

**Building Knowledge Economies:
Opportunities and Challenges for EU Accession Countries**

**Final Report of the Knowledge Economy Forum
"Using Knowledge for Development in EU Accession Countries"
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Introduction

The countries of Central and Eastern Europe have made significant strides in the past ten years in laying the foundations for market economies and democratic societies to flourish. For many of them, that progress is now recognized and symbolized by their candidacy for accession to the European Union. Yet EU accession is both an opportunity and a challenge for the transition economies. It helps to provide them a framework, and resources, for their continued efforts to reform their economic systems, reduce and adapt the role of the state in the economy, and restructure inefficient and uncompetitive sectors. It helps them create the policy frameworks, economic incentives, human capital, infrastructure and innovation capacity that will permit them to compete regionally and globally and thus create sustainable economic growth that benefits all sectors of their society.

At the same time, EU Accession poses a challenge for these countries. In its March 2000 Lisbon Summit, the EU set an ambitious target for itself: that Europe "would become during the next decade the most competitive and dynamic knowledge-based economy in the world". This target reflects the growing awareness, in Europe and elsewhere, that the ability to acquire and use knowledge is increasingly becoming a key factor in determining the competitiveness of a country's economy and may well mean the difference between prosperity and poverty, both between and within countries. As the EU has recognized, creating globally competitive knowledge-based economies requires a coherent, proactive strategy that reaches across many different sectors, encompassing areas as diverse as information infrastructure, research and innovation systems, education and life long learning, and government policy and regulatory frameworks. Most importantly, it requires *flexible and nimble* institutions and policy frameworks that can adapt to rapid change, and a creative and entrepreneurial private sector that can exploit new opportunities that emerge from that rapid change. For the Accession Countries, many of which are still struggling with some of the rigid institutional and policy legacies and slowly-changing economic and social conditions inherited from the socialist period, creating the conditions for knowledge-based economies to flourish is a particularly difficult, but no less urgent, challenge. In this regard, the 2001 Goteborg EU Summit adopted the *e-Europe + 2003 Action Plan*, which is meant to assist the accession countries in taking on some of these challenges.

In February 2002, the World Bank joined with the European Commission, the Organization for Economic Cooperation and Development (OECD), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB) and other partners to convene a high-level Policy Forum in Paris on "Building Knowledge Economies in the Context of EU Accession." This Policy Forum brought together high-level delegations (including representatives from government, academia, the private sector and civil society) from 10 EU Accession Countries: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia. They joined with experts from the sponsoring organizations and others for three days of discussion and analysis of the prospects for building knowledge-based economies in the Accession Countries. The discussion focused on:

- assessing the current state of efforts in the Accession Countries to create the conditions for knowledge-based economies, and the distinct challenges faced by these countries;
- identifying key opportunities and priority areas for action in the region as a whole and in individual Accession Countries;
- identifying how the international community can help the Accession Countries in addressing these challenges and opportunities.

The goal of the Forum was to move beyond general discussion of the knowledge-based economy to a specific and practical understanding of how the global trend toward knowledge-based economies affected the Accession Countries, how they could respond in practical ways to the challenges posed by this trend, and how their specific institutional and economic legacy shaped their efforts to respond. It focused, for example, on the seeming paradox that, while these countries are working actively to reduce the role of the state in the economy, the weak capacity of governmental -- both at the central and sub-national levels -- and societal institutions in many of these countries to implement and enforce new policies and practices is a key impediment and challenge to creating the environment for private sector innovation, foreign investment, and effective redeployment of the substantial human assets of these societies toward new and innovative economic activities.

The Forum was conceived as simply the first step in an ongoing and expanded cooperation on these issues between the Accession Countries, the World Bank, and the other international partners, working together to create the conditions for the growth of vibrant and globally-competitive knowledge-based economies in Central and Eastern Europe. In the months following the Forum, the World Bank will be working closely with its international partners to respond to the specific needs and requests of each Accession Country which is interested in the World Bank's continued support in this area, as they build the policy and regulatory frameworks, infrastructure, human capital, and research and innovation systems required for a knowledge-based economy. In this way, these countries can, in the coming years, take an active role in helping the European Union achieve the ambitious goal set out in the Lisbon Declaration, and in the process help themselves to become globally competitive knowledge-based economies that create opportunity for all.

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Chapter 1: Understanding the Knowledge Economy

Knowledge, and the ability to create, access and use it effectively, has long been a tool of innovation, competition and economic success, and a key driver of economic and social development more broadly. Yet several dramatic changes in recent years have fundamentally increased the importance of knowledge, and the competitive edge that it gives to those who harness it quickly and effectively. The ability to *process and transmit* information, globally and instantaneously, has increased exponentially per unit of cost in recent years due to the combined effect of advances in computing (microprocessor) speed, and competition, innovation and lower costs in global communications networks.

