization had substantially occurred by the early 1970s even though the Kosygin reforms had never been formally rescinded.¹¹²

¹⁰⁹ Carson, *Comparative Economic Systems*, 183.

¹¹⁰ Hanson, *Trade and Technology*, 106.

¹¹¹ Peter Toumanoff, "Economic Reform and Industrial Performance in the Soviet Union 1950-1984," in *Reorganization and Reform in the Soviet Economy*, ed. Susan J. Linz and William Moskoﬀ (Armonk, New York: ME Sharp Inc., 1988), 113.

¹¹² Carson, *Comparative Economic Systems*, 184.

2.2. Détente

The import of foreign technology was one of the founding principles behind the policy of détente. In the late 1960s and early 1970s Kosygin advocated large-scale imports of technology from the West. “We’ve got to go out and buy complete plants.”¹¹³ The Soviet leadership emphasized large-scale long-term projects such as the Kama River truck complex, KamAZ. However, there was no continuous involvement in the management of the projects; involvement was limited to technical backup and the marketing of the product on Western markets.¹¹⁴

The transfer of technology took the form of turnkey plants, licensing operations, compensation and coproduction agreements. There was no foreign direct investment (FDI), as foreign ownership was not permitted in the Soviet Union. However, industrial cooperation agreements were thought to provide some of the benefits of FDI.¹¹⁵ For example, through compensation deals, equipment, technology and know-how for a project were supplied on credit by the Western partners and repaid in kind through exports of the resulting output.¹¹⁶

In 1976, at the 25th Party Congress, Brezhnev reported that over the past five years the USSR imported almost 2,000 turnkey plants for a wide range of industries. He

¹¹³ Marshall I. Goldman, “Western Technology in the Soviet Union: What Happens to It?,” in *Selling the Rope to Hang Capitalism: the Debate on West-East Trade and Technology Transfer*, ed. Charles M. Perry and Robert L. Pfaltzgraff, Jr. (Washington: Pergamon-Brassey’s International Defence Publishers, 1987), 75.

¹¹⁴ John Slater, “Foreign Direct Investment in the Transition to a Market Economy,” in *Foreign Investment in Russia and Other Soviet Successor*, ed. Patrick Artisien-Maksimenko and Yuri Adjubei (Houndmills, Basingstok, Hampshire: MacMillan Press Limited, 1996), 7.

¹¹⁵ McMillan, “Foreign Investment in Russia,” 43–44.

¹¹⁶ *Ibid.*, 44.

stated that although the Soviet Union would continue to purchase plant, equipment, technology and know-how from the West, he emphasized that preference would be given to Western suppliers willing to provide long-term credit and accept part payment in products manufactured with their equipment. All new plants set up under these “buy-back” agreements with the West were to remain the sole property of the Soviet State. Brezhnev also criticized the performance of Soviet industry and pointed out that if buildings could not be completed on time or quality products delivered, the USSR could not “speak of any advantages gained by cooperating with the West”.¹¹⁷

The contribution of imported technology to Soviet production was minimal as Soviet industry had problems assimilating the imported technology. The lead times of foreign technology were slow and projects were not managed efficiently. Despite structural changes, Soviet enterprises still lacked adequate incentives to introduce innovations. Moreover, as competitive imports were seen as wasteful imported technology was meant to fill a void and did not induce Soviet managers to improve the quality of domestic products.¹¹⁸ In 1976, Berliner argued that unless the broad level of technological and managerial skills and knowledge in the USSR attained the level of that in the West, the imported equipment was likely to operate at a lower level of productivity than was found in the host country.¹¹⁹

During the 1970s the organizational restructuring affected enterprises in two important ways. In 1973, in a further attempt to improve production and coordination

¹¹⁷ European Intelligence Unit, “Brezhnev Calls for More Buy-Back Deals with the West,” *Eastern European Report* 5, no.9 (March 5 1976): 65-66.

¹¹⁸ Ed A. Hewett with Clifford G. Gaddy, *Open for Business: Russia's Return to the Global Economy* (Washington: The Brookings Institution, 1992), 17.

¹¹⁹ Berliner, *Soviet Industry from Stalin to Gorbachev*, 251.

between enterprises, large industrial associations were created. These associations were conglomerates of enterprises and research organisations with similar or complementary output. Secondly, enterprises were encouraged to establish “direct links” with other organizations; managers were granted the right to establish contacts directly with other firms, in turn facilitating production and distribution processes and reducing ministry involvement.¹²⁰

However, industrial associations, like enterprises, were constrained by plan targets and the central rationing of supplies. Consequently, incentives to innovate were still weak even though Soviet managers were being encouraged to replace obsolete and unproductive machinery with new models. Despite the efforts to improve the efficiency and quality of production, Linz reported that there was little change in managerial decision-making at the enterprise level. Managers often viewed reforms as ill conceived, inadequately executed and noted that they were frequently reversed.¹²¹

By 1980, there was growing Soviet concern about the cost-effectiveness of major purchases of plants, equipment and know-how from the West. There was an increasing awareness that the attempts to inject western equipment and technology into Soviet industry on a massive scale had failed to reverse the long-term downward trend of the economy and a realisation that much of the imported equipment had been wasted.¹²² Consequently, the imports of machinery and expertise from the West fell substantially in the 1980s.

¹²⁰ Susan J. Linz, “The Impact of Soviet Economic Reform: Evidence from the Soviet Interview Project,” in *Reorganization and Reform in the Soviet Economy*, ed. Susan J. Linz and William Moskoﬀ (Armonk, New York: ME Sharp Inc., 1988), 137.

¹²¹ *Ibid.*, 143.

¹²² McMillan, “Foreign Investment in Russia,” 46.

In 1980 *Business Eastern Europe* reported that Soviet Foreign Trade officials had stated that although they anticipated continued imports of computer and energy related technology, they stressed the importance of modernizing their existing plants and equipment on the basis of domestic R and D and technological innovation.¹²³ In 1981, Brezhnev stated that:

We Soviets must examine why we sometimes forget priorities and spend large sums of money to purchase equipment and technology from foreign countries, when we are fully capable of producing them ourselves, and also at a higher quality.¹²⁴

The change in policy reflected the economic realities of the mass transfer of technology, the problems of assimilating and diffusing the imported technology, as well as the cooling of Soviet-U.S. relations.

The waste of imported equipment was outlined at the 26th Communist Party Congress. The Ministry of Foreign Metallurgy was accused of importing 2 billion dollars worth of equipment that was simply not used, but left to sit in a field. The Ministry of Petroleum Industry was cited for purchasing 52 million dollars worth of recovery enhancement chemicals and never using them. There was also recognition of the fact that even when equipment was installed properly, its productivity was seldom more than 60-75 percent of capacity.¹²⁵ Machine builders and industrial engineers were directed to exploit new technology to its fullest capacity and eliminate the practices that made the

¹²³ European Intelligence Unit, "Soviets Question Costs of Technology Transfer," *Business Eastern Europe* 9, no.3 (January 18 1980): 19.

¹²⁴ Goldman, "Western Technology in the Soviet Union," 76.

¹²⁵ Ibid.

introduction of new technology difficult. There was recognition for the need to break from old habits in order to stimulate innovation.¹²⁶

2.3. Gorbachev and Perestroika

When Gorbachev came to power he wanted to tackle three main defects of the economy: inefficiency, poor quality and lagging technological development.¹²⁷ In 1985, at a meeting of the Central Committee of the Communist Party, Gorbachev stated that the acceleration of scientific and technological progress was a central part of the economic strategy. He argued that as well as economizing resources and improving product quality, it was necessary to re-equip enterprises as repair work had increased excessively because the old production apparatus had become obsolete. He also addressed the misuse of imported equipment, recognizing that it was not a new problem, but stating that no improvements had been made. Specifically, he outlined that the planning of purchases was not always thorough and that sometimes the purchases were not actually linked with plans for capital construction.¹²⁸

Furthermore, Gorbachev explained his ideas for restructuring. He wanted to bring R and D closer to production; he argued that the industrial institutes and design organizations should be included in amalgamations and enterprises. He also wanted to improve the system of incentives for enterprises producing high quality goods, increase

¹²⁶ "Effektivnost' novoi tekhniki," *Pravda*, 2 October 1981, second edition, p.1.

¹²⁷ Noreena Hertz, *Russian Business Relationships in the Wake of Reform* (Houndmills, Basingstoke, Hampshire: MacMillan Press Limited, 1997), 20.

¹²⁸ Mikhail S. Gorbachev, "The Key Issue of the Party's Economic Policy," Report at a Meeting at the CPSU Central Committee on *Accelerating Scientific and Technical Progress*, June 11, 1985, in Mikhail S. Gorbachev, *Selected Speeches and Articles* (Moscow: Progress Publishers, 1986), 128, 136 and 143.

the consumer's influence, improve price formation, establish a link between work performance and pay, and to make enterprises self-supporting, reducing the number of centrally issued plan assignments.¹²⁹

In an interview with *Time Magazine* in 1985 Gorbachev reiterated much of his intended plans of restructuring. In response to a question about the economy he responded that:

...we are seeking to strengthen democratic principles in management, to broaden the autonomy of production associations, enterprises, collective and state farms, to develop local self-management and to encourage initiative and a spirit of enterprise, naturally in the interests of society and not to its detriment.¹³⁰

He explained to the West that large-scale economic experiments were underway and that material and moral incentives, such as profit, pricing, credit and cost accounting of enterprises were to be introduced. He also clarified that although there was open criticism of industrial machinery and equipment, he emphasized that the solution was to be found through more effective use of the Soviet's own scientific and technological potential rather than through "technological transfusions" from the U.S.¹³¹

The past reliance on foreign imports was blamed for dampening innovation in the USSR. The 'import plague' as Gorbachev called it, led to the downgrading of domestic technology.¹³² Prime Minister Ryzhkov also blamed the dependence on foreign technology for poor industrial performance and attributed the lack of development of indigenous equipment to the 'headlong pursuit of imported technology'. He accused

¹²⁹ Ibid, 147-148 and 153-155.

¹³⁰ Mikhail S. Gorbachev, "Answers to *Time Magazine*," August 28, 1985, in Mikhail S. Gorbachev, *Selected Speeches and Articles* (Moscow: Progress Publishers, 1986), 244-245.

¹³¹ Ibid, 247.

¹³² Hewett with Gaddy, *Open for Business*, 29.

ministerial officials of needlessly purchasing technology that could be produced domestically.¹³³

Consequently, there was a shift in emphasis away from purchases that were used to overcome short-term bottlenecks towards an import policy that was geared towards overcoming longer-term economic problems and industrial modernization. Foreign equipment was to be purchased for the modernization of existing plants, rather than for large-scale projects such as the Kama River Truck Plant which had involved massive imports of Western machinery and know-how.¹³⁴ Moreover, more money was allotted for retooling enterprises in need rather than those that were already working with relatively new equipment.¹³⁵

There was also a recognition that the problem went beyond the structure of trade to the lack of openness in the economy itself. The isolation from world markets and foreign competition, the absence of foreign capital and investment in the Soviet economy, the inconvertibility of the currency, the separation of the domestic price system from the influence of world prices, and the non-participation of the Soviet Union in international economic organizations all contributed to the Soviet Union's negative economic performance. Gorbachev tried to address these issues as the reforms to the foreign trade system included administrative and structural reforms, measures to rationalize the system

¹³³ V. Semenikhin, "Diskussionnaia tpibuna: perestroiku uskorit' možhno – dlia etogo ekonomicheskaiia nauka dolzhna byt' blizhe k peal'nostiam proizvodstva," *Pravda*, 10 April 1989, second edition, p.3.

¹³⁴ John P. Hardt, "Gorbachev's Domestic Economic Strategy and East – West Commercial Connections," in *Selling the Rope to Hang Capitalism: the Debate on West-East Trade and Technology Transfer*, ed. Charles M. Perry and Robert L. Pfaltzgraff, Jr. (Washington: Pergamon-Brassey's International Defence Publishers, 1987), 52.

¹³⁵ Ye M. Trenekov, "Innovation, Efficiency Incentives System Critique." *Moscow MASHINOSTROITEL* (6), June 1986, 3-5, Transdex, JPRS-UMM-86-016, microfiche.

of exchange rates, measures to attract foreign investment and diplomatic initiatives directed towards firmly establishing links with international economic organizations such as the IMF.¹³⁶

Law on State Enterprises

Until 1987 the State both owned and controlled its enterprises through its appointed bureaucrats. While enterprise managers had operational control over production and some control over employment and wage policy, the state bureaucrats retained control over everything else, including production quantities and prices, investment decisions and who would manage the enterprises.¹³⁷

The Law on State Enterprises passed in July 1987 gave enterprises the freedom to operate on an independent basis. While state orders remained important, managers were free to find their own suppliers and develop links with other producers and consumers. They were also granted greater control over product and production decisions as well as the sale of output and wage and employment policies. At the same time they were expected to become self-financing, no longer enjoying incentives and subsidies provided through the centralized system.¹³⁸ By January 1988, 60 percent of industrial companies were required to become financially self-sufficient and Gosbank would no longer extend

¹³⁶ Smith, *Russia and the World Economy*, 125-127.

¹³⁷ Hertz, *Russian Business Relationships*, 127-128.

¹³⁸ Hibbert, "Training Soviet Managers," 234. and Slavo Radošević, "Divergence or Convergence in Research and Development and Innovation Between 'East' and 'West'?", in *Innovation and Technological Change in Eastern Europe: Pathways to Industrial Recovery*, ed. Michael Fritsch and Horst Brezinski (Cheltenham, UK: Edward Elgar Publishing Limited, 1999), 32.

credit to unprofitable enterprises and all factories were to have switched to self-financing by the end of the 1980s, in anticipation of a major price reform in 1991.¹³⁹

However, despite the enterprise law, state agencies maintained much of their former control over firms. 40 percent of polled managers argued that the central ministries violated the rights granted to them under the new law. Many maintained that the state ministries arbitrarily changed production plans, fixed additional production targets, and interfered in other ways. Hibbert argues that:

For many enterprise leaderships, perestroika represented a limbo reality, where they had neither fully broken away from the old-ministry-led command system, nor had they achieved full control over all business decisions in the factory.¹⁴⁰

Moreover, interview data revealed that not only did the ministries retain control, but also inputs were in short supply and the reforms had failed to increase productivity.¹⁴¹

Law on the Establishment of Joint Ventures

In January 1987, a new law was passed providing for the establishment of joint ventures. Joint ventures had not been permitted in the Soviet Union since Stalin had abolished them in the late 1920s, but they were seen as the prime method for obtaining Western technology and know-how. It was argued that joint ventures combined aspects of all of the transfer mechanisms, overcoming individual weaknesses and strengthening the overall character of the transfer.¹⁴²

¹³⁹ Thomas H. Naylor, "The Reeducation of Soviet Management," *Across the Board* 25 (February 1988): 28 and Bate, *Russia and the Post-Soviet Scene*, 73.

¹⁴⁰ Hibbert, "Training Soviet Managers," 234.

¹⁴¹ Linz, "The Impact of Soviet Economic Reform," 134 and 144.

¹⁴² Daniel L. Burghart, *Red Microchip: Technology Transfer, Export Control and Economic Restructuring in the Soviet Union* (Dartmouth, Brookfield Vt.: Dartmouth Publishing Company, 1992), 82-83.

The main advantages of joint ventures were that they would not only provide capital and equipment, but would also provide for the establishment of long-term technical training. Moreover, they offered Soviet enterprises the opportunity of long-term contracts with western scientists, managers and workers, which, in turn, would ensure a continuing flow of western ideas and technology. At the same time, these ventures with foreign partners were seen as a relatively cheap way of overcoming technological backwardness.¹⁴³ It was thought that the sustained contact with a western partner would ensure the diffusion of the new technology and that the direct influence of western managers would help improve production methods.

Under the new law, joint ventures were legal entities and had the right to operate on Soviet soil. The law stipulated that these ventures were free to establish their own operating policies without interference from Soviet planning organs; they were to be recognized as independent financial institutions “which operate on the basis of full economic accountability, self-support and self-financing”¹⁴⁴. The initial scope of these ventures was limited. One of the most important aspects of the law was that it foresaw a majority share of Soviet ownership; the Soviet partner was to have at least a fifty-one percent share in the enterprise and the chairman of the board and enterprise director had to be Soviet citizens.¹⁴⁵ However, in December 1988, as part of the plan to increase production, enterprises were granted the right to enter the foreign market and establish

¹⁴³ Ibid. and M. Tret'iakov, “Ubytki ili dokhody?” *Pravda*, 31 July 1989, second edition, p.5.

¹⁴⁴ The USSR Council of Ministers, “On the Procedure Governing the Creation on USSR Territory and the Activities of Joint Enterprises with the Participation of Soviet Organizations and Firms of Capitalist and Developing Countries,” in *The USSR Council of Ministers*, 27 January 1987, REDA 1987.

¹⁴⁵ Ibid.

direct production and trade ties with foreign partners.¹⁴⁶ Consequently, direct foreign trade rights were opened to all enterprises and procedures for establishing and operating joint ventures were liberalized. The mandatory Soviet majority share and the requirement that the chairman and director had to be Soviet citizens were rescinded.

Joint ventures were also subject to strict regulations regarding the repatriation of profits. The Soviet Union not only saw them as a means of gaining technology and technical know-how, but also as an extra source of hard currency and a means of developing exports of manufactured goods.¹⁴⁷ However, some of the firms that established agreements at this time commented that the Soviets were in fact more interested in the hard currency than the transfer of technology and managerial skills.¹⁴⁸

By the end of 1989, Soviet authorities had begun to complain that many of the joint ventures were nothing more than representative offices; furthermore, they argued that many of the operations were merely shop windows for western products.¹⁴⁹ The ventures were largely confined to assembly operations which meant that component parts were sourced in the West. Western firms would set up assembly lines, ship parts and components from the West, and have the machinery assembled in the Soviet Union. In other instances, only the key components would be shipped in from the West, in order to

¹⁴⁶ A. Ivashchenko, "Diskussionnaia tribuna: chto meshaet merkuriu," *Pravda*, 16 August 1988, second edition, p.4.

¹⁴⁷ Genrikh Bazhenov, "Reply to FRG Criticism of Joint Ventures," *Moscow New Times*, 16 February 1987, 16, Transdex, JPRS-UIA-87-012, microfiche and Hewett with Gaddy, *Open for Business*, 77.

¹⁴⁸ Christopher Dent, "The Business Environment in Russia: An Overview," *European Business Review* 94, no.3 (1994): 19-20. and European Intelligence Unit, *Russia: Country Report* (EIU Business International, third quarter 1993).