As the technical impediments (distance, geography, cost) to accessing and using the best knowledge about a given process, skill, or market decrease, that knowledge becomes increasingly the key to competitiveness, locally and globally. At the same time, these efficiencies in information and knowledge flows make possible, and necessary, a closer link between research/development and downstream innovation, an increased rate of innovation, and shorter product life cycles in many major sectors of the economy. Even in the more traditional agricultural and manufacturing sectors of the economy, knowledge (about crop varieties, about new markets, about innovative production processes) is more easily and rapidly accessible on a global basis, and thus its competitive value is increased.

The increase in global trade and foreign direct investment in recent years, itself facilitated by the ease of information flows, accelerates the impact of these changes. In an increasingly global economy, where knowledge about how to excel competitively and information about who excels are both more readily available, the effective creation, use and dissemination of knowledge is increasingly the key to success, and thus to sustainable economic and social development that benefits all. Innovation, which fuels new job creation and economic growth, is quickly becoming the key factor in global competitiveness.

The impact of global information flows, and of the knowledge economy, on governmental and societal institutions is no less profound or important. In information-rich environments where knowledge flows freely and communications are abundant and multi-directional, pressures increase on governments to be more transparent, accountable and participatory. At

the same time, the ability of governments to access and control information, and the uneven access to information and knowledge among sectors of society can, in certain circumstances, increase inequality and further entrench existing political and social elites. Unequal access to education and training can perpetuate and deepen inequality.

The growth of a global knowledge-based economy creates great opportunities, and poses great challenges, for all countries, but particularly for those that are still struggling to combat widespread poverty and create sustainable development that reaches all, or those dealing with difficult transitions from centralized forms of economic organization. To create these opportunities and navigate these risks, a country must do three difficult things. It must develop a coherent, multi-faceted national strategy for building and sustaining a knowledge-based economy. It must develop this strategy in a participatory, broad-based fashion that includes and empowers all major sectors of society, including the private sector, educators, scientists and innovators, civil society, the media and others. And it must implement this strategy in a sustained and patient fashion, carefully balancing competing priorities, difficult tradeoffs, and interdependent changes with different time horizons, all in the context of opening progressively to a fast-paced, rapidly changing, unpredictable and highly competitive global economy.

There are four essential, and interrelated, elements of any such strategy for building a knowledge economy:

1. *Creating an appropriate economic incentive and institutional regime* that encourages the widespread and efficient use of local and global knowledge in all sectors of the economy, that fosters entrepreneurship, and that permits and supports the economic and social transformations engendered by the knowledge revolution;
2. *Creating a society of skilled, flexible and creative people*, with opportunities for quality education and life-long learning available to all, and a flexible and appropriate mix of public and private funding;
3. *Building a dynamic information infrastructure*, and a competitive and innovative information sector of the economy, that fosters a variety of efficient and

competitive information and communications services and tools available to all sectors of society. This includes not only "high-end" information and communication technologies (ICTs) such as the Internet and mobile telephony but also other elements of an information-rich society such as radio, television and other media, computers and other devices for storing, processing and using information, and a range of communication services.

4. *Creating an efficient innovation system* comprising firms, science and research centers, universities, think tanks and other organizations that can tap into and contribute to the growing stock of global knowledge, adapt it to local needs, and use it to create new products, services, and ways of doing business.

Designing and implementing a coherent and sustained response to these challenges is not easy, particularly for developing countries and countries in transition, which face additional burdens from limited resources, weak institutional capacity, and a legacy of centrally-controlled economic development. This is particularly true for the EU accession countries which, upon EU membership, will have to compete effectively with the current EU member countries. Yet the risk of not responding to the opportunities created by the emergence of a global knowledge economy is even greater. In an open global economy characterized by rapid change and vibrant competition based on the ability of firms and nations to create, access, and use information and knowledge, the gap -- in income and livelihoods, in health and education, in government effectiveness -- between those countries that respond aggressively to these challenges and those that do not, is likely to increase.

For the countries of Central and Eastern Europe currently preparing to join the European Union, the opportunities, and the challenges, posed by the knowledge revolution are dramatic.

Chapter 2: Building Knowledge Economies in the Context of EU Accession: Opportunities and Challenges

The EU Accession process provides both opportunities and challenges to the countries of Eastern and Central Europe as they seek to build regionally and globally competitive knowledge-based economies. The opportunities come in several forms. First, the EU has itself recognized the vital importance of creating the conditions for the growth of the knowledge economy. In the Communique from its 2000 Lisbon Summit, the EU set the goal of creating “the most competitive and dynamic knowledge-based economy in the world by 2010”. This focus on the knowledge economy will significantly shape the work of the EU, and its relations with its newest members, in the next several years. Second, the accession process itself, and the process of implementing the *acquis communautaire*, both obliges and helps the Accession Countries to put in place the legal, administrative and regulatory frameworks for the knowledge-based economy. The structural and capacity-building support that the EU will provide its newest members in their first years of membership will help them to create the economic and social conditions, and the institutional capacity, to support the growth of a globally competitive private sector. The increased ability of these countries to have access to, and adapt to their needs, European and global best practice in all sectors of the economy, from agriculture and manufacturing to newer sectors where innovation and the use of knowledge are the major source of value added, will help provide dynamism to economies that have struggled to move away from their past rigidities.

At the same time, joining the EU is as much a challenge as an opportunity to the countries of Eastern and Central Europe. Participating fully in a globally competitive regional economic union will require of them a flexibility and adaptability in economy and society far greater than they have been accustomed to in recent decades. It will force them to address aggressively not only the rigidities and inefficiencies of their traditional agricultural and manufacturing sectors, but also the difficulties of adapting their often centralized and inflexible research/development and innovation regimes to a fast-moving global economy where the ability not only to innovate but to bring innovations successfully to market is the key to success.

The experience of OECD countries in creating the conditions for the knowledge-based economy helps provide a roadmap. In particular the experiences of three very different

countries – Korea, Ireland and Finland – in building globally competitive economies provide valuable lessons to the EU Accession Countries. Korea faced many of the same types of structural rigidities in its industrial sector and its education system, and many of the same pitfalls in the role of the government in the economy, that the Accession Countries now face. A severe economic crisis forced Korea to address these issues aggressively and comprehensively, and its response will help position Korea for global competitiveness in the knowledge-based economy. Finland and Ireland, each in their own way, have transitioned in the past few decades from relatively poor, predominantly agricultural, heavily rural economies and societies to globally competitive leaders in different sectors of the knowledge economy.

Box 1: Understanding the "Irish Miracle"

Ireland has experienced an extraordinary transformation in recent years. From a poor, largely-agricultural country whose young people were leaving by the thousands each year to seek opportunities elsewhere, Ireland has become in the last two decades one of the most dynamic knowledge-based economies in Europe. Its GDP per capita has risen in 15 years from less than 60% of the EU average to slightly better than the EU average in 2002, overtaking its neighbor the United Kingdom. Its real growth rate has averaged 6.5% over the past decade, during which it created 4 times as many net jobs as the UK. It has become a high-technology powerhouse within Europe, and the largest exporter of software in the region.

As in every case of dramatic and sustained economic growth, the reasons for Ireland's boom are complex. However, there is broad consensus that two factors in particular fueled Irish growth: education and foreign direct investment, the former being a precondition for the latter. Most analysts agree that Ireland's failure to invest significantly in education for its first 50 years of independence was a major cause of its economic backwardness during those years. Beginning in the 60s and increasingly in the 70s, however, successive Irish governments made a major commitment to expanding educational opportunities, by extending free secondary education to all (eliminating fees in secondary schools) and by an increased effort to upgrade tertiary and technical education. The Irish placed particular emphasis on expanding and improving their network of Regional Technical Colleges, an expansion that was further fueled by EU Structural Fund support in the early 90s.

This sustained but well-targeted investment in education lay the groundwork for, and then was further encouraged by, increased inflows of foreign direct investment by technology companies,

particularly in the early-to-mid 90s. Attracted not only by Ireland's skilled population but also by favorable wage and tax conditions and a government that aggressively sought to create conditions for foreign investment, technology hardware and software companies flocked to Ireland in the 90s, causing further upstream and downstream firm (and job) creation in their wake. This "virtuous cycle" of investment in quality technical education (and thus a skilled workforce), well-targeted foreign direct investment, and a favorable policy environment, seems to be at the heart of Ireland's success story.

Education and foreign direct investment were not magic bullets, however. Their combined effect was only possible because other fundamentals were in place. Ireland had consistently pursued trade openness since the 1960s. Its relatively non-ideological main political parties fostered a broad social consensus on economic priorities, and created a stable macroeconomic and fiscal environment.

Challenges remain for Ireland. High-technology markets can be as cyclical as any other market, as recent events have shown. Rural poverty and increasing income inequality are an ongoing challenge. The recent economic boom in the Dublin area has led to severe inflation in housing costs, fueled by weak supply. Irish infrastructure is still badly in need of upgrading.

Still, the Irish case points clearly to the fundamental importance of a sustained attention to human capital and attracting investment through good macroeconomic and policy frameworks, as two of the key pillars of building a knowledge economy.

The experience of these and other OECD countries point to a few long-standing truths, and to some new lessons particular to the challenges of the knowledge economy. The first lesson is the importance of *getting the fundamentals right*. Coherent, consistent, and predictable legal, regulatory and policy frameworks are essential to creating an environment for innovation, foreign investment, and growth of a vibrant private sector, the key driver of a competitive knowledge-based economy. Equally important is finding the proper balance between the role of the government and private sector initiative in driving innovation and creating new economic opportunities. Particularly given the rapid pace of innovation and change in the knowledge-based economy, it is impossible and imprudent for the government either to seek to drive and direct innovation or to pick and support "winners". Rather, its role is to create the conditions for fair competition, investment and trade; to promote sound macroeconomic and fiscal policies; and to address, in partnership with the private sector, key structural constraints on economic growth, including issues of infrastructure and human capital.