¹⁴⁹ V. Romaniuk, "Statistika i nash kommentapii: 'okno' v otkrytuiu ekonomiku?" *Izvestiia* 7 August 1991, evening edition, p.1.

foster dependence, but still maintain an almost complete production system in the Soviet Union.¹⁵⁰

2.4. The Post Soviet Period

The efforts to reform the system did not induce innovation or improve the production capacity of Soviet enterprises. Perestroika brought about a lot of changes, but the laws adopted left enterprise managers in limbo, since they had neither full state support, nor complete control of the enterprises. Moreover, the political climate and the 'war of laws' that led up to the collapse of the Soviet Union created uncertainty and confusion among enterprise managers, as they were not sure which of the new regulations they were to follow.¹⁵¹

The subsequent transition to a market economy brought about more political and economic changes. The dismantling of the centrally planned system, privatization and the advent of a competitive environment placed new pressures on enterprises. In first half of the 1990s, the government's top priority was on the transformation to a market economy, rather than legislation to regulate market activity, encourage innovation, or promote competition.¹⁵²

¹⁵⁰ Beverly Crawford, *Economic Vulnerability in International Relations: East-West Trade, Investment and Finance* (New York: Columbia University Press, 1993), 211.

¹⁵¹ For further discussion about the 'war of laws' refer to Terry Cox, *From Perestroika to Privatization: The Politics of Property Change in Russian Society 1985-1991* (Aldershot, UK: Avebury/Ashgate Publishing Limited, 1996), 125-126.

¹⁵² Serguei Glaziev, Il'dar Karimov, and Irina Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," in *Russian Applied Research and Development: Its Problems and its Promise*. ed. Leonid Gokhberg, Merton J. Peck, and Janós Gács (Laxenburg, Austria: The International Institute for Applied Systems Analysis, 1997), 93.

The transfer of technical equipment was replaced with the transfer of technical assistance in the forms of capital and know-how from the West in order to aid in the transition to a market economy. Foreign direct investment (FDI) became the primary vehicle for technology transfer. It became crucial to attract outside funds through FDI, which would not only supply much needed capital, but also demonstrate confidence to domestic investors.¹⁵³ Moreover, the European Bank for Reconstruction and Development (EBRD) saw FDI as an important vehicle for the transformation of the Russian system. The EBRD argued that FDI was important as it would not only help to replace obsolete capital but it would also expose enterprise managers and the workforce to new forms of institutional and production arrangements that are compatible with market development.¹⁵⁴

Fal'tsman argues that the economic climate in general and the pressure of foreign economic competition caused many enterprises in civilian machine building, light and other branches of the manufacturing industry to go bankrupt.¹⁵⁵ The development of technological capabilities was curtailed and there was a reduction in production. The state aggravated the situation with high taxes, tough antimonopoly policies, the under financing of sector based research and the rapid large-scale privatization program.¹⁵⁶

¹⁵³ Michael R. Czinkota, "Russia's Transition to a Market Economy: Learning About Business," *Journal of International Marketing* 5, no.4 (1997): 74.

¹⁵⁴ European Bank for Reconstruction and Development, *Transition Report 1995*, 118 quoted in John Child and André P. Czegledy, "Managerial Learning in the Transformation of Eastern Europe," *Organizational Studies* 17, no.2 (1996): 170.

¹⁵⁵ V. Fal'tsman, E. Korepanov, and L. Davydova, "Faktory sprosa na otraslevuiu nauku," *Voprosy ekonomiki*, no. 9 (1997): 69.

¹⁵⁶ A. Vol'skii, "Industrial'naia, innovatsionnaia i investitsionnaia nezavisimost'," *Ekonomist*, no.4 (1999): 3.

The initial law on foreign investment passed in 1991 allowed for 100 percent foreign ownership of enterprises as well as providing incentives for foreign investment. Despite these changes, joint ventures made only a marginal contribution to the Soviet economy, contributing less than 0.5 percent of the GNP in 1990.¹⁵⁷ However, in 1990, there were 1,754 registered joint ventures and by mid-1993 the number had increased to 9,125.¹⁵⁸ In the third quarter of 1993 the Economic Intelligence Unit (EIU) reported that the existing joint ventures were mainly small and medium-sized businesses in sectors where hard currency proceeds were guaranteed and investment in basic industry branches was negligible.¹⁵⁹ In September 1994, *Nezavisimaia gazeta* reported that the number of operating joint ventures was 7,758 with the number of personnel at 290,000.¹⁶⁰

The political and economic uncertainty was not conducive to foreign investment. There was a lack of coherent legislation covering the operations of foreign companies, complicated permit procedures, an inadequate credit system and a lack of sufficient protection for investments. Western companies stated that they encountered bureaucratic delays and problems in relations with local authorities. Investors were also subject to excessive tax requirements, the rigidity of the labour market and the uncertainty of price trends because of inflation. Moreover, there was a lack of a managerial mentality, various organizational problems, difficulties with the legal-legislative framework,

¹⁵⁷ Smith, *Russia and the World Economy*, 136.

¹⁵⁸ Christopher Dent, "The Business Environment in Russia," 19.

¹⁵⁹ European Intelligence Unit, *Russia: Country Report* (EIU Business International, third quarter 1993).

¹⁶⁰ "Statistika: aktivizirovalis' predpriiatiia s inostrannym uchastiem - ikh import rastet bystpee eksporta," *Nezavisimaia gazeta*, 21 September 1994, p.2.

insufficient offices and logistical facilities, and a lack of information on the local situation.¹⁶¹

Czinkota attributes the sparse flow of FDI into Russia in the mid-1990s not simply to the inadequate legislation, but also to the low profitability levels of early foreign entrants into Russia. He argues that problems arose because of the quality of the work force, of management, and of information. He further explains that enterprise managers, as well as the workforce as a whole, needed training in the operations of market economy in order to attract foreign investment.¹⁶²

The Russian government has taken steps to improve both the skill set of its workforce and investment legislation. Although Western-style business education schools had been in existence in Russia since perestroika, there has been a lack of coordination and standardization of training programs for enterprise managers. In 1994 the National Training Foundation (NTF) was set up for the purpose of implementing large-scale education projects and in 1997 the Russian government issued a decree on the “Training Managers and Executives for Enterprises of National Economy of the Russian Federation”.¹⁶³

Moreover, in 1999 the Law “On Foreign Investments in the Russian Federation” was adopted with the aim of improving the overall investment climate. The law guaranteed national treatment and stable conditions for foreign investors, and set out protection for property and the rights of foreign investors. It guaranteed full and

¹⁶¹ Carter Henderson, *Free Enterprise Moves East: Doing Business from Prague to Vladivostok* (San Francisco: The International Centre for Economic Growth, ICS Press, 1996), 11.

¹⁶² Czinkota, “Russia’s Transition to a Market Economy,” 75.

¹⁶³ Chapter five will discuss this in more detail.

unconditional protection of foreign investors' rights and interests and stated that they had the right to compensation for losses caused as a result of illegal action or inactivity by the organs of the state, local administration, or their employees.¹⁶⁴

Innovative Activity

Gorabachev's reforms were not only designed to increase productivity, but to increase innovative activity and generally provide the incentives to bring the Soviet Union technologically in line with the West. However, during the 1980s the number of prototypes of new technology created and/or assimilated into production decreased by 48 percent. The political and economic uncertainty created by the collapse of the system and the introduction of market forces resulted in a drastic decline in innovative activity. In the 1990s the number of prototypes dropped 40 percent and, as a result, the competitiveness of industrial products weakened and the export of machinery decreased.¹⁶⁵

Dyker and Radošević emphasize the importance of macroeconomic stabilization for the development of innovation. They argue that renewed economic growth could only be maintained on condition of a stable upward trend in productivity. An upward trend in productivity could only be sustained on the basis of the development of

¹⁶⁴ European Bank for Reconstruction and Development, *Russia: 2001 Investment Profile*, London, 2001, 12.

¹⁶⁵ IU Iakovets, "Predposylki preodoleniia innovatsionnogo krizisa," *Ekonomist*, no.1 (1998): 32.

technological capabilities, including the ability to assimilate new technology and to integrate into global production and marketing systems.¹⁶⁶

The legislative environment had a negative affect on the performance of industrial enterprises in the early stages of transition. However, since the mid-1990s, the Russian government has taken measures to promote productivity and innovation in civilian industry. The Russian government recognized that the development of a national system of innovation was paramount for promoting the economic stability of the country. To this end, The Ministry of Industry, Science and Technologies of the Russian Federation (MinIST) policies have been directed towards developing Russia's national innovation system.

In March 2001 Russian government officials, scientists and businessmen met with several OECD member countries and observers and examined the innovation climate in Russia. All of the participants agreed that it was important to create a broad awareness within their governments of the economic importance of supporting science and innovation. However, Russian participants admitted that this type of awareness was still lacking among many senior Russian legislative and executive branch officials.¹⁶⁷

The background report presented at the meeting outlined the some of the directives established to help improve Russia's innovation system. Several institutions for the purpose of developing and maintaining innovative activities, have been set up including a system of State Science Centres, a network of Innovative Technology Centres

¹⁶⁶ Refer to David A. Dyker, "Technology Policy and the Productivity Crisis in Eastern Europe and the Former Soviet Union," *Economic Systems* 18, no.2 (1994) and Slavo Radošević, "Strategic Technology Policy for Eastern Europe," *Economic Systems* 18, no.2 (1994).

¹⁶⁷ Organization for Economic Cooperation and Development, *Bridging the Innovation Gap in Russia* (The Helsinki Seminar, March 2001), 17-18.

(ITC) and Innovative Production Complexes (IPC). Moreover, an extra-budgetary fund for technological developments has been established.¹⁶⁸

An American official from the U.S. Civilian Research Development Fund observed that Russia's innovation system has been hampered by the conflicting interests of the big scientific R and D establishments and industrial branch ministries, and the new dynamic structures, such as ITCs, technoparks, technological incubators, innovative SMEs, etc. He recommended restructuring the traditional organizations, improving the system of tax incentives, enforcing intellectual property rights and encouraging personnel mobility to assist in the exchange of ideas.¹⁶⁹

Moreover, the lack of policy coherence and the high levels of legal and economic uncertainty in Russia presented difficulties for the development of a public science and technology (S and T) policy.¹⁷⁰ The unstable political situation and frequent changes in leading officials throughout the 1990s adversely affected the implementation of public policy for S and T.¹⁷¹ Nevertheless, in July 1996 the State Duma adopted the law 'On Science and State Science and Technology Policy'. The law defines the strategy for developing government S and T policy, the place of S and T activities within the state, society, and economy. It also defines the legal status of researchers and R and D institutions, and sets forth sources of R and D financing, the system of tax, credit and

¹⁶⁸ Ibid, 10.

¹⁶⁹ Ibid, 11-12.

¹⁷⁰ For a complete discussion of these types of systems refer to Pavitt, "Transforming Centrally Planned Systems," 54.

¹⁷¹ Leonid Gokhberg, "Transformation of the Soviet R and D System," in *Russian Applied Research and Development: Its Problems and its Promise*. ed. Leonid Gokhberg, Merton J. Peck, and Janós Gács (Laxenburg, Austria: The International Institute for Applied Systems Analysis, 1997), 20.

custom incentives for R and D, and details provisions for international S and T cooperation.¹⁷²

The law not only sets out the basic principles of state S and T policy, but also defines the institutional structure and responsibilities of the different levels of state authorities for S and T activities. Fonotov and Pipiia argue that the most important indicator of a state's actual S and T policy is the budget allocations to R and D. New measures addressed in the law include priorities for basic research, budget and non-budget funds for promoting S and T in Russia, rules for undertaking state orders for R and D, and licensing provisions of individual S and T activities.¹⁷³

Unfortunately, the law has some shortcomings. For example, there is no mechanism for certification of R and D institutions nor are certified institutions given any special incentives. The principles for certification are still to be developed, but it seems likely that all existing R and D institutions will be certified, thereby reducing the significance of the procedure. The law does not address state support to small business engaged in S and T. Nevertheless the new law provides a basis for further development of S and T policy as social and economic conditions change.

¹⁷² Natalie Gorodnikova, "Transformation of R and D in Russia: the Role of Government Priorities," in *Innovation and Structural Change in Post-Socialist Countries: A Quantitative Approach*, ed. David A. Dyker and Slavo Radošević (Dordrecht, the Netherlands: Kluwer Academic Publishers, 1999), 216.

¹⁷³ Viacheslav Alimpiev and Alexander Sokolov, "The Institutional Structure of Applied R and D," in *Russian Applied Research and Development: Its Problems and Its Promise*, ed. Leonid Gokhberg, Merton J. Peck, and Janós Gács (Laxenburg, Austria: The International Institute for Applied Systems Analysis, 1997), 32-33.

2.5. Concluding Remarks

Despite the reforms during the Soviet period, enterprises failed to assimilate and build upon imported technology. The transition to a market economy and the advent of joint ventures and FDI into Russia gave enterprises access to Western skills and know-how as well as machinery. However, throughout the 1990s the political and legislative environment did not support technological development and was not conducive to foreign investment. The legacies of the Soviet system coupled with the instability of transition resulted in a decline in productivity in civilian industry.

Enterprise managers have been primarily concerned with obtaining financial support rather than developing technological capabilities and engaging in innovative activities. They have had to acquire the necessary managerial skills not only to operate successfully in a market economy, but also to attract foreign investment. By the late 1990s the Russian Government realized that enterprises lacked legislative support and subsequently started to take measures to train enterprise managers, promote innovation and develop a coherent science and technology policy.

CHAPTER 3

DOMESTIC SOURCES OF RESEARCH AND DEVELOPMENT

The break-up of the Soviet Union and subsequent collapse of the centralized system brought about a crisis in research and development (R and D) and innovation activity in Russia. The transformation from central planning into a market-based system the sector suffered from a lack of financing, a drop in demand and the disappearance of administrative pressures to implement innovations. Moreover, scientific, technological and production links between the former republics of the Soviet Union were broken.

During the Soviet era, domestic sources of research and development were government financed and centrally controlled. The organization and hierarchical structure of the R and D sector was not conducive to innovation. The link between innovation and production was weak as R and D activities were separated from production units. The link was further weakened by the lack of coordination between the R and D and design institutes and the enterprises themselves.

The Russian Federation inherited the large, bureaucratic Soviet R and D structure and all of its problems. In the Soviet system the state was directly involved in R and D activities and in mediating technology transfer between and across the different levels of the R and D sector.¹ There was an imbalance between the amount of material, financial and labour resources invested in Soviet R and D and civilian industry's technological performance in comparison with other industrialized countries.² Gokhberg describes the

¹ Radošević, "Divergence or Convergence in Research and Development," 36.

² Kuznetsov, *Foreign Investment in Contemporary Russia*, 138.

Soviet model of R and D as a bargaining system where political factors rather than economic ones drove the central management, hierarchical structures and departmental barriers. Supply and demand levels of R and D services were not dependent on the performance of enterprises but rather set out in five-year plans. Consequently, enterprise managers had little incentive to develop new products or improve product quality. Moreover, the lack of the profit motive and financial responsibility created little incentive for process innovation.¹⁷⁶

It is important to understand the difference between basic and applied research. The OECD defines basic research as “activity aimed at obtaining new knowledge of the underlying foundation of phenomena and observable facts without any particular application or use in view.” The research usually starts from existing scientific literature and can be either experimental or theoretical whereas, applied research is directed toward a specific practical aim or objective.¹⁷⁷

Most applied R and D organizations in the USSR were located in large industrial institutes that were separated from production. These research institutes were twice as large as other types of R and D units. The lack of integration between these institutes and production units impeded the development of technological capabilities within enterprises. Pavitt argues that the Soviets viewed technology as a commodity that emerged neatly from R and D and could easily be transferred to production units.

¹⁷⁶ Gokhberg, “Transformation of the Soviet R and D System”, 10-11 and 16.

¹⁷⁷ Organization for Economic Cooperation and Development, *Frascati Manual 1993: Proposed Standard Practice for Surveys of Research and Experimental Development* (Paris, 1993) quoted in Gokhberg, Peck, and Gács, *Russian Applied Research and Development*, 8.

Consequently, production units did not fully develop their own in-house capacities for learning, developing and improvement.¹⁷⁸

3.1. The Soviet R and D Sector

Research, development and innovation planning was determined by three main science-policy and industrial-policy bodies: the Academy of Sciences, the State Committee on Science and Technology (SCST) and the State Planning Committee (Gosplan). Military and military-related production ministries were coordinated through the Military Industrial Committee (VPK).

The State Science and Technology Committee was created in 1957 and was transformed into the State Committee on Science and Technology (SCST) of the USSR in 1965. The SCST was responsible for developing a general strategy for R and D and coordinating economic policy among the main governmental agencies. The SCST did not have any significant R and D institutes of its own, but it controlled certain national technical information services, supervised technological cooperation agreements with foreign firms and governments, and designated particular branch research institutes as the lead institutes in major inter-branch cooperative R and D programs.¹⁷⁹ It also played a leading role in developing Science and Technology programs.

Gosplan was responsible for output and investment planning; therefore, its major role was in planning the introduction and diffusion of new products and processes. It also controlled resource allocations between branches for R and D and innovation activities.

¹⁷⁸ Pavitt, "Transforming Centrally Planned Systems," 45.

¹⁷⁹ Hanson and Pavitt, *The Comparative Economics of Research*, 20-21.

Subsequently, Gosplan guided the development of S and T programs. There were both national and regional S and T programs. The corresponding ministries and departments were responsible for branch programs and the republican governments developed regional programs.¹⁸⁰

The Academy of Sciences of the USSR operated a huge network of laboratories and along with the SCST held the leading role in developing S and T programs and the administration of funding for research. The Academy research institutes conducted significant amounts of military R and D as well as civilian research. It reported to the USSR Council of Ministers and Gosplan and was organized in a hierarchical structure similar to that of the branch ministries: the Presidium at the top, sectoral and regional departments at the middle level, and research institutes at the bottom. The Academy of Sciences and the branch academies of agricultural sciences, medical sciences, and education were responsible for most of the basic research conducted in the USSR. However, basic research was also carried out in a small number of non-Academy R and D institutes in the defence-oriented and higher education institutes.¹⁸¹

Institutions of higher education held a smaller role in the USSR than those in the West. R and D activities conducted in the industrial and Academy sectors were largely separated from higher education damaging the status and scientific authority of the universities. Consequently, the quality of R and D conducted in higher education was often second-rate. In 1990 basic research constituted about one-fifth of total R and D carried out in higher education institutions in the Russian Republic. Moore states that the

¹⁸⁰ Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 89.

¹⁸¹ Gokhberg, "Transformation of the Soviet R and D System," 13.

Soviets considered the role of universities in R and D was to instruct and that basic research was to be left primarily to the Academy.¹⁸² However, there were some elite universities and a few prestigious engineering colleges that maintained a tradition of high-quality research and received more resources than the other educational institutions.