As a recent World Economic Forum study has shown, the most competitive countries are those that create favorable conditions for continuous, market-driven and private sector-led innovation.

Box 2: Finland: From Forests to Phones

The forests that cover extensive portions of Finland provided, until recently, the main source of its wealth. In the 1960s, wood, pulp and paper products accounted for over 60% of Finnish exports. Even in 1990, this sector still accounted for 40% of exports, slightly above the share of metal and machinery products at 31%. Yet the figures for 1990 also showed the beginning of a trend that would confirm itself dramatically in the 90s: the emergence of Finland as a major exporter of electronic and high-technology products. By 2000, this sector had grown to over 30% of exports, and Finland had become a world leader in the production of cellular telephones and related equipment.

How did Finland, a small country with limited natural resources other than its forests, become a leading competitor in the "new economy"? Two factors in particular seem to have played a vital role: a sustained investment in research and development, to fuel innovation, and a coherent and forward-looking response to economic crisis.

The foundations for Finnish success had been laid over several decades. A combination of social cohesion, a consistent and predictable policy environment, and a strong commitment to education, created the general enabling conditions. In addition, since the early 1980s, Finland had consistently increased investment in research and development (R&D), and had expanded public finance of business R&D in the late 80s and early 90s, at a time when OECD countries were dramatically reducing government R&D support. This increased support, focused on encouraging innovations that could be brought to market, was one of the crucial elements of Finland's creative response to the crisis it faced in the early 90s -- a crisis from which it rebounded dramatically.

The dissolution of the Soviet Union in 1991 and the economic crises that spread throughout the new nations emerging from that dissolution, hit Finland hard, since these countries had been major markets for Finnish products. The Finnish GDP growth rate plummeted from 5% in 1989 to minus 5% in 1991. Unemployment soared in the same period from under 5% to almost 20%. The economic crisis of the early 1990s created a sense of urgency that formed the basis for a national consensus on dramatic reform.

Finland intensified its efforts to open its economy to foreign investment, to create the economic and policy incentives for innovation, to liberalize and deregulate domestic markets. This policy consensus, combined with the continued commitment to research and development, made possible the growth of a new high-technology sector in Finland, symbolized by, though not limited to, the cell phone giant Nokia.

Nokia is, however, a symbol both of Finland's success and of the potential fragility of that success. Nokia and its supplier network account for 20% of Finnish exports, and they have contributed as much as one third of overall GDP growth in Finland in the past few years. This network of companies, and the robust national innovation system that undergirds them, should provide Finland with some degree of protection against downturns and shifts in particular parts of the high-tech market. However, it is only by maintaining a clear commitment to the fundamental factors that enabled its success -- good and consistent policy frameworks, support for innovation, openness to the global economy -- that Finland can assure that its leadership in global technology markets will be more than a Nokia episode.

This does not imply, however, a strictly laissez-faire, minimalist model of the government's role in creating the conditions for the knowledge economy. On the contrary, evidence from OECD countries shows that a proactive, strategic role on the part of government, in dialogue with the private sector and civil society, is key. In the case of the Central and Eastern European EU Accession countries, this implies a two-fold and complex change in the role of the state in the economy. On the one hand, the institutions and habits of central state planning and of bureaucratic micromanagement of the economy have to be dismantled. From creating the mechanisms for planning, these states have to shift to creating the conditions for the unplanned -- the spontaneous and innovative forms of economic and social activity that characterize a knowledge-based market economy. At the same time, these states need to develop the active capacity to carry out the functions -- regulation, macroeconomic and fiscal policy, etc, -- that are legitimate and vital components of the role of the state as enabler and partner in a market economy.

Box 3: Korea: From Crisis to Opportunity

Until a few years ago, Korea was considered one of the most remarkable economic success stories of the past half-century, lifting itself in 30 years from widespread poverty to global competitiveness. From 1966 to 1996, Korean per capita income grew by an average of 6.8% annually. When it joined the OECD in 1996, Korea had already achieved universal primary and secondary education enrollment and surpassed the OECD average in tertiary enrollment. Life expectancy has increased to 72 years, just below the OECD average.

Yet in late 1997, the East Asia economic crisis hit Korea hard. GDP contracted by almost 6% in 1998, and unemployment rose to 8.5% in early 1999. While the crisis was short-lived and Korea enjoyed a dramatic recovery (the economy grew by 10.7% in 1999 and has continued strong growth since then), it brought to light fundamental questions about the sustainability of Korea's input-driven, government-led development model, and its heavy dependence on export of manufactured goods. Furthermore, it exposed several major weaknesses in the Korean economy and society that would make Korea much more vulnerable in the future, as regional competitors emerged and globalization progressed. In response, Korea has recently embarked on a concerted effort to reform its economy and society to lay the groundwork for competing globally as a knowledge-based economy.