The State Committee for Material and Technical Supplies estimated the resources needed for R and D innovations. The previous year's output was used as the starting point for the estimations, however the defence-oriented research institutes received the best quality resources.¹⁸³ By the 1980s the Soviet system of allocating resources was unable to provide adequate facilities and equipment. In 1990, 60 percent of R and D institutions did not own the buildings in which they operated.¹⁸⁴

Various factors contributed to the inefficiency of the R and D sector during the Soviet era. One of the greatest impediments to the sector was the separation of R and D institutions from industrial enterprises. There was a lack of coordination between separate research institutes, design bureaus and industrial enterprises. This separation resulted in the promotion of research at the expense of innovation; industrial organizations were responsible for completing the research laid out in the plans provided by the ministry, but they were not responsible for achieving economic results.¹⁸⁵ Moreover, there were barriers to transferring innovations between sectors, as there were no mechanisms for

¹⁸² Moore, "Science, Technology and Russia's Future," 45.

¹⁸³ Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 88.

¹⁸⁴ Gokhberg, "Transformation of the Soviet R and D System," 11.

¹⁸⁵ Gokhberg and Peck, "The Decline of the Russian R and D Sector," 94.

inter-industry diffusion of innovations. Ultimately, R and D and innovation activities were contained within individual ministries and fragmented across sectors.¹⁸⁶

The Organization of Industrial R and D

There were a number of bureaucratic obstacles in the Soviet organizational structure that impeded the implementation of R and D and innovation activities. Industrial R and D institutions were attached to specific branch ministries which had exclusive control over their assigned sectors of the national economy. The position and strength of particular ministries in the government hierarchy influenced the allocation of resources.¹⁸⁷ The structure of the R and D institutions was also hierarchical; there were strong vertical linkages and the different elements of the innovation cycle were located within the different hierarchies.¹⁸⁸ Moreover, the horizontal exchange of information among enterprises and R and D institutes from other branch ministries was difficult since they had to go through the hierarchical channels.

During the Soviet period the industrial sector employed the largest number of R and D specialists. It was primarily engaged in applied R and D. Each branch ministry established its own network of R and D units and the activities of most branch research institutes and design bureaus were oriented to the needs of specific industrial sectors.

¹⁸⁶ Radošević, "Patterns of Preservation, Restructuring and Survival," 2.
http://ssees.ac.uk/publications/working_papers/wp7.pdf (March 2002).

¹⁸⁷ Gokhberg, "Transformation of the Soviet R and D System," 12-13.

¹⁸⁸ Igor Egorov and Elias G. Carayannis, "Transforming the Post-Soviet Research Systems Through Incubating Technological Entrepreneurship," *Journal of Technology Transfer* 24 (1999): 160.

Subsequently, monopolies in the development of particular technologies were created and hampered the inter-sector diffusion of technology.¹⁸⁹

The separation of R and D institutions from enterprises was the greatest source of inefficiency. Most of these institutions served the branch ministries rather than specific enterprises which meant that the enterprises themselves were reduced to production units and often not active in the innovation process. Enterprise managers considered innovation an unnecessary risk. Subsequently, they generally directed their own limited R and D activities at the immediate needs of the enterprise itself, such as adapting external R and D and modernizing current products. However, enterprise managers had little incentive to use the results of external R and D as it meant interrupting production in order to adapt the R and D to the enterprise's specific production conditions.

Moreover, about half of the resources allocated to R and D were for military purposes. There were approximately 700 R and D institutions in leading positions in many technological areas. Politically the defence-oriented research institutes and the Russian Academy of Sciences were given top priority. In 1990, defence constituted approximately 40 percent of total R and D expenditures.¹⁹⁰ They were supported by extensive state actions including direct budget funding, centralized supply of imported research equipment, construction of modern buildings for the most prestigious institutes and hard-currency appropriations for missions abroad and for scientific literature. However, there was limited application of military R and D to civilian industries.¹⁹¹

¹⁸⁹ Gokhberg, "Transformation of the Soviet R and D System," 13-14.

¹⁹⁰ Centre for Science Research and Statistics, *Development of Science in Russia* (Moscow, 1993), 268 quoted in Gokhberg, "Transformation of the Soviet R and D System," 14.

¹⁹¹ Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 89.

The industrial ministries were responsible for establishing research topics, allocating R and D resources and financing the projects executed by branch research institutes. Industrial ministries supervised the All-Union Industrial Associations (AIA) and industrial associations (IA). In industrial ministries a single organization managed the entire innovation cycle from performing applied R and D to the application of its results to industrial production. S and T departments were responsible for managing R and D activities.¹⁹² [See Appendix 2]

In the late 1970s and the early 1980s large and important projects were implemented within the framework of national S and T programs. However, R and D institutions responsible for the fulfillment of these programs did not have the authority to finance research institutes in adjacent branches. Therefore, there was no incentive to implement projects that crossed ministry and industry boundaries.¹⁹³

Despite the numerous attempts to reform the organization of the R and D system and to increase economic incentives fundamental systemic problems persisted to impede the implementation of industrial innovations. There was a lack of coordination between scientific research and industry as well as a lack of cooperation across industrial ministries. Industrial innovation was further impeded by industrial enterprises tendency to maximize output at the expense of the quality and novelty of products. Moreover, there were not enough pilot plants and large-scale testing facilities to assist in the development of new products and processes.¹⁹⁴

¹⁹² Alimpiev and Sokolov, "The Institutional Structure of Applied R and D," 36.

¹⁹³ Ibid.

¹⁹⁴ Ronald Amann, "Technological Progress and Soviet Economic Development: Setting the Scene," in *Technical Progress and Soviet Economic Development*, ed. Ronald Amann and Julian Cooper (New York: Basil Blackwell Ltd., 1986), 16.

3.2. The Innovation Process

The overall weakest part of the Soviet S and T system was its innovation activity. The Soviet system assumed that the R and D process occurs in a unidirectional linear way. Each industrial ministry controlled the research performed within its own sectoral research institutes. The design bureaus within the ministry then designed prototypes for industrial production. The prototypes were tested in experimental production before going into mass production. Although the system avoided duplication of research and ensured that R and D would be oriented to the priorities of industry, the structure was inflexible and there was a lack of feed back in the system.¹⁹⁵

R and D and innovative activities were performed in the research institutes and design bureaus without consultation with the enterprises and the ultimate “users” of the innovation. Moreover, the users’ experience in operating and modifying production equipment was neither fed back to the design bureau, nor diffused to other users.¹⁹⁶ The slow rate of production modernization and the fact that new machines and technologies were only marginally better than the old ones were indications of the low rate of innovative activity.¹⁹⁷

¹⁹⁵ Gokhberg and Peck, “The Decline of the Russian R and D Sector,” 94 and Alimpiev and Sokolov, “The Institutional Structure of Applied R and D,” 35-36.

¹⁹⁶ Pavitt, “Transforming Centrally Planned Systems,” 46.

¹⁹⁷ Kosals, *Why Doesn't Russian Industry Work?* 138.

Barriers to Innovation

The separation of R and D institutes from the enterprises meant that enterprise managers, designers, production participants were not active in the innovation process. As a result, there was a lack of emphasis on development work in enterprises since they often had to duplicate the development of new technologies from external sources to fit their specific technological capacities. For example, an enterprise receiving technical documentation on a new product and its prototype was often unable to begin production, as the developer did not take into account the actual technological potential of the given enterprise. Consequently, when introducing new machinery with its own personnel, the enterprise practically repeated the entire complex of experimental development work, the production technology was changed, and new production accessories were introduced.¹⁹⁸

Berliner explains that the general problem with the Soviet economic structure was that it favoured established products and processes and discriminated against innovations. The state provided enterprises with the technology and supplies needed to produce and also sold the products once they were produced, while enterprises were to concentrate on producing the maximal output of the products that they were instructed to produce.¹⁹⁹ By producing the same product and using the same process for as long as possible enterprises minimized supply problems. New products or processes would often require the enterprise to be assigned to new suppliers who were not familiar with the enterprise's quality requirements. Moreover, changes involved a certain amount of wastage until the

¹⁹⁸ A Zaichenko, "Risk i samostoiatel'nost' innovatsionnoi deiatel'nosti," *Voprosy ekonomiki*, no. 1 (1988): 42.

¹⁹⁹ Berliner, *Soviet Industry from Stalin to Gorbachev*, 253-254.

new technology was mastered and required extra supplies that had not been accounted for in the supply plan.²⁰⁰

The adverse innovative environment contributed to the technological backwardness and declining growth in Soviet industry. Along with the aforementioned bureaucratic and systemic obstacles, the inadequate incentives, pricing problems and lack of appropriate criteria for evaluating innovation were also problematic. There was also a shortage of experimental and testing facilities, a lack of competition in R and D work, and the overspecialization of R and D personnel and agencies. Innovation was also impeded by poor workplace conditions, including lack of appropriate supplies and information, aging capital stock, and low productivity of the workforce.²⁰¹

Moreover, in the Soviet system innovations needed official recognition. The central administration issued assignments and state orders for innovations. Permission had to be granted at the various hierarchical levels before an innovation would be included in the plans or even be tested. This could be a very long drawn out process, for example, a single technological system involving only 10-15 engines and pieces of machinery required 400-500 official letters of approval.²⁰²

Consequently, the introduction of many innovations was imposed from above. The management and workforce within enterprises seldom introduced innovations on their own initiative. The problem was that initiative was punishable. The penalty for

²⁰⁰ Ibid.

²⁰¹ Susan J. Linz and Jeff E. Biddle, "Innovation in Russian Industry: A Case Study of R and D in Transition," *Economic Development and Cultural Change* 46, no.2 (January 1998): 233.

²⁰² Kosals, *Why Doesn't Russian Industry Work?* 78.

mistakes could be even more severe than poor workmanship or idleness.²⁰³ Neither the promise of high rewards nor the threat of business failure could move management to technological innovation. Enterprises were free of competitive pressures to cut costs and tended to use obsolete machinery as long as it was still operational.²⁰⁴

Often innovations needed by enterprises failed to be implemented even though official orders had been issued, funds appropriated, equipment supplied, and specialists and managers sent abroad to acquire new skills. Despite the fact that there was a significant time lag in installing the new equipment, if it was installed at all, funding was supplied.²⁰⁵ The installation of foreign or new equipment was not a top priority as a manager's main goal was to maximize output rather than reduce inputs and run efficiently. In Soviet industry the use of older, inferior technology remained and even expanded long after new substitutes were available.²⁰⁶

Managers were not inclined to take risks with installing new equipment, because of the fear of punishment for errors that might be incurred. Often the adoption of new equipment required adaptation in other parts of the production system and the attempt to implant a new technology in an old production system resulted in failure.²⁰⁷

²⁰³ Ibid, 137-139.

²⁰⁴ Hanson and Pavitt, *The Comparative Economics of Research*, 32.

²⁰⁵ Kosals, *Why Doesn't Russian Industry Work?* 139.

²⁰⁶ During late 1980s there was a lot of discussion in the newspapers about the problem of uninstalled equipment. For a examples refer to V. Tsaubulin, "Glasnost' i deistvennost'," *Pravda*, 30 July 1989, second edition, p.4 and V. Iakovlev, "Na temy dnia: za valiutu – i na kklad," *Izvestiia*, 12 January 1989, evening edition, p.1.

²⁰⁷ Crawford, *Economic Vulnerability in International Relations*, 104.

Consequently, managers focused on implementing innovations that were not that different from former products.²⁰⁸

Moreover, in the Soviet system, the diffusion process of innovation was slow and weak. On average, innovations were introduced in only one or two enterprises and approximately 13 percent of innovations were used by additional enterprises. Gokhberg states that the low rate of innovation and diffusion was a reflection of the lack of incentives for enterprises. Enterprises were not under pressure to introduce new processes at lower costs because in the Soviet system prices were based in part on costs. Moreover, the planning system emphasized the increase in volume of output and ensured that almost all output would be sold.²⁰⁹

Both planners and managers impeded the development and diffusion of innovation in Soviet industry. The bonus structure instituted for the fulfillment of production targets was greater than that for the introduction of new technology. As discussed in chapter 1 plan targets were set relative to the firm's productive capacity and were raised annually without corresponding increases in inputs and without allowing for the downtime required to retool for a new product or process technology.²¹⁰

There was little reward for innovation despite the fact that bonuses for successful R and D and innovation were a feature of the Soviet economic planning system. The bonuses awarded for new technology were outweighed by the more substantial bonuses that industrial enterprises could earn for successfully fulfilling the output plan. However,

²⁰⁸ "Effektivnost' novoi tekhniki," *Pravda*, 2 October 1981, second edition, p.1.

²⁰⁹ Gokhberg, "Transformation of the Soviet R and D System," 18-19.

²¹⁰ Susan J. Linz, "Barriers to Innovation: the Economic Impact of Perestroika," *Economics of Transition* 1, no.3 (1993): 448.

there was a concerted effort in the late 1970s to increase the impact of the bonuses for innovation.²¹¹ There were also attempts to increase incentives by establishing sectoral funds, granting special governmental and departmental awards and introducing ranks for researchers. However, these had a limited impact because the bureaucratic structure kept the system from reflecting the wide variance in returns inherent in innovation.²¹²

The increase in the bonuses for new technology did not change the traditional attitudes on the importance of plan fulfillment of the ministries and enterprises. Amann illustrates that during the Soviet era a vicious circle had been created whereby in spite of the political pressures for more rapid technical progress there was no significant improvement in the material environment. Consequently, the slow growth in real investment led to a slowdown in the rate of diffusion of new technology. As a result, the opportunities for 'learning by doing' were reduced and the pressures for plan fulfilment at lower levels of the system were intensified.²¹³ [See Appendix 3]

Furthermore, managers acknowledged that bonuses for innovation were ineffective because they did not offset the risks involved. Managers were unable to enforce their requirements on design specifications and were obliged to cover the costs associated with refashioning the technology.²¹⁴ For example, in a study done in 1988, a chief designer of a large truck plant explained that in the 1970s he had registered an international patent for a piece of equipment he and his team had invented, but despite its obvious technological advance, the top management of the enterprise did not adopt it.

²¹¹ Amann, "Technological Progress and Soviet Economic Development," 18.

²¹² Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 90.

²¹³ Amann, "Technological Progress and Soviet Economic Development," 21.

²¹⁴ Linz, "Barriers to Innovation," 449.

The retooling time and expense, as well as the production delays during the installation offset the bonus for the introduction of the new technology.²¹⁵

3.3. Soviet R and D Performance

The output of applied R and D was often below international standards.²¹⁶ Soviet performance was often held back by the slowness of creating new production facilities and the failure to replace obsolete technologies with new ones. Soviet civilian R and D often performed an adaptive and imitative role, often in the form of reverse engineering, that was appropriate to the level of Soviet development.²¹⁷ Consequently, there had been numerous resolutions at Party congresses and plenums urging the improvement in the R and D sector including conducting various organizational experiments at branch and regional levels. By the mid-late 1980s, however, despite these efforts by Soviet leaders to accelerate R and D, official reports conceded that there was a reduction in the tangible results of R and D activities.

A Soviet report on the economic effect of the 15,000 models of new equipment that were introduced in the early eighties outlined that less than 3 percent of the new equipment generated cost savings and higher productivity and 86.2 per cent of them produced no return at all.²¹⁸ Moreover, 25 percent of documented innovations in the

²¹⁵ Sheila M. Puffer, "Unpublished Field Notes for *Behind the Factory Walls: Decision Making in Soviet and US Enterprises*", 1988, quoted in Sheila M. Puffer, "A Riddle Wrapped in an Enigma: Demystifying Russian Managerial Motivation," *European Management Journal* 11, no.4 (December 1993): 274.

²¹⁶ Alimpiev and Sokolov, "The Institutional Structure of Applied R and D," 36.

²¹⁷ Hanson, "International Technology Transfer," 358.

²¹⁸ Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 66-67.

1980s had already been registered as inventions 6 to 10 years earlier. In 1990, more than 70 percent of innovations were aimed at minor improvements of existing, and often obsolete, technologies. Although these improvements were implemented rather quickly, they soon became obsolete.²¹⁹

During the 1980s there was recognition that scientific-technological progress was being characterized by the accelerated obsolescence of new machinery. In an interview with *Izvestiya* in 1989, Martynov, the Director of the USSR Academy of Sciences, Institute of World Economics and International Relations, stated that without the reform of the outmoded forms of scientific development, the Soviet Union would slide down to the position of a developing country.²²⁰ Returning to Amann's vicious circle, Amann explains that due to the lack of material conditions for the introduction of new machinery enterprises claimed economic benefits of obsolete equipment.²²¹ [See Appendix 3] Moreover, most enterprises did not have the necessary experimental base to introduce new machinery within a short time. Consequently, new machinery was often obsolete by the time it was introduced into production, and therefore, the cost of its development was a partial or total loss to society.²²²

²¹⁹ Gokhberg, "Transformation of the Soviet R and D System," 18.

²²⁰ B. Ivanov, "Interv'iu izvestii: gde my budem savtra?" *Izvestiia*, 2 November 1989, morning edition, p.5.

²²¹ Amann, "Technological Progress and Soviet Economic Development," 21.

²²² Zaichenko, "Risk i samostoiatel'nost' innovatsionnoi deiatel'nosti," 42.

3.4. Gorbachev and Perestroika

In 1988 and 1989 Gorbachev introduced new economic arrangements for the R and D system. An aspect of these reforms was the concept of *khozraschet*, or the self-financing of R and D institutions and enterprises. R and D institutions gained a level of independence regarding the selection of research objectives. They also received the right to create project portfolios on the basis of negotiated contracts with enterprises. Moreover, these reforms were the beginning of the denationalizing of the research institutes. The reforms gave staff members the right to rent buildings and equipment from the government in order to meet their research needs.²²³

The reforms initially created new links between R and D and industry. However, research institutes had also become concerned with costs and profit. To this end, they began to raise contract prices and focus on short-term projects, particularly those based on work that had already been completed, allowing them to receive premiums for completed work. Consequently, less profitable basic and long-term applied research was neglected.²²⁴

Although the economic reforms introduced the notion of profit and allowed research institutes a certain amount of freedom, in 1990 most industrial R and D was still largely controlled and financed by the ministries. The reforms did not remove the main barriers to innovation. Horizontal linkages remained weak, incentives for development and diffusion activities were not increased, and there was still no legal protection of intellectual property rights. Moreover, despite the official recognition that there was a

²²³ Gokhberg, "Transformation of the Soviet R and D System," 16-17.

²²⁴ Ibid.

great deal of inefficiency and waste caused by obsolete equipment and production processes, there were no provisions made for removing or replacing the equipment.²²⁵

3.5. The Russian R and D Sector

The collapse of the Soviet system and subsequent economic crisis led to a drastic decline in R and D and innovation. The R and D sector was subject to the unstable economic environment and severely affected by high interest rates, unpredictable domestic demand, decreased centralized financing and a shortage of working capital for enterprises. During the early years of transition government policy was limited to maintaining R and D institutions: the subsidies for R and D disappeared and political pressures on the sector to catch up with the West waned.