The first area where substantial reform is required (and has begun) is in the role of government in the economy and the economic and institutional regime for innovation and economic growth. The Korean government has traditionally played a direct and active role in most sectors of the economy, in close cooperation with the large conglomerates (chaebol) that dominated it. While this strategy helped fuel Korea's earlier growth, it is particularly ill-adapted to the rapid change and flexibility that characterize a competitive knowledge-based economy. A weak financial sector, inflexible labour markets, and significant impediments to market exit (bankruptcy and industrial restructuring) and entry (new firm creation) deprive Korea of the ability to respond quickly to changing conditions and opportunities in the global economy.

Education is another area where traditional strengths hide new weaknesses. Intense and sustained investment (both public and private) in education has been one of the pillars of Korea's economic development. Yet the Korean education system is inflexible, overregulated, and of uneven quality, with an overemphasis on formal schooling, quotas and testing. Adult learning opportunities are limited, and there is considerable gender inequity both in higher education and (resultantly) in the job market.

Korea has begun to address the challenge of deregulating the education system, increasing autonomy for secondary and university education, permitting greater flexibility in curricula, and increasing quality. It is also beginning to address the urgent need to increase opportunities for life-long learning, and to strengthen ties with the international educational system.

Research and development is another area where Korea has not been getting good value for its investment. Korea spends more on R&D, as a percentage of GDP, than most OECD countries. However, there are fundamental weaknesses in the Korean innovation system which the government has begun to address. Linkages among firms, research institutes, and universities are weak. Public investment in R&D is not sufficiently transparent or rooted in a clear economic rationale, and it is often duplicative of industry research. Ties with global research networks are weak.

The government has recognized that the challenges and weaknesses brought to light by the crisis of the late 90s provide an opportunity for reform and revitalization of the Korean economy. On the basis of recommendations from the World Bank and the OECD, the Korean government has embarked on an ambitious strategy to address these weaknesses, make its economy more flexible, adaptive, and open, and claim its place as a leader in the global knowledge-based economy.

The Accession Countries have made considerable progress in addressing this challenge. Furthermore, in the past few years, they have taken advantage of the momentum (and financial, institutional and technical support) generated by the accession process to implement wide-ranging economic and institutional reforms that will help position them as competitive knowledge-based economies. Most have seen respectable economic growth in the past few years. Hungary, Latvia, Poland, and Slovenia, for example, have seen several years of uninterrupted growth, as have Estonia and Lithuania to a lesser extent. Bulgaria, Romania and the Czech Republic suffered serious macroeconomic crises in the mid-to-late 1990s but are rebounding. Slovakia has rebounded in the past two years from a period of macroeconomic instability and international isolation. In most accession countries, there is encouraging progress in creating an entrepreneurial culture and the conditions for private sector-led innovation. Yet substantial challenges remain, particularly in creating a *coherent and flexible* set of strategies and policies across the four key dimensions of building knowledge economies, with realistic goals and priorities, and the resources and capacity to implement them effectively.

1. *The Enabling Environment for the Knowledge Economy:* Creating the appropriate economic and institutional regime that provides incentives for the efficient use of local and global knowledge, that fosters entrepreneurship, and that permits rapid adaptation in firms, institutions and markets is a daunting challenge for any country, and particularly so for the EU Accession countries. A recent World Bank study of the transition process in Central and Eastern Europe has pointed to slow progress in several countries in restructuring old, uncompetitive firms and in creating conditions for entrepreneurship and new firm creation, which means that the discipline of competition is weakened and resources do not easily flow to their most productive use. Some countries, such as Poland and Hungary, addressed these challenges early and aggressively, with hard budget constraints for state enterprises, liberalization, and openness to foreign investment. The Czech Republic has also created an increasingly attractive environment for foreign investment, and was the first country in the region to join the OECD. However, in several accession countries, political and bureaucratic resistance persists (including substantial public resistance) to restructuring uncompetitive firms and market segments because of the short-term economic and social costs of such restructuring, and the lack of other opportunities for those affected in economies where new firm and job creation is still sluggish. Even where political will exists, government capacity to design and implement structural reforms is often still weak.

If conditions for facilitating market *exit* (restructuring or closing old firms) are still unsatisfactory, conditions for market *entrance* by new firms, domestic or foreign, are often worse. A still-weak financial and capital market sector means that capital is not readily available for innovation or firm creation. Labor markets are still insufficiently flexible to support the mobility, constant skill upgrading, and effective allocation of human resources vital to a rapidly-changing knowledge economy. The social safety nets necessary to facilitate this mobility, by easing adjustment to firm and market restructuring, are still weak and overburdened. Continued government subsidies to uncompetitive firms (to delay the economic and social impacts of restructuring) act as a further drag on innovation and new firm formation, by diverting financial and human resources away from more productive activities. Legal and bureaucratic impediments to new firm creation are still widespread. This is especially troublesome since new firms are the major source of innovation and economic growth in most advanced economies, and particularly in knowledge-based economies.