Furthermore, the partnerships between production enterprises and research institutes were broken with the large-scale privatization of state enterprises. Industrial ministries were no longer responsible for coordinating the work of research and production units and enterprises were concerned with short-term and survival goals. The lack of financing also caused a brain drain of scientists and engineers abroad and to other domestic activities.²²⁶

In the early 1990s, it was assumed that the fundamental reform of institutions and incentive structures would be enough to improve the former Science and Technology system. S and T policy between 1992 and 1995 shifted from budgetary support of R and D institutions to non-state financing. It was thought that competition would create the

²²⁵ Linz, "Barriers to Innovation," 451-452.

necessary incentives for innovation or imitation and that decentralization would eliminate delays and the rigidities of central planning. User sovereignty would ensure that enterprises concentrated on product innovations that would improve performance according to user demands and process innovations that would reduce costs. Moreover, entry into the world market system would strengthen competitive pressures and improve the quality and productivity of S and T activities.²²⁷

However, these changes have not become apparent, but rather there has been a massive reduction in R and D expenditures and a 'brain-drain' out of R and D into other sectors or countries. This is not only reflective of an unfavourable macroeconomic environment, but also the consequence of a lack of competencies needed to generate and implement changes and improvements in business organisations, and to formulate and execute supporting public policies.²²⁸ The Russian government attempted to reform the R and D sector by adopting new legislation and introducing tax incentives. However, these reforms were made within the old centralized system of S and T management. Most government R and D funds were still being distributed through the old industrial ministries or departments that controlled specific programs and the share of the government R and D funds distributed on a competitive basis remained small.²²⁹

²²⁶ Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 93 and Egorov and Carayannis, "Transforming the Post-Soviet Research Systems," 171.

²²⁷ Pavitt, "Transforming Centrally Planned Systems," 50-51 and Andrey Fonotov and Lioudmila Pipiia, "Government Policy for Applied R and D," in *Russian Applied Research and Development: Its Problems and its Promise*. ed. Leonid Gokhberg, Merton J. Peck, and Janós Gács (Laxenburg, Austria: The International Institute for Applied Systems Analysis, 1997), 150.

²²⁸ Pavitt, "Transforming Centrally Planned Systems," 51.

²²⁹ Alimpiev and Sokolov, "The Institutional Structure of Applied R and D," 51-56.

Organizational Changes

There were a series of major organizational changes at the level of state management and that of the research institutes themselves. The Ministry of Economy replaced Gosplan and the Ministry on Science and Technological Policy (MSTP) replaced the State Committee on Science and Technology (SCST). Many branch ministries were closed. R and D institutes were privatized, large financial groups were established and small businesses engaging in S and T activity emerged.²³⁰

In September 1993 the Interdepartmental Coordination Commission on Science and Technology was established. The commission was responsible for decisions on the development of science and technology at a federal level. In 1995 the MSTP adopted the position that its main task was to stabilize and support R and D in accordance with its reorganization. To this end, the commission became the Governmental Commission on Science and Technology Policy and was headed by the Prime Minister of Russia. The Council for Science and Technology Policy was also established. The council makes recommendations for S and T policy and is headed by the President of Russia.²³¹

The USSR Academy of Sciences was dissolved and transformed into the Russian Academy of Sciences (RAS). The RAS retained the administrative control over the activities of its research institutes. The Academy did not significantly change its structure or bureaucratic organization. Moreover, it managed to retain its budget financing better than other R and D sectors because of its political influence. However,

²³⁰ Ibid, 40.

²³¹ Ministry on Science and Technological Policy of the Russian Federation (MSTP), *Reference Material on the Status, Main Problems, and Development Trends in Science and Technology* (Moscow, 1996) quoted in Fonotov and Pipiia, "Government Policy for Applied R and D," 133.

its inter-republic research programs were discontinued, and R and D contracts between institutes and enterprises in different republics were canceled.²³²

Throughout the 1990s, Government financing for the Academy was primarily in the form of support to basic research. 58 percent of the Academy's 1994 expenditures were for basic research, up from 52 percent in 1990. Applied R and D accounted for more than one-third of the Academy's activities and Academy institutes maintained a level of participation in budgetary-financed goal-oriented S and T programs.²³³

The role of university R and D was reduced due to the economic crisis. R and D were no longer considered economically "profitable" activities by many universities. In 1994 the higher education share in GERD was 4 percent. The universities' share in basic research increased as applied R and D contracts with industry decreased sharply and left them dependent on state funds for basic research. By the beginning of 1995 the share of basic research in university R and D had reached 39.6 percent.²³⁴ For the most part the R and D had not been integrated into industry and higher education retained only a small number of R and D organizations.²³⁵

The industrial sector retained its share of gross expenditures of R and D (GERD) of over 75 percent throughout the 1990s. In the post Soviet system most R and D activities have been in civilian industry rather than defence. Although there has been an increase in the number of R and D institutes the increase is attributed to the break up of

²³² Gokhberg, "Transformation of the Soviet R and D System," 20 and 25.

²³³ Ibid, 25.

²³⁴ Ibid, 25-27.

²³⁵ Radošević, "Patterns of Preservation, Restructuring and Survival," 6-8.
http://ssecs.ac.uk/publications/working_papers/wp7.pdf (March 2002).

larger institutes into smaller ones. Industrial R and D institutes retained their links with enterprises, usually in the framework of associations, financial industrial groups, or large conglomerate firms. Industrial R and D institutes filled the short-term requirements of enterprises, since long-term research declined.²³⁶

However, the privatization program further weakened the links between industrial R and D institutes and production units as enterprises were privatized separately from R and D institutions. Privatization began in the R and D sector in 1992. A number of provisions were established for the privatization of R and D institutions. Some were to remain publicly owned and some are to be subject to state control even after privatization, depending on the nature of research that was conducted. In about 20 percent of the privatized institutions the government retained full control over the property and a “golden share”, giving it the right to approve key decisions. However, in other institutions, the government was to have no role in management after privatization.²³⁷

Industrial enterprises still did not significantly support R and D because they had only a long-term payoff, and they lacked sufficient investment funds to introduce radical innovations.²³⁸ Moreover, the unfavourable investment climate hindered innovation activity and made financing of R and D unattractive to private capital.²³⁹ Therefore, the lack of alternatives to government support led to the continuation of the Soviet style centralized system of R and D financing for both applied R and D and basic research.

²³⁶ Gokhberg, “Transformation of the Soviet R and D System,” 27-28.

²³⁷ Alimpiev and Sokolov, “The Institutional Structure of Applied R and D,” 44.

²³⁸ Glaziev, Karimov, and Kuznetsova, “Innovation Activity of Russian Industrial Enterprises,” 98.

²³⁹ Fonotov and Pipiia, “Government Policy for Applied R and D,” 132.

However, the State no longer has the resources to maintain the Soviet R and D establishment that Russia inherited and R and D funds have decreased.²⁴⁰

3.6. Post Soviet Innovation

When the Soviet system collapsed in 1991 there was a need for a new regulating mechanism for innovating activity that would be conducive to increasing motivation for long-term investment.²⁴¹ The enterprises themselves did not have the economic resources to introduce innovations, although they recognized that in the long-term they must innovate to survive. The reduction in the government's purchasing power of scientific and technical products meant that there was no incentive for industries to use new and up-to-date technology. The collapse of the system resulted in the abolition of the bonus structure; consequently, there was a lack of effective incentives for raising competitiveness and efficiency.²⁴² However, in some sectors obsolete technology and techniques were gradually being replaced with new effective equipment and technology.²⁴³

In the post Soviet system the development of applied R and D and technology is increasingly determined by demand from industrial enterprises. Enterprises have had to reorient their innovation activities in accordance with market forces; consequently, they

²⁴⁰ Gokhberg, "Transformation of the Soviet R and D System," 22-23 and Fonotov and Pipiia, "Government Policy for Applied R and D," 133.

²⁴¹ V. Loginov and A. Kulagin, "Innovatsionnaia politika: mery po aktivizatsii," *Ekonomist*, no.9 (1994): 26.

²⁴² A. Kol'tsov and M. Bykova, "Dinamika i struktura proizvodstva," *Ekonomist*, no. 7 (1997): 9.

²⁴³ Loginov and Kulagin, "Innovatsionnaia politika," 26.

have had to focus on both product innovations and process innovations. In the Soviet system the technological emphasis was on product development, as enterprises did not have to consider cost concerns or user needs, however, with the transition to a market economy these considerations have become important for survival. Between 1992 and 1994 process innovations were introduced by 63 percent of innovating enterprises.²⁴⁴

These process innovations have focused on cost reductions in the energy, fuel, and materials sectors. Russian enterprises have been forced to cut costs because of the increase of relative prices of energy and materials, as well as the fierce competition in the domestic and foreign markets. Often labor-saving process innovations are of little value because managers want to maintain employment levels. Enterprises still favour product innovations as they raise the revenues of an enterprise while maintaining the employment level.²⁴⁵

The implementation of innovation is a key component of industrial activity in order to manufacture competitive products, retaining traditional markets, and diversify production. However, many obstacles, including financial constraints, lack of in-house research and experimental bases, and lack of the necessary S and T and marketing information still hinder innovative activity at the enterprise level.²⁴⁶ Enterprises have not yet become the main agents of innovation. From 1992 to 1994, 17,000 enterprises were surveyed and fewer than 4,000 had engaged in innovative activity.²⁴⁷ Moreover,

²⁴⁴ Radošević, "Divergence or Convergence in Research and Development," 30 and Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 97-98.

²⁴⁵ Ibid.

²⁴⁶ Gokhberg and Kuznetsova, "Specificities of Innovation Activity in Russian Industry," 292.

²⁴⁷ Centre for Science Research and Statistics, *Innovations in the Industry Sectors* (Moscow, 1996) quoted in Glaziev, Karimov, and Kuznetsova, "Innovation Activity of Russian Industrial Enterprises," 96.

Gaponenko states that not many enterprises are willing to engage in the R and D necessary to adapt Western technologies to operating conditions in Russia.²⁴⁸ However, despite this innovative activity in Russia occurs predominantly through technology transfer from Western countries, usually in conjunction with privatization and/or capital transfer.²⁴⁹

3.7. Government Initiatives to Promote Research, Development and Innovation

New gaps have emerged in R and D and innovation and there is still a gap between R and D institutions and enterprises. As discussed in chapter two, by the late 1990s the Russian Government started developing S and T legislation and although a new national innovation system has not yet emerged the Russian Government has tried to promote R and D and Innovation.

In 1993 the government began to implement the State Research Centres (SRC) program as governmental R and D financing was drastically reduced and the survival of R and D institutions was an important consideration for policymakers. The program was intended to minimize the destruction of the largest research institutes possessing state-of-the-art equipment. However, in the first two years the SRC program did not have sufficient financing; government funding gave them barely enough money to pay salaries

²⁴⁸ Gaponenko, "Innovatsii i innovatsionnaia politika," 97.

²⁴⁹ Werner Meske, "The Transformation of R and D in the Post-Socialist Countries: Asset or Liability," in *Innovation and Structural Change in Post-Socialist Countries: A Quantitative Approach*, ed. David A. Dyker and Slavo Radošević (Dordrecht, the Netherlands: Kluwer Academic Publishers, 1999), 143.

and maintain the facilities, with little left for renovation and improvement of equipment.²⁵⁰

Another government initiative was the Complex Program of the Development and Governmental Support of Innovative Entrepreneurship in the Russian Federation for the Period 1994–1996. The program was aimed at creating legal, organizational, and economic conditions for developing enterprise innovations; forming a market infrastructure for innovation activity; and involving researchers in innovation. The program was government financed and supported by funds from private investors.²⁵¹

Other government initiatives include a number of tax incentives established for institutions and enterprises performing R and D, and for organizations introducing new equipment and technologies, as well as the promotion of cooperation in international S and T. The Government has encouraged the participation of Russian scientists and engineers in international S and T projects, employment abroad of Russian researchers, the establishment of foreign companies in Russia, and joint ventures involving Russian and foreign organizations. Although the exchange of scientific information with colleagues or to various databases both within the country and abroad is still restricted.²⁵²

However, despite these initiatives innovative activity among enterprises is still low. In 1996 the first national innovation survey was implemented in Russia. 24,940 enterprises were surveyed of which 1,363 were engaged in innovative activity. There was a drastic decline in innovation activity after 1991; in 1995-1996 innovation activity

²⁵⁰ Fonotov and Pipiia, "Government Policy for Applied R and D," 140.

²⁵¹ Ibid, 142.

²⁵² Gokhberg, "Transformation of the Soviet R and D System," 20-21 and Fonotov and Pipiia, "Government Policy for Applied R and D," 143.

fell below six percent, as compared to 60-70 percent in the 1980s. The highest levels of innovation were predominantly in export-oriented sectors such as chemicals and refined petroleum products and ferrous metallurgy. These sectors are not high in R and D intensity, but are able to finance relatively long-term investment. The enterprises in the survey cited that a shortage of their own funds and a lack of financial support from the government, along with the low demand for new products and excessively high costs hindered innovation activity.²⁵³

The results of the survey also indicate that enterprise managers still do not consider R and D a priority in innovation expenditure. The survey found that 43.5 percent of innovation expenditure went on acquisition of machines, equipment, and other fixed assets necessary for the introduction of new or improved products and processes. Retooling and industrial engineering accounted for 17 percent bringing the introduction of new products and processes up to 60 percent of all expenditures for innovative activities in 1995. [See Appendix 4] However, only 41.8 percent of all innovating enterprises surveyed were involved in the acquisition of technologies with 30 percent of these acquiring them from abroad. Moreover, in order to meet short-term goals, enterprise managers considered the introduction of already established technologies into production more important than developing their own indigenous technologies.²⁵⁴

The reconstruction of the R and D sector and the privatization of both research institutes and industrial enterprises redefined the role of enterprises in the development process. Financing is no longer secure and enterprises are no longer simply production

²⁵³ Innovation activity was measured by the share of enterprises carrying out development and introduction of new or improved products and technologies in Gokhberg and Kuznetsova, "Specificities of Innovation Activity in Russian Industry," 292 and 294.

units. Consequently, most enterprise managers have had to start implementing new product and process technologies, if only to a limited extent, in order to survive in the market system.

However, throughout the 1990s, enterprise managers have focused on short-term survival rather than long-term development goals. In order to improve production and remain competitive, enterprise managers need to focus on long-term planning by improving the technological capabilities of their workforce and developing indigenous innovations, including innovations in managerial practices.

²⁵⁴ Ibid, 295-299

CHAPTER 4

MANAGERIAL BEHAVIOUR

Environmental factors combined with traditional managerial behaviours resulted in a lack of innovation in Soviet enterprises. Enterprise managers were not inclined to introduce innovations into production as they were not motivated by market forces and avoided taking risks. Soviet enterprises could survive without innovations as they were not subject to market pressures and were heavily supported and controlled by the State apparatus.

Historical forces and traditions have shaped Russian managerial behaviour. Key cultural attitudes, values and beliefs have influenced the hierarchical structure and the motivation of Russian managers and workers in Russian enterprises. The centralization of authority and responsibility has deep roots in Russian attitudes and the concept of collectivism and the egalitarianism ethic have defined Russian managerial values. Subsequently, Soviet enterprises developed in accordance with these two fundamental principles.

4.1. The Soviet Period

Hierarchy and formal status were important to Soviet managers and workers. Managers relied upon the hierarchy when making decisions and resolving conflict. Vlachoutsicos and Lawrence explain the structure of the Soviet hierarchy and describe it as a '*matrioshka* management system'. They explain that at the core of the traditional Soviet hierarchy was a form of collective called the structural task unit (STU). The STU

was essentially any group charged with performing a specified task. Soviet enterprises were STUs and contained administrative, service, and production STUs. For example, if an enterprise had more than one plant, there were five progressively smaller STUs and five hierarchical levels of line managers: the director of the enterprise, the plant managers, the workshop managers, the foremen and the brigade. [See Appendix 5]²⁵⁵

STUs operated as collective entities and were virtually impenetrable by outsiders; sharing information, even on trivial matters, needed the leader's approval. They strengthened the vertical integration by fostering personal loyalty, commitment and communications among superiors and subordinates. In turn, STUs were expected to guarantee basic essentials to all of their members, including providing stores in factories and securing their housing for their employees.²⁵⁶

However, STUs also created excessive compartmentalization, consequently impeding horizontal integration.²⁵⁷ Each manager had direct authority over all subordinate managers and workers; therefore, they could bypass subordinate managers. In effect they could communicate with, give instructions to, receive reports from, interfere with and even assume authority over employees on any subordinate level of the hierarchy. Moreover, subordinates from all levels had direct access to their leaders. However, there was a lack of horizontal links between STUs and when a task required coordination between two or more STUs, their managers had to work within the

²⁵⁵ Charalambos Vlachoutsicos and Paul R. Lawrence, "What We Don't Know About Soviet Management," *Harvard Business Review* 68 (November - December 1990):51-52.

²⁵⁶ *Ekonomika i organizatsiia promyshlennogo proizvodstva* (EKO), "Zapadnyi menedzher i sovetskii direktor," *Ekonomika i organizatsiia promyshlennogo proizvodstva*, no.5 (1990): 22.

²⁵⁷ Charalambos Vlachoutsicos, "Russian Communitarianism: An Invisible Fist in the Transformation Process of Russia," in *Managing Organizational Change in Transition Economies*, ed. Daniel Denison (Mahwah, New Jersey: Lawrence Erlbaum and Associates Inc., 2001), 177, 184.

hierarchy and refer to their common boss for every decision. In contrast, in the US management system accountability flows up and down the hierarchy one step at a time and although the hierarchy functions through a vertical chain, both horizontal and vertical communication take place at all managerial levels.²⁵⁸

However, within the structure of the hierarchy, the Soviet ideal considered the enterprise to be a democratic institution. Everyone was entitled to have his or her voice heard and employees at any level felt free to speak with the director general.²⁵⁹ Initially, Soviet managers were expected to balance one-person leadership and collective leadership. It was expected that a manager was an unquestioned authority figure, but at the same time the workers expected to have the right to discuss issues and submit proposals to their manager. However, the concept of 'centralized leadership/grass-roots democracy' did not last long and, ultimately, enterprise managers wielded all the power and bore all of the responsibility. Moreover, enterprises became stagnant as nothing was done without authorization from above.²⁶⁰

Managerial Qualities

Soviet managers were typically chosen on the basis of professional merit and political reliability. The ideal manager was expected to be authoritative, assertive and even inspirational with a thorough knowledge of production. Within the context of the Soviet enterprise, managers were to be capable, hard working, and genuinely solicitous of

²⁵⁸ Vlachoutsicos and Lawrence, "What We Don't Know," 51-52 and 56.

²⁵⁹ Nigel Holden, Cary Cooper, and Jennifer Carr, *Dealing with the New Russia: Management Cultures in Collision* (Chichester, UK: John Wiley and Sons Limited, 1998), 81.

²⁶⁰ Sheila M. Puffer and Associates, *Business and Management in Russia* (Cheltenham, UK: Edward Elgar Publishing Limited, 1996), 19-20.

their workforce. Moreover, managers were considered good leaders if they inspired confidence, and created a sense of purpose and pride throughout the enterprise.²⁶¹

However, the description of the ideal manager leads to an apparent contradiction in the literature: on the one hand, Soviet managers were idealized as democratically minded leaders who managed by personal example and on the other hand, there was a strict adherence to the hierarchy. In accordance with the paradox of balancing one-man leadership with the collective managers were expected to be paternalistic as well as egalitarian. They were expected to be strong, directive leaders when carrying out policy decisions, but managers who were firm and frank with their subordinates expected fierce loyalty in return.²⁶²

Vlachoutsicos and Lawrence explain that in practice, Soviet managers took their responsibilities very seriously, but were extremely cautious about getting involved in matters for which they were not officially responsible. They were responsible for working within the hierarchy and keeping their superiors informed of their ability to fulfill their part of the plan. Consequently, they were cautious about taking risks and assuming specific obligations for achieving results.²⁶³

Furthermore, Soviet managers were used to working under their production capacity, with the threat that a single disruption could spread into a production crisis.

²⁶¹ Holden, Cooper, and Carr, *Dealing with the New Russia*, 81 and 83.

²⁶² Refer to Vlachoutsicos and Lawrence for further discussion about the apparent paradox. See also Holden, Cooper, Carr, *Dealing with the New Russia*, 81-83 and Gros and Steinherr, *Winds of Change*, 46.

²⁶³ Paul R. Lawrence and Charalambos Vlachoutsicos, "Managerial Patterns: Differences and Commonalities," in *Behind the Factory Walls: Decision Making in Soviet and US Enterprises*, ed. Paul R. Lawrence and Charalambos Vlachoutsicos (Boston, Massachusetts: Harvard Business School Press, 1990), 273-276, 282-283.

Consequently, Soviet managers were adept at overcoming unexpected obstacles and developed skills as troubleshooters.²⁶⁴ In practice, successful managers had strong skills of persuasion, an inclination for petitioning and a knack for grooming apparatchniks. They were tenacious, cunning, and skilled at playing the system with a record of commitment with the party. They were also accomplished networkers who fostered close personal relationships with those who could dispense favours and radiate influence.²⁶⁵

Managerial Responsibilities

Soviet managers were primarily responsible for ensuring that the targets of the plan were met. As discussed in chapter 3 the centralized system was biased towards plan fulfillment and provided little incentive to improve product quality, reduce production costs, conserve energy and raw materials or improve productivity.²⁶⁶

Under the Soviet system the state planned innovation activities and planning authorities determined the knowledge transfers between R and D institutes and enterprises. The results of innovative activities were considered public goods and individuals did not appropriate the profits generated by an innovation. Subsequently, the Soviet system used individual bonuses and piece rates to motivate managers and workers rather than focusing on goal identification.²⁶⁷

²⁶⁴ Ibid, 284.

²⁶⁵ Holden, Cooper, and Carr, *Dealing with the New Russia*, 82 and 84.

²⁶⁶ Naylor, "The Reeducation of Soviet Management," 32-33.

²⁶⁷ Fritsch and Werker, "Innovation Systems in Transition," 11 and Lawrence and Vlachoutsicos, "Managerial Patterns: Differences and Commonalities," 284.

The primary source of managerial bonuses was the basic bonus earned for fulfilling the basic plan targets. A large portion of the manager's monthly take-home pay was tied to fulfilling the plan targets. Innovating enterprises earned smaller bonuses as innovation appeared to have a negative effect on plan fulfillment.²⁶⁸ As pressure increased for managers to maximize output, the resistance to innovation became stronger. In the mid-1970s, however, there were several attempts to improve managerial incentives: rewards for innovation were raised, along with those for producing spare parts, which were often in chronically short supply.²⁶⁹

The problem in the Soviet system was not just the lack of incentives for innovation but the lack of penalties for not innovating. Enterprise managers did not have to worry about market forces for, as long as the plans were fulfilled they would continue to receive salary and bonuses. Moreover, the Soviet commitment to full utilization of resources meant that managers and workers enjoyed a measure of job security. If planners had rejected obsolete or poor quality products, enterprises would have had to invest in the innovation process, as they would have been unable to pay their suppliers and might have had to lay off workers or even been forced into liquidation. The fact that managerial reputation was based on the enterprise's ability to meet plan targets meant that the risks attached to innovation were greater than the risk of doing nothing.²⁷⁰

During the Soviet era the state and the enterprise managers were, in some regards, in conflict; the state wanted to maximize the efficient use of resources, while managers wanted to maximize their own bonus. Since bonuses were linked to plan fulfillment,

²⁶⁸ Berliner, *Soviet Industry from Stalin to Gorbachev* 202 and 263.

²⁶⁹ Carson, *Comparative Economic Systems*, 186-187.

managers were not motivated to exceed the plan.²⁷¹ Moreover, this led to an apparent discrepancy between the goals of the planners and managerial behaviour in the development and diffusion of technology. Managers took responsibility for selecting the optimal production strategy in order to meet the multiple production targets and their decisions often generated conflicting results to planners' goals.²⁷²

Soviet managers were responsible for producing goods, but they did not have to worry about distributing them; subsequently, as managers did not have to consider sales and marketing they did not worry about cost or product quality. An additional reform designed to encourage firms to increase product quality required them to raise the share of output awarded the State Seal of Quality and tied managerial bonuses to the fulfillment of delivery contracts.²⁷³

The hindrances affecting the ability of enterprise managers to fulfill their responsibilities were reiterated in a series of interviews with Soviet emigrants in the US conducted in the 1980s. Participants had held positions in industrial enterprises, design institutes, scientific research institutes, and other planning, financial, and supply organizations involved in the research-production cycle. The design engineers, reporting on work experiences from the 1960s through to the early 1980s, stated that the emphasis placed on the ability to produce more by planners was reflected in the nature and number

²⁷⁰ McAuley, "Central Planning, Market Socialism," 37, 40-41 and 47-48.

²⁷¹ Kari Liuhto, "The Transformation of the Management Effectiveness in the Post-Soviet Enterprises," *Centre for East European Business Studies*, Copenhagen Business School, 1998 Conference Paper. <http://www.cbs.dk/centres/cees/network/pdf/Liuhto.pdf> (December 2001).

²⁷² Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 67.

²⁷³ Naylor, "The Reeducation of Soviet Management," 30 and Carson, *Comparative Economic Systems*, 187.

of funded projects. One of the biggest problems facing design engineers was the pressure to produce designs at a fast pace, resulting in a low quality of work. Moreover, the designs themselves tended to focus on performance reliability rather than new innovations.²⁷⁴

Interview evidence with former Soviet managers also revealed that despite the fact that there were plan targets for the introduction of new technology planners were willing to accept alternatives to innovation if they generated higher output levels. Alternatives included reducing production reserves, work-time losses, and equipment downtime, as well as improving resource utilization and preserving old machinery by extensive repairs.

However, the Soviet system impeded managers from making informed decisions about technological alternatives as the flow of information was prohibited and planners were ill informed about the microeconomic consequences of using particular machines.²⁷⁵ Consequently, managers and design engineers minimized research within development programs and used already proven parts and subassemblies rather than designing improved components. Managers also reported giving conservative estimates of lead times required to bring projects on line and meeting only minimum performance and cost requirements.²⁷⁶

Soviet managers saw the shortages of supply as their greatest constraint. They pursued supplies in the same way that Western marketing managers pursue new

²⁷⁴ Linz, Susan J. "Emigrants as Expert-Informants on Soviet Management Decision-Making," *Comparative Economic Studies* (Fall 1986): 64-89 quoted in Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 69.

²⁷⁵ McAuley, "Central Planning, Market Socialism," 43.

²⁷⁶ Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 69.

customers for product ideas in a sluggish market.²⁷⁷ The supply system operated by a centralized material-allocation method and enterprises were entitled to receive specified quantities of materials and equipment. Berliner argued that the system gave strong support to the stability of production, but discouraged innovative change.²⁷⁸ Industrial managers compensated for the shortcomings of the supply system by developing large, vertically integrated plants and producing as many of their needed inputs in-house. Innovation was often avoided for fear that the new input requirement would upset the production process.

Managerial Practices

General aspects of managerial practices were defined by a personal approach to the enterprises' activities. Enterprise managers were 'hands on' and would tour their plants on a daily basis.

The Soviet manager's place was not in his office, but with people, and that meant not only frequent and impromptu meetings with particular groups, but also having to address full-scale meetings of the workforce to explain a problem and his proposed solution.²⁷⁹

It was important that managers attended meetings in person; indirect communication, such as distributing memorandums, was frowned upon.²⁸⁰ Moreover, they had a tendency to overstaff in order to ensure the fulfillment of plan targets rather than place

²⁷⁷ Holden, Cooper, and Carr, *Dealing with the New Russia*, 83.

²⁷⁸ Berliner, *Soviet Industry from Stalin to Gorbachev*, 256-257.

²⁷⁹ Holden, Cooper, and Carr, *Dealing with the New Russia*, 81-82.

²⁸⁰ Ibid.

too many demands on their subordinates.²⁸¹ However, when problems arose and disciplinary action was necessary they were inclined to impose sanctions in the forms of cuts in bonus and fringe benefits, demotion, and public criticism.²⁸²

Soviet managers did not equate time with money since their main concern was with plan fulfillment rather than cost reduction. Managers focused on short-term, rather than medium-term, or long-term planning and would avoid the risk of non-fulfillment at any cost. In order to reduce the risk of failing to meet production deadlines managers tended to avoid commitments to firm deadlines, unless all the necessary supplies were guaranteed.²⁸³ They improvised methods to meet the plan based on insufficient resources and usually had only an indirect knowledge of quality practices. Subsequently, as they focused on securing supplies, production workers maintained control over production issues, including quality practices.²⁸⁴ Henceforth, effective managers were those who persevered and fulfilled their enterprise's plans in spite of shortages of materials, equipment, and facilities.

Officially managers were rewarded for meticulously following rules and demonstrating loyalty to communist party principles. Achievement, ambition and initiative were not only discouraged, but also condemned for being individualistic and antisocial characteristics.²⁸⁵ Consequently, managers were not inclined to take the

²⁸¹ Gros and Steinherr, *Winds of Change*, 47.

²⁸² Lawrence and Vlachoutsicos, "Managerial Patterns: Differences and Commonalities," 284-286.

²⁸³ Holden, Cooper, and Carr, *Dealing with the New Russia*, 83.

²⁸⁴ Nancy Birch and John Pooley, "Changes in Russian Quality Management Practices from 1989 to 1992," *Management International Review (MIR)* 35, no.3 (1995): 226 and also refer to Simon Clarke et al., "Privatisation of Industrial Enterprises in Russia," *Europe-Asia Studies* 46, no.2 (1994): 181-182.

²⁸⁵ Puffer, "A Riddle Wrapped in an Enigma," 478-479.

initiative or endure the risks associated with implementing new technology for successful results were expected from an initiated innovative project as it would have been accounted for in the overall plan.²⁸⁶

It took much more to persuade enterprises in centrally planned economies to innovate than in competitive market enterprises, as there was less assurance that the innovations would result in cost reduction or quality improvement, and that negative changes would be easily eliminated or prevented.²⁸⁷ Soviet managers acted as barriers to innovation. They were hesitant to innovate, as plan targets were not reduced to compensate for production delays arising from installing new technology. Installation difficulties, supply difficulties, and performance discrepancies all contributed to the risk of introducing new technology. Moreover, the incentive structure failed to compensate for the risk of innovation.²⁸⁸

Consequently, managers who decided to implement innovations, faced the risk that the product would fail to perform, that its costs of production would be higher than forecast and that there would be a period of uncertainty until the production process was fully mastered. Moreover, there was the risk that new supply problems would arise, that the price set for the product would provide a very small profit, and that the basic plan targets would not be met and consequently, his income would decline during that period.²⁸⁹

²⁸⁶ Fritsch and Werker, "Innovation Systems in Transition," 12.

²⁸⁷ Kazimierz Z. Poznanski, *Technology, Competition, and the Soviet Bloc in the World Market* (Berkeley, California: Institute for International Studies, University of California, 1987), 180.

²⁸⁸ Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 72-73.

²⁸⁹ Berliner, *Soviet Industry from Stalin to Gorbachev*, 264.

Furthermore, interview evidence revealed that although managers were pressured by the planning ministry and Party officials to introduce new technologies they were not allocated sufficient materials to do so. A significant amount of resources were dedicated to the imitation or 'reverse engineering' of existing technology. Managers reported that there were often problems copying a foreign machine for they did not have the appropriate parts and had to improvise and/or change the design.²⁹⁰

Gosplan controlled all aspects of the production process, including how and what products were to be produced, and what technologies would be used and developed. Since enterprise managers knew that there was no effective competition and that planners would not enforce absolute quality standards, then time would be focused on filling the minimum plan requirements. However, the separation of R and D institutes from enterprises meant that managers often encountered problems introducing new technology designed by people who had no knowledge of the production conditions. Moreover, research institutes and design bureaus could not override the enterprise directors. If the managers did not want to participate in the innovation process, research institutes and design bureaus could not intervene, as the installation of new technology was subordinate to the everyday demands of management and production.²⁹¹

Interview evidence revealed that quality was actually a plan target and when quality targets were met bonuses were doubled. However, there were no quality standards. One informant reported that in the machine building industry, they were always behind in introducing the latest equipment. Another stated that they did not

²⁹⁰ Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 71 and 86.

²⁹¹ Kosals, *Why Doesn't Russian Industry Work?* 77 and 81.

always use the best available technology since there was not enough money to buy the equipment. Despite the recognition that much of the technology was of obsolete design, engineers reported that three-quarters of their work in the 1970s and early 1980s involved modifying existing technology.²⁹²

4.2. Perestroika

The reforms introduced under perestroika gave enterprise managers extended autonomy. They gained rights over what they produced and how, as well as the right to choose among customers and suppliers, to hire and fire workers, and to set prices and wages. Moreover, most short-run and investment decisions were transferred to enterprises with greater retention rights over profits, losses and depreciation.²⁹³ However, managers lacked skills necessary to operate within the context of these reforms. They had no experience in areas such as market planning, production management, international finance, and organizational development.

The reforms also failed to create an effective incentive structure for innovation. Soviet enterprises had not had a major role in R and D and consequently, there were problems associated with giving enterprises an active role in the innovation process. In an article in *Pravda*, it was argued that in the course of many years of social stagnation, people had lost ideological and moral incentives for improving productivity.²⁹⁴ The enterprises had no effective systems for control over managers and had little experience not only in marketing, but also in advertising, packaging and product design. Labour

²⁹² Linz, "Innovation Strategies in Centrally Planned and Transition Economies," 69 and 86.

²⁹³ Carson, *Comparative Economic Systems*, 189.

relations combined paternalism with regards to layoffs and worker resistance to efforts aiming at higher productivity. Moreover, enterprises faced heavy tax burdens and because contracts were not enforced suppliers and workers often went unpaid.²⁹⁵

Under the reforms of perestroika, State enterprises were meant to become more independent with the advent of *khozraschet*, or self-financing. However, in 1987 a fourth of all state enterprises required subsidies or earned too little profit to update their capital equipment.²⁹⁶ In the early 1990s, despite the transition to a market economy and the privatization program, these enterprises remained inefficient by Western standards. Their equipment and technologies remained largely obsolete and most of their products were out-of-date and of poor quality.

Furthermore, the enterprise managers maintained many Soviet practices. They continued to focus on pleasing their ministerial superiors instead of their customers, stockpiling raw materials, and hiring surplus employees. They were still concentrating on short-term projects, day-to-day activities, production bottlenecks and trouble-shooting.²⁹⁷ Moreover, low standards among the workforce regarding output and quality remained and vertical integration was carried to an extreme of self-sufficiency, at the expense of cost efficiency.²⁹⁸

²⁹⁴ V. Semenikhin, "Diskussionnaia tpibuna: perestroiku uskorit' možhno – dlia etogo ekonomicheskaiia nauka dolzhna byt' blizhe k peal'nostiam proizvodstva," *Pravda*, 10 April 1989, second edition, p.3.

²⁹⁵ Gokhberg and Peck, "The Decline of the Russian R and D Sector," 98-99.

²⁹⁶ Carson, *Comparative Economic Systems*, 189.

²⁹⁷ Kosals, *Why Doesn't Russian Industry Work?* 142.

²⁹⁸ Charalambos Vlachoutsicos and Paul R. Lawrence, "How Managerial Learning Can Assist Economic Transformation in Russia," *Organizational Studies* 17, no.2 (1996): 317.

4.3. The Post Soviet Period

The collapse of the Soviet system and the transition to a market economy changed the demands placed on enterprise managers. The market was associated with the autonomy of the enterprise and party affiliation was replaced with professionalism. Managers had to become proactive and knowledgeable with regard to Western management theories. Managers had greater power than in the past and the number of 'management' issues increased.²⁹⁹ However, despite the fact that the English words 'manager' and 'management', russified as *menedzher* and *menedzhment*, were introduced as early as the mid-1980s, they were superficially assimilated and the operational and organizational implications of the terms were not understood.³⁰⁰

Reforms instituted in 1992 included the removal of price controls, the phasing out of central planning for supply, production and distribution systems, and privatization. Vlachoutsicos and Lawrence argue that these reforms failed to address the need for radical restructuring of the large state enterprises and the total absence of any distribution or marketing institutions and private financial institutions. Moreover, when state orders began being eliminated in 1992, enterprises did not reduce their payrolls and reorganize around free market opportunities and realities. Consequently, they ran up overwhelming debts by keeping redundant employees on their payroll and in order to avoid wholesale bankruptcies, shutdowns and mass unemployment the government extended them 'soft' credits.³⁰¹

²⁹⁹ Vincent Edwards, Gennady Polonsky, and Avgust Polonsky, *The Russian Province After Communism: Enterprise, Continuity and Change* (Houndmills, Basingstoke, Hampshire: MacMillan Press Limited, 2000), 152.

³⁰⁰ Holden, Cooper, and Carr, *Dealing with the New Russia*, 94.

³⁰¹ Vlachoutsicos and Lawrence, "How Managerial Learning Can Assist Economic Transformation," 314.

Russian managers lacked the training and experience to operate in a market economy. Enterprise managers had a number of developed managerial skills such as coping with persistent supply shortages, finding new markets and new sources of supply. Moreover, they had skills in maximizing the use of existing equipment, labour and raw materials in order to develop new lines of production.³⁰² However, they were weak in achieving inter-departmental and inter-organizational coordination and integration. They also lacked managerial knowledge necessary for survival in a competitive market including skills in marketing, sales, capital accounting, cash flow and financial management.³⁰³

Furthermore, in the transition period, planning and engineering departments lost some of their power, as sales became the paramount issue for managers. Sales were no longer guaranteed by state purchase and enterprises lacked the means to purchase raw materials. Consequently, many Russian industrial enterprises established “commercial” departments and created commercial director positions in order to supervise the sales, supply and marketing departments.³⁰⁴

The transition from central planning toward a market-based economy meant that managers of newly privatized enterprises were free to set their own production targets, determine the prices and markets for their products, and develop their own sources of

³⁰² Vlachoutsicos, “Russian Communitarianism,” 187.