Related to these issues of the economic incentive regime are several key elements of the *institutional* regime on which the accession countries have made encouraging, but incomplete, progress. While political stability and the rule of law are basically assured in all accession countries (indeed, these are fundamental prerequisites for accession), regulatory frameworks for major sectors of economic activity are often still weak, as is government capacity to enforce these regulations. Shortages of trained and experienced personnel for key policy, administrative, and regulatory functions are a widespread problem in the region, exacerbated by an "internal brain drain" of many highly-qualified people from chronically under-resourced government agencies to the emerging private sector.

Controlling corruption, and assuring transparency and accountability of government institutions, remains a challenge, exacerbated by the difficult conditions of government work. The most recent Annual Progress Report on Accession by the European Commission (November 2001) has pointed to corruption at different levels of government and administration as a persistent problem in several accession countries and an impediment to innovation and effective competition. Relatedly, the capacity of judicial institutions to interpret and enforce laws, adjudicate disputes, and help foster an environment where all have an incentive to "play by the rules", continues to be weak in several accession countries.

These institutional weaknesses serve as a further drag on innovation and adaptation to global competition, particularly since they often serve to protect the interests of the least productive, most traditional, but sometimes most well-connected, segments of the economy. At the same time, the weak capacity of several governments in the region to *deliver* on reform by *implementing* policies in a timely and coherent manner, tends to weaken the credibility of, and support for, reform measures and the political coalitions advocating them.

As the accession countries become exposed to greater regional and global competition within the context of EU membership, the negative impacts of a weak economic incentive and institutional regime will be felt more acutely. Accession and the process leading to it provides a valuable source of motivation and legitimacy for decisive government action designed to create the conditions for restructuring, innovation, and competitive markets. And the resources (both financial and human) that the EU will devote to assisting the accession countries in their first years of membership, if creatively deployed and matched with decisive government action, can serve as further leverage for change. The accession countries, as a group, clearly recognize

these challenges and are mobilizing to address them. However, much hard work remains to be done. Many accession countries are now developing and implementing comprehensive national strategies to create a favorable environment for entrepreneurship, new business development, and foreign investment, but weak administrative capacity, inadequate legal structures, and persistent corruption in certain countries remain impediments.

2. *Human Resources for the Knowledge Economy:* On first glance, the accession countries would seem well positioned to provide the human resources for competitive knowledge economies. With high rates of educational enrollment and literacy, well-established strengths in math and science, a long tradition of scientific and technical research, and long-established university systems, these countries would seem to have many of the tools in place for training their people for the challenges of the 21st century economy and society. Yet, as Korea discovered, a well-developed but inflexible education system can be as much of an impediment to success in the knowledge economy as an underdeveloped system. The combined legacy of highly centralized government control, rigid guidelines for outputs of different types of education and training, the remnants of a fairly inflexible (and externally imposed) regional division of labor in higher education and research, and rigid hierarchical distinctions between educational and vocational training, have left most of the Accession countries ill equipped for the human resource challenges they will face in a globally competitive knowledge based economy.

As the OECD countries are still learning (many of them with considerable struggle and difficulty), and as Peter Drucker and others have demonstrated forcefully, workers at all levels in the 21st century economy will need to be lifelong learners, adapting continuously to changed opportunities, work practices, business models and forms of economic and social organization. Education systems will have to adapt accordingly, continuing to focus on quality and broad access while giving more emphasis to flexibility in format and subjects, non-degree and life-long learning opportunities, and a continuous dialogue among educators, government and the private sector. New models for financing this more diverse mix of learning opportunities will be needed, with a greater role for the private sector and greater options for local diversity of choices within the framework of clear but flexible national standards, which in turn focus on results and impact rather than inputs.

This means fostering diversity and choice in the supply and form of learning opportunities. The basic principle of education and learning systems in knowledge-based economies is that "one size does not fit all" and that learning happens everywhere in the economy and society, not just in the classroom. A "learner-centered" approach focused on life-long learning, adaptability and a culture of innovation requires that individuals should have a wide range of choices -- public and private, formal and informal, classroom-based, on-the-job, or at a distance, synchronous or self-paced -- for addressing their specific learning needs and goals at different stages in their lives. This applies not only to adult learning, but also to formal education systems and national curricula, which in many accession countries remain overly rigid.

This in no way implies an abandonment of national priorities, standards, or learning goals for different age groups or educational sectors. It does, however, imply flexible standards focused on results. It also requires that testing, assessment and certification instruments and priorities should be aligned with this flexible, results-based, learner-centered approach.

The role of government changes in this approach, from operating and controlling a mostly-public, centrally-designed and financed set of formal educational institutions to setting broad national goals and standards; supervising, supporting and monitoring system and institutional performance, providing policy leadership, and ensuring accountability.