³⁰³ Vlachoutsicos and Lawrence, “How Managerial Learning Can Assist Economic Transformation,” 312.

³⁰⁴ Igor B. Gurkov, “Organizational Changes in Russian Industrial Enterprises: Mutation of Decision-Making Structures and Transformations of Ownership,” in *Managing Organizational Change in Transition Economies*, ed. Daniel Denison (Mahwah, New Jersey: Lawrence Erlbaum and Associates Inc., 2001), 371.

supply.³⁰⁵ However, there was little change in the daily operation of enterprises as most privatized firms were still operating in the same way that they had done during the Soviet era. Many of the managers who were in charge during the Soviet period continued to run the newly privatized enterprises retaining their autocratic power.

Moreover, enterprises did not have the financial resources to invest in new plant and technology, and still relied upon government subsidies for continued operation.³⁰⁶ Consequently, most enterprises did not change their product lines to meet market needs, but rather continued to produce for inventory to maintain employment. Managers were not interested in implementing new innovations, as they were not about to replace cheap labour with expensive equipment.³⁰⁷

Despite the fact that the system has changed and Russian enterprise managers now have new responsibilities, aspects of the traditional social values still determine rewards and penalties. Consequently, they still play an important part in the Russian manager's thinking and the collectivist mentality can still thwart change.³⁰⁸ Managers appear to be confusing their influence over economic life with business competencies. These competencies are often nothing more than 'knowledge and connections' to get state subsidies and get rich. These competencies do not appear to include the welfare of

³⁰⁵ Sheila M. Puffer, Daniel J. McCarthy, and Alexander I. Naumov, *The Russian Capitalist Experiment: From State-Owned Organizations to Entrepreneurships* (Cheltenham, UK: Edward Elgar Publishing Limited, 2000), 22.

³⁰⁶ Ibid, 16.

³⁰⁷ Balabanova and Grudzinskii, "Institutsional'nye usloviia transfera tekhnologii," 42.

³⁰⁸ Holden, Cooper, and Carr, *Dealing with the New Russia*, 58-59.

the population and consequently, managers are generally operating in ways that do not make for stabilization of political and economic life.³⁰⁹

Company officials from both foreign and domestic firms have cited a lack of business focus, business experience, product knowledge and the absence of financial independence as impediments to establishing an effective distribution network in Russia. Under the Soviet system, distribution networks in the Western sense did not exist. Distribution centres did exist, but the central authorities rather than the centres themselves determined everything. Consequently, few Russians have experience in marketing, studying local demand or responding to customers' needs.³¹⁰

Vlachoutsicos and Lawrence attribute the slow progress of managerial learning to the fact that reforms at the institutional and individual levels have been neglected. They argue that at the institutional level, state enterprises need to restructure themselves into smaller market-oriented firms. At the individual level, Russian managers should transform themselves from shortage-focused managers operating in a planned economy, to profit-focused managers operating in a competitive market economy.³¹¹

4.4. Management Education

The first minor exposure to western-style management education was in the early 1980s and Soviet style business schools continued to be established throughout the Gorbachev period. The principal task of management education during perestroika was

³⁰⁹ Ibid, 115-116.

³¹⁰ Prince, Todd, "Manufacturers Wheeling, Seek Efficient Dealing: Distribution Net Key for Industrial Firms," *The Russia Journal* 3, no. 21 (64) <http://www.russiajournal.com> (June 05-11 2000).

³¹¹ Vlachoutsicos and Lawrence, "How Managerial Learning Can Assist Economic Transformation," 311.

to create a new kind of manager from the old class of administrators and bureaucrats. However, management education was hampered by the persistence of a complex 'semantic gap'. In Soviet system there was no need for the words or concepts of market planning, production management, international finance and organizational development. Even in the late 1980s, the term 'management' was associated with 'get-rich-quick capitalism' and methods of efficiency that would logically lead to unemployment and exploitation.³¹²

Knowledge sharing

The issue of knowledge sharing within the Russian enterprise is a key component to successful management education both at the individual level and the organizational level. In order for the skills and knowledge offered by Western training programs to be successfully transferred and assimilated, Russian managers need to be receptive to and active participants in knowledge sharing within their respective enterprises.

Culture and behaviours are often the drivers or inhibitors of knowledge sharing. A number of problems related to knowledge sharing are reinforced in the Russian enterprise. Traditionally Russian managers and employees have been eager to accumulate knowledge but strongly resist sharing it. Moreover, they have lacked the incentives for sharing knowledge. The single departments have been primarily oriented towards their own goals and tasks without considering the enterprise as a whole.

³¹² Holden, Cooper, and Carr, *Dealing with the New Russia*, 93-95.

Subsequently, cross-departmental cooperation is substituted by intensive interpersonal interaction and networking.³¹³

In general, the workforce in Russia is well educated, highly skilled and imbued with a deep industrial culture. "Human resources are an essential component of knowledge transmission. If knowledge is the capacity to act, the actor is the person with the knowledge."³¹⁴ However, the strong centralization, dominance of formal rules, one-man authority and lack of tolerance towards pluralism and diversity constituted a context that was not conducive to the sharing of ideas, knowledge and information.³¹⁵ Management learning through the exchange of common experiences is a new experience for Russian managers.

Contrary to the claim in the literature that describes the enterprise as a collective, Husted and Michailova argue that when it comes to knowledge sharing Russians are individualistic. They argue that Russians are not willing to share knowledge within the enterprise even when the resources have been invested in transforming the knowledge into an explicit and easily transferable state (i.e. information). They are concerned with protecting their individual competitive advantages and believe that accumulating knowledge supports their position in the organization and their further career development. Moreover, the strong departmentalization in Russian organizations makes

³¹³ Kenneth Husted and Snejina Michailova, "Knowledge Sharing in Russian Companies with Foreign Participation," *Centre for East European Studies*, Copenhagen Business School, 2000, 10.
http://www.cbs.dk/centres/cees/publications/cees_wp_00/wp31.pdf (January 2002).

³¹⁴ Gault and Hansen, "Knowledge Flows in the S and T System," 415.

³¹⁵ Husted and Michailova, "Knowledge Sharing in Russian Companies," 9.
http://www.cbs.dk/centres/cees/publications/cees_wp_00/wp31.pdf (January 2002).

the application of well-known techniques of sharing knowledge problematic in the Russian context.³¹⁶

Furthermore, the traditional hierarchy also affects Russian knowledge sharing. In contradiction to the ideal of the democratic minded leader, managers tend to have difficulties accepting that they can learn from employees from the lower levels of the organization. Consequently, they resist working in a group with people from hierarchically lower levels, for example in the context of management education and training programs.³¹⁷

Managerial Learning

A key question to be considered in managerial learning is what existing knowledge, including ways of thinking and practices, managers should be encouraged to 'unlearn' and what should be retained as a valuable basis.³¹⁸ Managerial learning carries very significant psychological and social connotations over and above its technical content. The transformation of Russian managerial behaviour may be more problematic when it is not simply a matter of accepting change, but also making difficult adjustments within their own organizations and communities. Moreover, Russian managers already hold defined roles within their organizations that affect their

³¹⁶ Ibid, 5-6.

³¹⁷ Ibid, 8.

³¹⁸ John Child and André P. Czegledy, "Managerial Learning in the Transformation of Eastern Europe," *Organizational Studies* 17, no.2 (1996): 174.

willingness to accept and act upon the new knowledge and accompanying values to which they are exposed in their learning processes.³¹⁹

In order for management education to be successful in Russia, trainers need to be sensitive to the traditional hierarchical structure and behavioural patterns of Russian managers. Moreover, simply bridging the knowledge gap will not induce Russian managers to implement the necessary changes to operate in a market economy if the new knowledge has no contextual meaning for them on an individual and an institutional level. The skills that are transferred have to be relevant to the current environment in Russia and compatible with the traditional values of Russian managers.

³¹⁹ Child and Czegledy, "Managerial Learning," 170-171.

CHAPTER 5

MANAGEMENT EDUCATION

Managerial training programs play an important role in Russia's transition to a market economy. As explained in the preceding chapters Russian managers lack the skills necessary to operate in a market economy. Subsequently, they have been participating in Western management-style training programs in order to develop skills such as marketing, finance and business planning. The sources of training range from Russian universities and academies to corporate training centres of Western corporations and training activities supported by grants from Western governments and institutions. Moreover, Western entrepreneurs are offering basic training activities and Western universities are sponsoring educational activities.

However, questions arise as to just how effective these training programs are in providing Russian managers with the relevant skills that will enable them to operate in the transition economy that exists in Russia today. Are training programs an effective vehicle of technology transfer? More specifically, are Russian managers assimilating their new knowledge and implementing changes within their organizations? Moreover, has the training had an impact on productivity and innovation in Russian industrial enterprises?

As discussed in chapter four developing effective Western training programs for Russian managers has been difficult since Western experts and Russian managers have a limited knowledge of each other's managerial experience and culture. Basic terms such as profit, retained earnings, assets, liability and investment capital were alien to the

Russian manager, as these terms had no relevance in the Soviet system. In the Soviet system the term business itself carried not quite ethical or legal connotations.³²⁰ Moreover, speculation, the resale of any state-produced goods at a higher price than first paid, was illegal and managers did not have to worry about distribution. Consequently, they did not consider these to be important issues; production output was the only issue that really mattered.³²¹

At the same time, however, it has also been important for Western training programs to respect and not devalue the experience and knowledge of Russian managers. Context-specific competencies need to be retained and appreciated by Western training programs and foreign managers. Child and Czegledy point out that many Eastern European managers were already well versed in some of the skills needed to participate effectively in foreign trade and within international networks. They already had experience developing personal business networks, as it was one of the essential skills that they had to develop in order to cope with the frequent failures in central planning.³²²

5.1. Gorbachev and Perestroika

The restructuring reforms instituted by Gorbachev in the mid-1980s included provisions for the training and retraining of Soviet managers. In 1988 the first Western-style business school was opened, subsequently the number of business schools throughout all parts of the former USSR mushroomed. By 1990 there were already 30

³²⁰ Stanislav Shekshnia, "Managing People in Russia: Challenges for Foreign Investors," *European Management Journal* 12, no.3 (September 1994): 303.

³²¹ Iris I. Varner and Carson H. Varner, "A Culture – Based Framework for Successful Business Training in Russia," *Human Resource Development Quarterly* 5, no.4 (Winter 1994): 363-365.

³²² Child and Czegledy, "Managerial Learning," 173.

management training centres and schools in Moscow alone.³²³ However, these schools varied tremendously in quality and facilities and were also considered to be too theoretical.³²⁴

In December 1990 the Soviet Association of Business Schools was established. The Association's purpose was to exchange ideas and information on all aspects of management education, identify and meet new needs, and develop contacts with business schools abroad.³²⁵ Gorbachev stressed that there was a need for foreign know-how in market mechanisms and set up the "Reform cadres" foundation to select candidates for training abroad.³²⁶ However, there was the problem of relating foreign management education to the precise needs of the Soviet enterprise. Participants complained that the foreign partners were unaware of the enterprise managers' real needs and the methods of implementing the programs had not been adapted to their culture.

In a 1990 interview with the Russian Journal *Ekonomika i organizatsiia promyshlennogo proizvodstva*, the director of a scientific-production association in Novosibirsk spoke about attending a management training school in the Federal Republic of Germany. He explained that the training program included market analysis, sales planning, marketing, and training in organization and labour incentives. He complained

³²³ M. Krushinskii, "Litsom k rynku: kadry dlia reformy," *Izvestiia*, 1 June 1990, evening edition, p.3.

³²⁴ Holden, Cooper, and Carr, *Dealing with the New Russia*, 99 and Djordjija Petkoski, *The Moscow Case: Private Sector Development Training and Consulting in Economies in Transition* (Washington: The Economic Development Institute, The World Bank, 1997), 20.

³²⁵ Holden, Cooper, and Carr, *Dealing with the New Russia*, 101.

³²⁶ M. Krushinskii, "Litsom k rynku: kadry dlia reformy," *Izvestiia*, 1 June 1990, evening edition, p.3.

that the Western trainers expected that they had no knowledge whatsoever of these subjects and at times explained things that were common knowledge.³²⁷

Case Study-Coventry Polytechnic Management Training Course

The Coventry Polytechnic in the UK was one of the many foreign educational institutions offering training to Soviet managers as part of perestroika. In January 1989 Coventry Polytechnic obtained financial sponsorship from the Barry Martin Group of Companies to conduct a short management course in Moscow for 200 leading Soviet industrialists. As a result, the Polytechnic negotiated a series of agreements with a cooperative centre in Alma-Ata, Kazakhstan, which was to research the hard currency enterprises and then to recruit them for training. The Polytechnic did a preliminary needs analysis prior to the training; the staff visited the republic and ascertained that their program would meet specific Soviet educational requirements. By July 1990, over 150 Soviet executives had attended the Polytechnic's management courses, which had been paid for in hard currency by their respective enterprises.³²⁸

Hibbert explains that the classroom work with Soviet managers revealed some insights into the problems of the enterprises. He states that the Polytechnic found that the Soviets preferred learning techniques based on formal presentations with a 'define answer approach' and that they had some difficulty adapting to the 'student-centred approach'. The hierarchical nature of Soviet management resulted in reluctance among

³²⁷ *Ekonomika i organizatsiia promyshlennogo proizvodstva (EKO)*, "Zapadnyi menedzher i sovetskii direktor," 16.

³²⁸ Hibbert, "Training Soviet Managers," 231-233.

senior managers to participate with their subordinates in student-centred activities such as role-playing.³²⁹

Furthermore, the managers regarded 'marketing' as the key to successfully exporting goods to the world market. However, they did not perceive the considerable difference in the quality of their own products versus those produced in the West. Hibbert explains that invariably they would bring along samples of their products and request information on potential customers only to be told that the product was not up to quality standards.³³⁰

The Polytechnic also found that Soviet managers were not interested in discussing the management problems that existed inside Soviet factories. Soviet executives were hardly going to talk about the methods that were used to fulfill production quotas in an overly controlled and rule-bound economy. Consequently, instructors used management training films dubbed into Russian that highlighted problems that were intrinsic to any large industrial organization.

Joint Ventures

The introduction of the Joint Venture Law in 1987 also gave Soviet managers access to Western managerial practices.³³¹ One of the principal reasons that the Soviets were attracted to joint ventures was that they were considered to be a strong source for managerial knowledge transfer. Joint ventures were expected to provide access to

³²⁹ Ibid, 233.

³³⁰ Ibid.

³³¹ Refer to Chapter 2 for further discussion of the law itself.

technology, training, management skills and marketing know-how that would allow firms to compete on the world market.³³²

Both the Royal Dutch Shell Group and Siemens offered managerial and business training through their joint ventures. The Royal Dutch Shell Group brought capital, expertise and equipment and also trained Russian engineers in business management, marketing, finance, quality control and safety procedures.³³³ Shell found that with its joint ventures in Russia they were introducing state-of-the-art equipment and training local staff in both technical and business skills. The company found the level of technical skills to be high, but commercial skills and know-how were almost non-existent. The company trained the local staff with the intention of reducing the ratio of Western experts to local employees.³³⁴

Siemens observed that although the main problems they encountered were the uncertain legal environment and the bureaucracy, they also had problems with the lack of business culture. Consequently, Siemens pursued a very active retraining policy, which included building teams of Eastern and Western colleagues, and sending Eastern employees to the West to gain experience. They also found that in terms of technical skills, the Easterners were theoretically more advanced than their western counterparts,

³³² Judith Thornton and Nadezhda N. Mikheeva, "The Strategies of Foreign and Foreign-Assisted Firms in the Russian Far East: Alternatives to Missing Infrastructure," *Comparative Economic Studies* 38, no.4 (Winter 1996): 102.

³³³ Margaret Sharp and Michael Barz, "Multinational Companies and the Transfer and Diffusion of New Technological Capabilities in Central and Eastern Europe and the Former Soviet Union," in *Technology of Transition: Science and Technology Policy for Transition Countries*, ed. David A. Dyker (Budapest: Central European University Press, 1997; distributed in the US by Oxford University Press), 117.

³³⁴ *Ibid.*, 107-108.

but lacked practical know-how. Siemens was positive about market potential, the quality of the workforce and its potential to learn a new management culture.³³⁵

5.2. The Post Soviet Period

When the centralized system collapsed in 1991 enterprise managers started developing investment proposals and knew that they had to build new buildings and buy new equipment in order to increase production. They argued that what they needed was financing; they sought foreign investment and credits from the government because the interest rates of the commercial banks were too high. However, they lacked an understanding of supply and demand; they argued that they would identify their customer base once they had completed their new investments and increased production.³³⁶

There were limited results in cases where managers had undertaken initial restructuring measures, as both relevant information and managerial skills were in short supply. Managers were responsible for a number of restructuring issues that could be addressed without substantial new investments including organization, new ownership structures, corporate finance, cost-cutting and marketing. However, many made uninformed, unsupported, and consequently unsuccessful efforts to adopt the best Western practices.³³⁷

In a 1994 staff appraisal report for a management and financial training project the World Bank assessed that Russian managers needed training in business strategy, marketing and selling, costing and pricing, financial management and control, export

³³⁵ Sharp and Barz, "Multinational Companies," 117-118.

³³⁶ Petkoski, *The Moscow Case: Private Sector Development*, 17-19.

promotion, and corporate governance. Its assessment also concluded that there was a need for retraining in production, production organization, productivity and quality management, and human resource management. Moreover, the report outlined the requirements necessary for Russian enterprises to operate successfully in a market economy. These included business and organizational diagnosis, business planning, enterprise organization and restructuring, business partner identification, the forming of strategic alliances, market development, the changing of incentive/motivation patterns, and corporate finance.³³⁸

The World Bank report argued that the domestic management and financial training system in Russia required thorough restructuring and reorientation to serve a market economy, but lacked the resources and policy to do so. It recognized that in the short-term most managers were looking for training and advice that was problem-and action-oriented rather than long-term planning. Russian managers wanted training that would have a direct impact on the improvement of their enterprises' capabilities, competitiveness and business performance.³³⁹

However, Czinkota draws attention to fact that as well as the learning issues associated with the transition to a market economy, there was also a need for skills to improve managerial behaviour. He outlines the results of a field study conducted in 1995-1996 that investigated the business education needs in Russia. The study consisted of four focus group sessions and interviews with 68 individuals. The participants were

³³⁷ Ibid, 19-20.