The role of the private sector becomes more important in several ways. First, it increasingly serves as a provider of learning opportunities, both "on the job" in every sector of the economy and in a transformed and expanded "life-long learning" sector. Second, the growing and changing needs of the private sector in a rapidly changing knowledge-based economy help to inform and shape demand for learning opportunities. Third, the private sector needs to work in partnership with government and other social actors (including trade unions) to create the environment for flexible on-the-job learning, risk-taking and initiative by learners, flexibility in defining and adapting jobs and the skills they require, and continued adaptation of learning supply (including vocational and technical training) to individual and society-wide demand.

This flexible mix of public and private source of education and life-long learning requires new models of how to finance learning. The public sector will understandably retain the key role

in financing core national education priorities, particularly in primary and secondary education. However, even here, new models of how to balance central, regional and local initiative, financing and control in formal education need to be explored. In the formal higher education sector (tertiary and post-graduate) much work remains to be done in the Accession Countries to create the legal and regulatory environment, and the economic and institutional incentives, for private investment and innovation, although several accession countries have made good progress in encouraging the growth of private universities.

The Accession Countries also need to pay greater attention to access to education and learning opportunities in poor and rural communities and among traditionally disadvantaged groups, including minorities, the disabled, and, in some Accession Countries, women.

Last but not least, the human capital of the education and learning sector itself -- teachers, trainers, counselors, mentors, administrators, learning designers, etc. -- needs to be substantially enhanced and diversified in the Accession Countries. The fiscal pressures faced by most of the governments in these countries have put severe strains on the resources available to the traditional education sector (leading, in many cases, to defection and demoralization among teachers and administrators.) The process of reforming and diversifying the education sector and increasing private sector participation in an expanded life-long learning sector can help provide the rationale, momentum and resources for more effectively targeting scarce public resources to key national educational priorities. It can also help to reduce the waste and inefficiency of highly bureaucratized and over-centralized national education systems.

The governments will need to play a crucial leadership role in creating national dialogue and consensus on the need for reform, articulating a broad strategy for building the human capital of a knowledge economy, creating the legal and regulatory frameworks and incentive regimes for private participation, and fostering cooperation among the public sector at all levels, the private sector and civil society in creating a national ethos for, and the conditions to support, life-long learning. Many of the accession countries are already giving high priority to education reform and broader human capital issues. Estonia's National Education Strategy, for example, focuses both on increasing the supply and flexibility of vocational training and on reforming higher education curricula and degree programs to correspond more closely to European standards.

3. *Information Infrastructure:* There are several, interrelated ways in which the widespread availability and use of information and communications technologies (ICTs) could dramatically benefit the Accession Countries in their efforts to build globally-competitive knowledge-based economies.

First, while debates persist about the impact of ICTs on productivity and economic growth, it is fairly clear that the labor- and capital-intensive manufacturing and agricultural sectors of many accession country economies could generate significant productivity gains from the targeted use of a range of ICTs, for greater efficiency in design and production processes; just-in-time access to inventory, demand and market information; and access to regional and global knowledge and best practice. ICTs alone do not generate change in traditional and inefficient production practices and forms of industrial and agricultural organization. They do, however, create leverage and incentives for those broader changes. Thus, even in these more traditional sectors, broader access to, and effective use of, ICTs could help the Accession Countries increase their productivity, competitiveness and capacity for innovation.

Second, the spread of ICTs increases the ability of these countries to take advantage of regional and global opportunities for new forms of economic activity (from teleservices to offshore software production to applied research) that are not tied to a specific location of physical infrastructure.

Third, ICTs help make possible (both through their application in the functions of government and in providing information and voice to the public) more responsive, transparent and participatory forms of governance, and help reduce the opportunity for corruption.

Finally, ICTs broaden the range of education and life-long learning opportunities available to individuals and organizations.

The past ten years have seen steady improvement in the access to, cost of, and reliability of basic telecommunications infrastructure in the Accession Countries, as well as access to and use of advanced infrastructure and services including the Internet and mobile telephones. Many of the accession countries have made ICT infrastructure development, and the spread of ICT use and services in government, commerce, and education, a national priority. Estonia, for example, was an early leader in the region in promoting access to

computers and the Internet in schools. Bulgaria is seeking to leverage its traditional strengths in ICT production, which suffered seriously after 1991 but has rebounded to become one of the most dynamic sectors of the Bulgarian economy in the past few years. Hungary's Szechenyi Plan offers a comprehensive roadmap for creating an information society, as does the Czech Republic's State Information Plan. Most accession countries have similar national strategies in some stage of planning or implementation. However, there is still considerable progress to be made in most of the accession countries in making these plans a reality. While all the accession countries have made progress in establishing appropriate policy and regulatory frameworks, and institutional capacity, to implement and oversee competition and private investment in telecommunications infrastructure and services, telecoms sector liberalization is still incomplete, and competition limited, in most of them. Progress in unbundling services and permitting private investment and competition in several different domains (local loop, cellular, long distance, Internet services, transmission/infrastructure, etc. has been slow. The challenge of extending affordable access/service to poor, rural and underserved communities is only slowly being addressed, and risks being a source of increasing inequality. While many of the accession countries have plans for increasing ICT penetration and services in government ("e-government"), the private sector ("e-commerce") and in education, implementation has so far been slow. Legal frameworks and enforcement mechanisms for assuring privacy, consumer protection and protection of intellectual property are still weak in many cases.