³³⁸ World Bank, "The Russian Federation - Management and Financial Training Project: Staff Appraisal Report," *World Bank Project Database*, 23 November 1994, 10-11.
www.worldbank.org/sprojects/Project.asp?pid=P008826 (August 2002).

³³⁹ Ibid.

managers of Russian industrial enterprises and banks, educators and government representatives, and Russian and Western managers working for Russian enterprises. Problem solving, decision making, customer orientation, team building and communications abilities were rated highest in terms of learning needs for managerial behavioural change.³⁴⁰

5.3. Managerial Training Programs

When the Soviet Union collapsed in 1991 a number of Western companies offering business education flocked to Russia to teach management know-how and conduct business seminars. However, many left disappointed due to the slow progress of the changes and the cultural hurdles that they faced. Many Western trainers did not understand the nature of the administrative structures that were developing in Russia.³⁴¹

The 1994 World Bank report outlined some of the problems with the training programs offered by donor institutions just after the collapse of the Soviet Union. These programs were dispersed and tended to be directed towards specific institutions. Much of the assistance was devoted to financing international experts and study tours abroad with little focus on providing in-country training, developing Russian trainers, and adapting training materials to the Russian context. Moreover, the report also recognized the complaints of Russian participants and agreed that some of the assistance had been

³⁴⁰ Czinkota, "Russia's Transition to a Market Economy," 73.

³⁴¹ Varner and Varner, "A Culture – Based Framework," 362.

designed without adequate involvement of Russian experts or recognition of Russian strengths.³⁴²

Furthermore, the World Bank report outlined the main characteristics of an effective management training program. These characteristics include carefully targeted training, decentralized planning, strong linkages to the enterprise, quality through standards and on-going staff development with systematic evaluation results. A successful training program also needs a steady source of financing, strong institutional management and sustained investment in developing institutional capacities.³⁴³

Unfortunately, many Western programs have assumed that Eastern European managers need the same set of competencies that are needed to operate in a standardized market economy.³⁴⁴ However, in established market economies the necessary mechanisms and customer behaviour are ingrained, henceforth, business knowledge and acumen can continuously adjust to new conditions. The Russian economy, on the other hand, does not have the established market mechanisms and the collapse of socialist philosophical tenets did not result in an immediate adoption of new market-oriented ones such as profit, private property, competition, and risk.³⁴⁵

One of the main obstacles that Western educators have found when designing and delivering effective training courses is the nature of a country in transition. The type of system that has been developing has not been clear to either Russian or Western management educators. Moreover, Western assumptions about management have not

³⁴² World Bank, "The Russian Federation - Management and Financial Training Project," 21-22.
www.worldbank.org/projects/Project.asp?pid=P008826

³⁴³ Ibid, 25

³⁴⁴ Child and Czegledy, "Managerial Learning," 172.

corresponded to Russian assumptions; there has been a lack of understanding of managerial learning in the context of the transition economy and a failure to recognize that managerial tasks and their goals had to be redefined.

Consequently, adapting Western management know-how and its underlying concepts into post Soviet terms of reference has been a challenge.³⁴⁶ There has been a difference in Western trainers' intentions and the Russians' expectations. Western trainers have tended to teach methods while the participants have expected to be told the facts and procedures to follow. Moreover, managers are more interested in practical, easy management methods that they can apply directly to their situation.³⁴⁷

Russian managers have blamed external factors for most of the problems that their enterprises are facing. Since the collapse of the Soviet system enterprise managers have primarily been concerned with survival and securing direct or indirect government support. Moreover, they have complained about the loss of links with customers and suppliers from the other republics of the former Soviet Union (FSU), high inflation, and a banking system that has not been able to support the enterprises' regular business activities.³⁴⁸

Enterprise managers have also been interested in attracting foreign investors and issuing new shares, but generally have not been thinking about restructuring and improving the profitability of their enterprises. However, they have found their own skills to be of little help for functioning in a market economy. Managers generally have

³⁴⁵ Czinkota, "Russia's Transition to a Market Economy," 74.

³⁴⁶ Holden, Cooper, and Carr, *Dealing with the New Russia*, 107 and Child and Czegledy, "Managerial Learning," 176.

³⁴⁷ Czinkota, "Russia's Transition to a Market Economy," 76-77.

little to no knowledge of business plans and lack an understanding of the role of managers, owners and investors in the ownership structure in a market economy.³⁴⁹

Varner and Varner conducted two series of seminars aimed at training Russian managers. The participants of the first series were city, regional government officials involved in economic development and foreign investment and the second group were managers and executives from large companies that were formerly government-owned but were in the process of becoming private. Their study confirms that environmental factors are of major concern and impediments to change within the enterprises. They found that most Russian managers were worried about political instability and the instability of business regulations as well as the fact that the traditional bureaucracy is slow to change. Moreover, the study found that managers were also concerned about the negative effect these factors were having on foreign investment.³⁵⁰

Since the collapse of the centralized system, enterprise managers have been responsible for securing resources, determining prices, setting production targets, and establishing their own markets and distribution networks. Western training programs have been expected to provide Russian enterprise managers with the skills necessary to carry out their new responsibilities. However, enterprise managers and trainers alike have observed difficulties and obstacles in regards to both the implementation of the new knowledge and the training itself.

Russian managers and Western trainers seem to perceive the obstacles to organizational change and industrial development a bit differently. The managers

³⁴⁸ Petkoski, *The Moscow Case: Private Sector Development*, 17-19.

³⁴⁹ Ibid.

themselves focus primarily external factors, including political uncertainty, weak legislation and a lack of financial and material resources when discussing the dominant obstacles to change and development in their enterprises. Although Western management trainers recognize these external barriers they also consider internal factors that hinder the implementation of change within enterprises, such as the traditional hierarchy within the system, one-man leadership and the lack of interdepartmental coordination, including a lack of knowledge sharing.

The problems of the training programs themselves range from differences in the expectations of both managers and trainers to the lack of relevance of the training to the Russian situation. Although managers and trainers agree that the training must focus on the skills that are necessary in a market economy, they do not always agree on what these skills entail. For instance, they all agree that marketing, sales and financial management skills important, but Russian managers do not always understand the importance of business strategy.

5.4. Case Study-The National Training Foundation

The Russian Government set up the National Training Foundation (NTF) in 1994 for the purpose of implementing large-scale education projects. The NTF is patterned after Western private foundations and government-sponsored institutions. It is a partnership between government and the private sector and functions as a non-governmental, independent organization. Subsequently, it maintains separate interests from the sectoral training infrastructure and ensures the involvement of the private sector

³⁵⁰ Varner and Varner, "A Culture – Based Framework," 362.

in its management. Moreover, it is a partially decentralized and non-profit organization.³⁵¹

The NTF's main objective is to assist in the creation of efficient education, training and retraining of specialists. It is responsible for efficiently implementing projects that are financed by the Russian government, international financial institutions, and bilateral and multilateral intergovernmental cooperation programs in education and training. It's current activities include support of education restructuring efforts, the implementation of new education models and standards, and the development of Russian learning materials and courses that meet international standards. The NTF is an associate member of the European Foundation of Management Development (EFMD) and has established contacts with European organizations involved in management development. The NTF has already implemented a number of projects in cooperation with the IBRD, TACIS, and the European Training Foundation.³⁵²

The National Training Foundation's Survey Results

In 1996 the NTF published the results of two surveys on management development in Russia. The two surveys were intended to provide insights into the perceptions of the effectiveness of Russian managers and the perceptions of training needs. NTF Survey 1 aimed to identify the key barriers constraining the development of Russian managers. The survey was conducted with the help of Centre for Sociological Research of Moscow State University and solicited opinions of industrial managers,

³⁵¹ World Bank, "The Russian Federation - Management and Financial Training Project," 34. www.worldbank.org/sprojects/Project.asp?pid=P008826

³⁵² The National Training Foundation, *web site*, www.ntf.ru/english/index.htm (19 March 2003).

representatives of educational institutions providing management education, government officials with legislative and executive competencies, and representatives of sponsoring organizations. There were 403 respondents in total out of which 235 were industrial managers.³⁵³

The Russian managers were polled about what they considered to be the greatest challenges to operating in the transition economy:

Chart 5.1. The Challenges of Russian Managers

1. National Training Foundation, "Barriers on the path of the development of effective management: report of results of a survey," (Moscow: National Training Foundation, 1996) quoted in Holden, Cooper, and Carr, *Dealing with the New Russia*, 136.

Chart 5.1 illustrates that in accordance with the learning needs explained earlier in the chapter, marketing received the greatest response; over half of the respondents considered it to be a challenge. Less than half of the respondents indicated that securing financial resources was a challenge. This is slightly surprising given that the literature suggests that throughout the 1990s the government was still supporting many enterprises.

³⁵³ Holden, Cooper, and Carr, *Dealing with the New Russia*, 130.

Moreover, it does not seem to follow given importance placed on attracting foreign investment and the reported problems that enterprises have incurred.³⁵⁴

Less than 30 percent saw corporate strategy as a challenge. This can be explained by the fact that although it is considered important by Western managers and trainers, the literature suggests that Russian managers do not consider it an important issue. Only 20 percent cited supplier relations as a problem. One possible reason for this is that most enterprise managers had established supply arrangements during the Soviet period. Less than 20 percent considered the introduction of new technologies to be a challenge. However, there is also little evidence in the literature to suggest that innovation and product improvement have become priorities.

The survey also outlined perceived obstacles to management development in Russia. Environmental factors were considered to be the greatest barriers to managerial development. [See Appendix 6]³⁵⁵ In accordance with the Varner and Varner seminars cited earlier, the country's political and economic instability was considered to be the greatest obstacle to management development in Russia. Approximately 90 percent of the total respondents and just over 90 percent of the managers considered it to be either an important or a very important obstacle. The tax system, the impossibility of long-term planning and the unsuitable legislative foundation were also considered to be very important environmental obstacles. As discussed in chapter two managers consider these important obstacles as they act as deterrents to foreign investment.

³⁵⁴ Refer to chapter 2 for more discussion of the issue of foreign investment

³⁵⁵ National Training Foundation, "Barriers on the path of the development of effective management: report of results of a survey," (Moscow: National Training Foundation, 1996) quoted in Holden, Cooper, and Carr, *Dealing with the New Russia*, 131-132.

Moreover, the lack of support by the government was considered an important obstacle to management development by over 50 percent of the respondents. More than 60 percent of the total felt that the underestimation of importance of instilling effective management systems was acting as an obstacle and 58.2 percent thought that there was a lack of interest from government officials. [See Appendix 7]³⁵⁶

The lack of adequate educational resources was not generally considered to be an obstacle to management development. [See Appendix 8]³⁵⁷ Although more than 50 percent cited difficulties in locating qualified managers as an obstacle, less than half of the respondents felt that the absence of adequate literature and insufficient number of education centres acted impeded management development. This can be explained by the fact that there is not a lack, but rather an abundance of resources. The problem is not in the quantity, but the quality and coordination of material and programs. Moreover, only 38 percent of managers felt that the absence of literature and information on management development and an insufficient number of education centres were important obstacles.

All of the aforementioned factors are external to enterprises. The absence of tradition in Russian management was the only factor rated that reflected internal obstacles to development within the enterprises themselves. Chart 5.2 illustrates that contrary to the literature written on Soviet management and management education, less than 50 percent of the respondents felt that this was an important obstacle. However, 80 percent of respondents did at least recognize that it was an obstacle.

³⁵⁶ Ibid.

Chart 5.2. The Absence of Tradition in Russian Management as an Obstacle to Management Development in Russia.

2. National Training Foundation, "Barriers on the path of the development of effective management," quoted in Holden, Cooper, and Carr, *Dealing with the New Russia*, 131-132.

The results of the National Training Foundation's survey indicate that the environmental factors are considered to be the most important obstacles to management development. There was little variance in the responses in the other categories; the responses were rather evenly split between important, minor and not an apparent obstacle. However, the four environmental factors, particularly the political and economic instability, were considered to be important barriers to management development by considerably more than 50 percent of those surveyed.

³⁵⁷ Ibid.

5.5. Case Study-The Yeltsin Democracy Fellowship Program

In June 1992, during President Yeltsin's visit to Canada, Prime Minister Mulroney announced the launching of a decade long program of training for Russian specialists in Canada. The Canadian International Development Agency was responsible for the general governmental coordination of the program, the University of Saskatchewan was authorized to manage the trust fund and Universalis (formerly SIGMA VI) was to settle organizational and technical matters. Under this program, approximately 100 young Russians from both the public and private sectors came to Canada for short-term training each year. Training was in specific thematic areas with short-term practical attachments to Canadian public and private sector organizations.³⁵⁸

Although the Yeltsin Democracy Fellowship Program (YDFP) was officially launched in 1992 the project had problems securing and maintaining a private Russian partner. In 1997 it became part of the Presidential Managers' Training Program (PMTP). In addition to this large-scale management training program, the Russian Government set up the Federal Commission on Organization of Management Training for Enterprises in the National Economy of the Russian Federation. The Federal Commission became the private partner in the YDFP.³⁵⁹

³⁵⁸ Background information provided by YDFP in February 2003, for general information refer to the CIDA web site: www.acdi-cida/CIDAWEB/webcountry.nsf/VLUDocEn/Russia-Projects, multisectoral link.

³⁵⁹ The Programme on Training Managers and Executives for Enterprises of National Economy of the Russian Federation, *web site*, <http://skpk.hse.ru> (26 February 2003).

The Yeltsin Democracy Fellowship Program's Survey Results

In 2002 The Yeltsin Democracy Fellowship Program administered surveys to 135 fellows who had completed their training in Canada. The survey results were presented as part of the information and analytical materials relating to the results and efficiency of the Yeltsin Democracy Fellowship Program presented at a conference in 2002. The survey considered several aspects of management training including the impact of the training on management development in Russia, obstacles to management development, including the relevance of the training itself.

The survey questions were quite general for measuring the usefulness of the training, the possible answers ranged from a very significant extent to no impact at all. The impact of the training on practical job activities was considered significant by fewer than 60 percent of the respondents. However, 75.5 percent of respondents stated that the training helped them significantly in acquiring new knowledge that was necessary for their everyday work. [See Appendix 9]³⁶⁰ Consequently, this implies that the respondents were able not only to use their training, but they were able to adapt it to help them acquire new knowledge relevant to their own work.

However, the impact of the training on management development itself was not thought to be as strong. [See Appendix 10]³⁶¹ On an individual level almost half of the respondents felt that the training only had a significant impact on their ability to build new management techniques, the other thought to that it had only a small impact. However, over 80 percent of respondents felt that their attitudes towards their work had

³⁶⁰ The Yeltsin Democracy Fellowship Program, "2002 Survey Results," Information provided by the YDFP (26 February 2003).

³⁶¹ Ibid.

changed as a result of the training. 50 percent felt that their attitudes had changed significantly and that they had gained a greater understanding of their goals and objectives, but 30 percent felt their attitudes had changed only to a very small extent.

However, chart 5.3 indicates that on an organizational level the training was thought to have much less of an impact. The answers were split between all categories, but more than 50 percent thought that it had only had some impact on the management development in the organization itself. Only 3 percent of the respondents felt that it had had a significant impact, 50 percent thought that it had some, whereas 25 percent felt that it had had no impact at all.³⁶²

Chart 5.3. The Impact of Training on Management Development at the Organizational Level

% of respondents, n=135

3. The Yeltsin Democracy Fellowship Program, "2002 Survey Results," Information provided by the YDFP (26 February 2003).

³⁶² The Yeltsin Democracy Fellowship Program, "2002 Survey Results," Information provided by the YDFP (26 February 2003).

The survey also asked respondents to assess the whether factors were stimuli or impediments to management development. The skill level within the organization was not considered a major obstacle to management development. The majority of the responses were split between helpful and irrelevant. [See Appendix 11]³⁶³ This corresponds with the earlier survey published by the Fellows of the Yeltsin Democracy Fellowship program [see chart 5.4], in which fewer than 20 percent of the respondents cited lack of trained personnel as an obstacle to management development.

Chart 5.4. Obstacles to Management Development

4. Results from Fellows of the Yeltsin Democracy Fellowship Program Survey published in the Fellows of the Yeltsin Democracy Fund newsletter. www.pf-club.org/vestnik2/02.htm translated by author. The source has several limitations, as it is merely a small sample of results that have been reproduced for benefit of alumni. However, these early responses do reflect the arguments made in the literature and are also reiterated in later surveys.

³⁶³ Ibid.

Moreover, in accordance with the literature and the challenges ranked by managers in the NTF survey the condition of financial and material resources was considered to be an important obstacle. Over 40 percent of the respondents felt that the condition of the resources prevented management development. Chart 5.4 illustrates that this also corresponds with the earlier survey in which over 60 percent of the respondents surveyed felt that the lack of financial and material resources was a major obstacle.

The attitudes within the organization were not considered to be impediments to management development. Over 40 percent of the respondents felt that the attitude of their superiors was actually helpful, and 40 percent felt that it was irrelevant. Just over 30 percent thought that the attitude towards change in their organization was helpful to management development and fewer than 40 percent of respondents felt that it was irrelevant. [See Appendix 12]³⁶⁴

The high levels of responses that indicate that attitudes are irrelevant reflect the fact that managers themselves do not consider internal factors within the organization of the enterprise important barriers to management development. The management training literature and Soviet management literature disagrees and argues that positive attitudes towards change in the organization is in fact very important for successful management development.

In these surveys the relevance of training to both the Russian environment and the respondents own working environment was thought to be important to management

³⁶⁴ Ibid.

development. Over 60 percent felt that the relevance of the training to Russian circumstances was helpful in applying their new knowledge and fewer than 50 percent of their respondents felt that the relevance to local working environment helped them implement their new knowledge. [See Appendix 13]³⁶⁵

Keeping in mind that the above answers are inflated as they reflect only a small sample of respondents' opinions, the general consensus among those surveyed was that the training had a positive, albeit sometimes limited, affect on management development. The lack of qualified human resources was not considered to be a major issue. This can be explained by the fact that the Russian workforce is generally regarded to be very highly skilled. However, the responses indicate that the lack of financial and material resources is a major obstacle to management development.

5.6. Case Study-The Presidential Managers' Training Program (PMTP)

The Presidential Managers' Training Program training was launched by the Presidential Decree on "Training Managers and Executives for Enterprises of National Economy of the Russian Federation" issued on 23 July 1997, and by a decree signed on July 15 2000 the PMTP was to continue until the year 2003. Its main objectives were to train a new generation of managers and executives who are able to operate in a market economy, to assist the processes of enterprise restructuring and modernization of the Russian economy, and to establish and develop contacts between Russian and foreign companies.³⁶⁶

³⁶⁵ Ibid.

³⁶⁶ Background information provided by the Yeltsin Democracy Fellowship Program (26 February 2003).

In the long-term the PMTP was to develop management systems and processes and create a critical base of highly skilled and competent managers and executives. Short-term objectives included setting up a sustainable system of management training, introducing modern practices in management style and thinking, upgrading the skills and retraining 5,000 managers and executives annually and setting up a 'Federal Reserve of Management Cadre' with a comprehensive data base.³⁶⁷

Between 1998-2001 more than 19,000 trainees graduated from the PMTP's professional qualifications courses in management, marketing and finance at the Russian training institutions and almost 5,800 managers completed internships in 15 foreign countries, including Canada through the Yeltsin Democracy Fellowship Program. Participants were high-medium level managers of private, public and state companies. They were to be university graduates between the ages of 25-40 years old, with at least one year of managerial experience. They came from a variety of sectors including industrial, agricultural, trade and services rendering enterprises, and venture and financial companies with a priority for companies undergoing restructuring or implementing innovative and investment projects.³⁶⁸

The PMTP's Survey Results

Between 1998-2000 the Russian Ministry of Economic Development and Trade administered surveys of the PMTP in order to assess the impact, efficiency and results of the program. 8,000 participants were interviewed and 96 percent of the respondents

³⁶⁷ The Programme on Training Managers and Executives for Enterprises of National Economy of the Russian Federation, *Web Site*, <http://skpk.hse.ru> (26 February 2003).

stated that they obtained new knowledge and skills.³⁶⁹ A review of the survey results claimed that after 1998, enterprises started to think about making their products more competitive, raising the quality and reducing production costs. There also appeared to be a shift in attitude of the managers and a strategic attitude to management appeared to be developing. Moreover, the priorities of enterprise executives seemed to shift from quantitative to qualitative.³⁷⁰

In 2002 the PMTP conducted a follow-up survey. 1418 participants were surveyed, 37 of them had been trained in Canada. It is important to keep in mind that the respondents of the survey were all between 25 and 40 years of age. The results of this survey were a small representation of a broader picture, but they provide a larger context for the results of the surveys done by the Yeltsin Democracy Fellowship Program. The survey yielded more concrete results as it focused on the nature of the actual changes that were being implemented as a result of the training. Consequently, it yielded specific answers to questions about management development, production issues and the relevance of the training to Russian enterprises.

From the results it can be deduced that managers are aware of the importance of organizational changes within their enterprises. Charts 5.5 and 5.6 illustrate the nature of the both the organizational changes that managers were considering, but had not yet implemented as well as changes that they had already implemented.

³⁶⁸ Ibid.

³⁶⁹ "English summary of Marchenko's review of president program surveys June 2002", Information provided by YDFP (26 February 2003).

³⁷⁰ Ibid.

Chart 5.5. Considered Organizational Changes within Enterprises

Chart 5.6. Implemented Organizational Changes within Enterprises

5. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

The results indicate that over 60 percent of respondents were considering or had already implemented changes to raise the effectiveness of the company's management. Fewer than 60 percent indicated that they were planning to change the actual management structure of the enterprise. Moreover, over 50 percent of the managers indicated that they

were considering changes to improve relations with their workforce. These responses reflect the fact that managers are interested in improving the management structure.

The survey results indicate that the training has had a positive impact on the development of the skills needed to fulfill the new responsibilities of Russian managers. The transition to a market economy has meant that managers are now responsible for the sale and distribution of their own products. Charts 5.7 and 5.8 show the impact of the training programs on management development. Chart 5.7 draws attention to the actions that managers have undertaken to fulfill their new responsibilities.

Chart 5.7. Practical Actions Planned or Undertaken to Fulfill New Responsibilities

6. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

Only 30 percent of the respondents indicated that they were taking or planning to take practical actions to develop or extend their sales network and just over 20 percent indicated that they were search for and developing new distribution channels. However, just over 50 percent of respondents indicated that the as a result of the training they had plans to take or already undertaken measures to intensify relations with clients. This is

quite significant, as under the Soviet system the enterprises were not linked with the users. As discussed in chapter one Soviet industry adhered to the linear innovation model which did not allow for feedback from the users back to the producers.

Chart 5.8 illustrates that the training is helping managers develop their market skills. Over 50 percent of respondents indicated that they were taking actions to improve their market activity, just over 40 percent of respondents were interested in developing a new business strategy and 40 percent had indicated that they had started advertising.

Chart 5.8. Practical Actions Planned or Undertaken to Develop Market Skills

7. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

The survey also inquired about the impact of the training on production development. Chart 5.9 demonstrates that although there is some consideration by managers to implement changes to production, the survey results indicate that managers do not consider production development to be their top priority. Just over 30 percent of managers were considering changes that would improve their competitive advantage. Fewer than 30 percent were interested in diversifying their production activity and only

20 percent were interested in diversifying their product lines. This is indicative of the fact that enterprises are not yet in a position to focus on development and innovation.

Chart. 5.9. Considered Changes to Production

8. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

However, charts 5.10 and 5.11 illustrate that the training is having some impact on the development of technological capabilities. 40 percent of the respondents indicated that they were planning to take or had undertaken actions to reduce production costs. Fewer than 40 percent stated that they were increasing output and just over 40 percent had taken actions to increase product quality. In accordance with this just over 40 percent indicated that they had plans to implement new technologies. Over 30 percent of the respondents indicated that they were planning to retool their organizations and/or develop new products. This indicates that as a result of the training at least some managers are taking steps to improve their production capacity and become competitive.

Chart 5.10. Practical Actions Planned or Undertaken to Improve Production Capacity

Chart 5.11. Practical Actions Planned or Undertaken to Improve Technological Capabilities

9. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

In addition to surveying the impact of the training on the activity of the managers, the PMTP also surveyed the relevance of the training to management development in Russia. The questions were quite specific and can be separated into four different areas: general management, marketing, financial management and personnel management

training. [See Appendices 14-17]³⁷¹ Just over 30 percent of respondents felt that the training in these specific areas were of any relevance to their circumstances. Out of the four areas, the financial management training was thought to be the least relevant. Just over 20 percent felt that the calculation of costs was relevant to their situation, and fewer than 20 percent indicated that analytical accounting, taxes and investment analysis training was relevant to their management development. This corresponds with the discussions earlier in the chapter that indicated that the expectations of the Russian participants and the Western trainers are often different. Moreover, it also supports the claim by Russian participants that Western trainers do not have an understanding of the current economic circumstances in Russia.

Comparatively, the relevance of training issues such as business plans, strategic planning, the organizational structure of the company, market research, working and management teaching and upgrading received the greatest number of responses. The suggested changes and practical actions taken by the managers to improve their enterprises also support the relevance of the training in these areas. The survey revealed that the training did have some impact, albeit a limited one, on management development and even had positive effects on production development.

5.7. Concluding Remarks

The surveys considered in the three case studies focused on different aspects of the impact of Western training programs on management development in Russia. The 1996 National Training Foundation (NTF) survey established the main concerns of the

³⁷¹ The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," (Information provided by YDFP (26 February 2003)).

managers. The survey indicates that managers were primarily concerned with surviving in a competitive economy as marketing and the securing of finances were the cited as the top concerns. The NTF survey also revealed that environmental factors are considered to be the greatest obstacles to management development.

In comparison, the Yeltsin Democracy Fellowship Program (YDFP) surveys also revealed that the lack of adequate resources were a great concern for Russian managers. The survey data indicated that the condition of financial and material resources was considered to be an obstacle to management development. The YDPF surveys were quite general; consequently, they provide only limited insight into the impact of the training. Overall, the surveys revealed that the Western training is having a positive, albeit small, impact on management development of its participants.

The Presidential Managers' Training Program on the other hand, provided more concrete evidence of the impact that training programs are having on management development. Moreover, the data also revealed that the participants of the program are considered production issues as well as marketing issues. They revealed that cost cutting measures are being taken and that managers are interested in quality improvement. Moreover, the fact that a relatively large number of managers indicated that as a result of their training they are now working closely with their clients indicates that a new innovation model is starting to develop in Russian industry.

None of the surveys directly addressed the issue of the hierarchical structure within Russian enterprises. The PMTP survey indicated that managers are implementing changes to the organizational structure, but nothing specific was mentioned. Moreover, contrary to the literature and perspectives of the Western managers themselves, none of

the surveys revealed the hierarchy to be an obstacle in management development. In fact, in the YDFP survey managers indicated that the attitudes of their superiors were either helpful or irrelevant to implementing change.

It is important to keep in mind that positive responses for all three surveys are most likely inflated and that the answers reflect the opinions and therefore, backgrounds, of the participants. However, despite the limitations, including their limited size and scope, all of the surveys support the claim that Western training programs are having some impact on management development in Russia.

CONCLUSION

The transition from a centrally planned system to a market economy has been difficult for Russian industrial enterprises. It was expected that the new competitive environment would motivate enterprise managers to increase innovative activity, improve efficiency and raise the quality and level of productivity. Moreover, the shift from the transfer of equipment to the transfer of Western technical assistance, including the transfer of technical know-how and much needed capital, would assist in the development of the private sector. However, given the legislative uncertainty and financial instability throughout the 1990s, enterprise managers concentrated on short-term survival goals rather than improving productivity.

Privatization has shifted the responsibility of attracting Western technical assistance to the enterprises themselves. However, the political and legislative environment has not been conducive to the transfer of technical assistance to Russian enterprises. In the mid-1990s foreign investors complained that Russian enterprise managers lacked the necessary skills to operate in a market economy and that the legislation in Russia did not protect their rights or their investment. By the end of the 1990s the Russian Government had started taking measures to improve the environment for foreign investors and train enterprise managers.

Throughout the 1990s the legislative and political environment continued to impede innovation. Implementing institutional changes, such as the restructuring of administrative system, privatizing State enterprises and the development of financial institutions, as well as securing technical assistance to aid in the process, took priority

over the promotion of innovation. Moreover, the dismantling of the planning system meant not only abolishing the previous incentive structure for production, but also the elimination of a guaranteed market for industrial products.

The incentive structure has been replaced with survival motivation generated by the presence of foreign competitors, as well as the enterprises' need to attract foreign investors. However, R and D activities have not yet been brought together with production. In many cases, the privatization of R and D institutes has resulted in the severing of established ties with specific enterprises and most enterprises have not had the financial means to develop their in-house R and D facilities. However, in the late 1990s government officials started to focus their attention on developing science and technology policy and a national innovation system as a means to support and promote R and D activities.

In 2001 Andrey Svinarenko, the Deputy Minister for Industry, Science and Technology of the Russian Federation, and Deputy Chairman of the Federal Commission on Organization of Managers' and Executives' Training for Enterprises of the National Economy of the Russian Federation, stated that:

The main obstacles to production and development in mid-term and long-term perspectives are the scarcity of resources and low competitiveness of national products. Therefore, in order to attain constant growth in production, satisfy the demand on internal and external markets and to ensure Russia's economic security, we need to take the innovative path and gradually increase efficiency of production, as well as competitiveness of our products.³⁷²

Enterprise managers have recognized the need to implement innovations and improve their production quality in order to survive in the new competitive environment.

³⁷² Andrey Svinarenko, Statement made at the annual conference of the Presidential Program Regional Alumni Associations and Regional Commissions (21 December 2001)
<http://skpk.hse.ru/english/conference/211201/annex4.html> (26 February 2003)

Moreover, managers realize that they need to improve the productivity in order to attract foreign investment.

Although it appears that Russian managers have, to a certain extent, successfully assimilated and adapted the knowledge transferred through Western training programs, it is rather premature to conclude that training programs have had a significant impact on productivity and innovation in Russian industrial enterprises. The survey evidence does support the claim that Western training programs are having some impact on management development in Russia. The survey evidence reflects the fact that change within enterprises has been slow. In most cases, less than half of managers surveyed responded positively to questions about implementing change. The political and economic instability and lack of financial resources were cited as the greatest obstacles to management development.

The survey evidence also reveals that training programs are having an impact on production. Although marketing issues are of primary importance, managers are also concerned with improving production capacity, cutting costs and increasing product quality improvement. Moreover, managers are now concerned with the 'users' of their products and are improving relations with their clients. This indicates that the linear innovation model that the Soviets adhered to is changing and a new innovation model is starting to develop in Russian industry.

It is apparent that quality and appropriateness of the training has improved since the early 1990s. That being said, Russian managers now have a greater understanding of market forces than they did in 1991. Most of the respondents attributed the problems of applying their new knowledge to external forces, including political and economic

uncertainty, rather than to adaptability of the knowledge to Russian circumstances. Consequently, training programs that are sensitive to the transition environment appear to be an effective form of technology transfer. Both the surveys and legislation adopted by the government indicate that there is continued national support for management training in Russia.

Considerations for Future Study

A more indepth study of The Presidential Managers' Training Program would yield more conclusive results of the effectiveness of the managerial training as a vehicle of technology transfer. The program is currently in the process of wrapping up and it is sure to be evaluated over the next few years. The program provided internships in 15 donor countries and also supported domestically run training facilities. Analysis of the data from the donor countries as well as the program as a whole would provide useful insights into the impact of managerial training on Russian industry.

The impact of managerial training programs could further be illustrated by factoring the age of the participants. The participants of the PMTP, which included the participants of the Yeltsin Democracy Fellowship Program, were all between the ages of 25 and 40. It would be interesting to see the comparison of the results of their findings with that of a program that has trained managers of all ages. There is the hypothesis that change will not occur under the old guard, especially with managers who hold the same positions as they did before the collapse of the system.

Other future study considerations include the sectoral analysis of training programs, the impact of technical training provided by joint ventures, and measuring the impact of training in Russian industry through economic indicators.

The Technology Transfer Process

1. Michael Barz, "Foreign direct investment and technology transfer in Eastern Europe: the case of Russia", doctoral thesis, University of Sussex, 1996, as adapted and extended from Wei Liu, "International technology transfer and development of technological capabilities: a theoretical framework", *Technology in Society*, vol. 17, no.1, 1995: 103-120, in Margaret Sharp and Michael Barz, "Multinational Companies and the Transfer and Diffusion of New Technological Capabilities in Central and Eastern Europe and the Former Soviet Union," in *Technology of Transition: Science and Technology Policy for Transition Countries*, ed. David A. Dyker (Budapest: Central European University Press, 1997; distributed in the US by Oxford University Press), 97.

The Technology Transfer Process¹

Typical organization of civilian industrial R and D in the USSR

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2. Viacheslav Alimpiev and Alexander Sokolov, "The Institutional Structure of Applied R and D," in *Russian Applied Research and Development: Its Problems and Its Promise*, ed. Leonid Gokhberg, Merton J. Peck, and Janós Gács (Laxenburg, Austria: The International Institute for Applied Systems Analysis, 1997), 37.

A Vicious Circle

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3. Ronald Amann, "Technological Progress and Soviet Economic Development: Setting the Scene," in *Technical Progress and Soviet Economic Development*, ed. Ronald Amann and Julian Cooper (New York: Basil Blackwell Ltd., 1986), 21.

Appendix 4

Innovation Expenditure by Type of Innovative Activity: 1995 (%)

4. Leonid Gokhberg and Irina Kuznetsova, "Specificities of Innovation Activity in Russian Industry," in *Innovation and Structural Change in Post-Socialist Countries: A Quantitative Approach*, ed. David A. Dyker and Slavo Radošević (Dordrecht, the Netherlands: Kluwer Academic Publishers, 1999), 296.

The Soviet Management Structure: the STU in the STU in the STU

5. Charalambos Vlachoutsicos and Paul R. Lawrence, "What We Don't Know About Soviet Management," *Harvard Business Review* 68 (November - December 1990): 52.

The Soviet Management Structure: the STU in the STU in the STU⁵

Appendix 6

**Environmental Obstacles to Management Development in Russia:
Results of the National Training Foundation Survey 1**

Political and economic instability

% of all respondents, n=403

% of industrial managers, n=235

Impossibility of long-term planning

% of all respondents, n=403

% of industrial managers, n=235

6. National Training Foundation 'Barriers on the path of the development of effective management: report of results of a survey', Moscow: National Training Foundation, 1996 in Holden, Cooper, and Carr, Dealing with the New Russia: Management Cultures in Collision, Chichester, England: John Wiley & Sons Inc, 1998, 131-132.

Existing tax system

% of all respondents, n=403

% of industrial managers, n=235

Unsuitable legislative foundation

% of all respondents, n=403

% of industrial managers, n=235

Appendix 7

**Lack of Support as an Obstacle for Management Development in Russia:
Results from the National Training Foundation Survey 1**

Underestimation of importance of instilling effective management systems

% of all respondents, n=403

% of industrial managers, n=235

Government officials' lack of interest in management development

% of all respondents, n=403

% of industrial managers, n=235

7. National Training Foundation 'Barriers on the path of the development of effective management: report of results of a survey', Moscow: National Training Foundation, 1996 in Holden, Cooper, and Carr, Dealing with the New Russia: Management Cultures in Collision, Chichester, England: John Wiley & Sons Inc, 1998, 131.

**Lack of Adequate Educational Resources as an Obstacle to Management
Development in Russia:
Results from the National Training Foundation Survey 1**

Difficulties in locating qualified managers

% of all respondents, n=403

% of industrial managers, n=235

Absence of literature and information on management development

% of all respondents, n=403

% of industrial managers, n=235

8. National Training Foundation 'Barriers on the path of the development of effective management: report of results of a survey', Moscow: National Training Foundation, 1996 in Holden, Cooper, and Carr, Dealing with the New Russia: Management Cultures in Collision, Chichester, England: John Wiley & Sons Inc, 1998, 131.

Insufficient number of education centres for management development

% of all respondents, n=403

% of industrial managers, n=235

The Impact of Training on Everyday Activities:

[% of respondents, n=135]

To what extent has the training been instrumental to you in acquiring new knowledge necessary for everyday work?

To what extent has the training been useful for your practical job activities?

The Impact of Training on Management Development at the Individual Level:

[% of respondents, n=135]

To what extent has the training been conducive to mastering new methods of solving professional tasks?

Have your attitudes towards (understanding of) goals and objectives of your work changed as a result of the training?

Appendix 11

The Level of Human, Material and Financial Resources as a Stimulus or an Impediment to Management Development:

[% of respondents, n=135]

Level of staff skills in your public institution

Condition of financial and material resources

Attitudes as Stimuli or Impediments to Management Development:

[% of respondents, n=135]

Attitude of superiors

Attitude towards changes in the institution

The Relevance of the Training as a Stimulus or Impediment to Management Development:

[% of respondents, n=135]

Relevance of the training to the Russian environment

Relevance of the training to the local working environment

The Relevance of General Management Training to Management Development:**[% of respondents, n=1418]**

14. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

The Relevance of Marketing Training to Management Development:**[% of respondents, n=1418]**

15. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

The Relevance of Financial Management Training to Management Development:**[% of respondents, n=1418]**

16. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

Appendix 17

The Relevance of Personnel Management Training to Management Development:**[% of respondents, n=1418]**

17. The Presidential Managers' Training Program, "PMTP follow-up Survey, 24.04.02," Information provided by YDFP (26 February 2003).

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