Of course, the accession countries are not alone in these challenges. Even in many of the EU member states, legal frameworks for the information society are still incomplete. Licensing procedures are still long and complex in several EU countries, and legal frameworks are not flexible enough to cope with rapidly changing markets. The EU's "E-Europe" initiative is designed to address these challenges in a coherent and proactive fashion, and the initiative's recent "e-Europe plus" extension to the accession countries, provides both the framework and the incentive for the accession countries to make progress on these issues. The key objectives of the initiative, and of the new EU regulatory package for telecommunications that is one of its key elements, is to facilitate simple market entry for new providers of ICT infrastructure and services, increase competition, and expand Internet access and use, while protecting consumer rights and privacy. The Commission's new telecommunications package encompasses a series of directives, on liberalization, competition frameworks, authorization, access and interconnection, unbundled local loop regulation, universal service, and data protection, that will provide the common legal basis for the emergence of a Europe-wide information economy. By

providing a range of technical support to the Accession Countries as they seek to implement "e-Europe plus", the EU will provide significant assistance to the Accession countries in creating competitive and innovative markets for ICT services, and broader penetration of ICT infrastructure, products and services across all sectors of the economy, government and civil society. Yet the hard work of policy and regulatory reform, capacity building, fostering competition and innovation, creating an attractive environment for domestic and foreign private investment, and extending service to the poor and marginalized, continues.

4. *National Innovation Systems:* Continuous, market-driven innovation is the key to competitiveness, and thus to economic growth, in the knowledge economy. This requires not only a strong science and technology base, but, just as importantly, the capacity to link fundamental and applied research; to convert the results of that research to new products, services, processes, or materials; and to bring these innovations quickly to market. It also entails an ability to tap into and participate in regional and global networks of research and innovation.

Many of the Accession Countries have long-standing traditions of excellence in scientific and technical research, both fundamental and applied. However, a variety of factors have dramatically weakened their national innovation systems in the past decade. The combined pressures of industrial restructuring/privatization and public sector budget pressures have reduced dramatically the public resources available for research and development, both in fundamental research and in applied/industrial research. These reductions have not been substantially offset by increased private R&D investment, either from domestic firms or from foreign multinationals. Thus, much of this world-class capacity in fundamental and applied research has been underutilized in the last ten years. The traditional fragmentation of research systems in many accession countries, with poor coordination/cooperation among research institutes, a weak role for universities, and limited national, regional and global networking, is only slowly being addressed. While many governments in the region recognize the changed role of government as partner, enabler and stimulator of public-private partnerships in innovation, their ability to effect change in a coordinated and coherent fashion has been uneven due to lack of resources and human capital and the urgent press of other priorities, including economic restructuring and social welfare.

Most accession countries have recognized in the past several years both the weakness and decline of their R&D capacity and the urgency of developing more robust national innovation systems. And there are hopeful signs in several countries. As universities (both public and private) gain more autonomy, many have moved aggressively to build their own ties with industry and regional/global R&D networks to foster market-driven applied research. Several cities and regions have begun to develop technology parks, incubators, and other focal points for public-private partnership embracing universities, research institutes, the private sector and international partners, such as the "Sunrise Valley" complex planned around the University of Vilnius in Lithuania.

Fundamental challenges and priorities remain, however, if the accession countries are to nurture world-class national innovation systems that will help them compete regionally and globally. They need to set realistic goals and priorities, and to make difficult choices about where to focus resources. In order to do so, they need to benchmark their existing R&D capacities against global standards and make sober assessments about their strengths, weaknesses, and greatest areas of opportunity. This will then help them develop a roadmap for, and mobilize public and private resources for, a national innovation system that leverages a given country's areas of strength in research and development. This will also help them identify priority areas for regional and global networking and foreign direct investment, both to reinforce national strengths and to access global knowledge and innovation in other areas. A particular challenge for governments, given their resource constraints, will be to set clear priorities for continued support of fundamental research. Here too, a sober assessment of national strengths against global benchmarks will help identify priorities. At the same time, many of the accession countries still need to rationalize and coordinate a range of government policies, and a maze of government agencies and actors, that have an impact on, or create the environment for, research, development and innovation.

At the same time, they need to bear in mind that creating the conditions for innovation in a knowledge-based economy is a broader challenge than rationalizing the formal structures of the national innovation system. Innovation in business models, and innovation at the firm level, will be enabled, or constrained, more by the broader economic and legal environment than by the structure of the national innovation system. The challenge, therefore, is both to rationalize the national innovation system and to set in place the broader policies, economic incentives, and legal mechanisms that encourage innovation across the economy and society.

Chapter 3: The Role of the International Community

From the beginning of their transition toward market economies over a decade ago, the central and east European accession countries have benefited from growing interest, cooperation and support from a range of international partners. Multilateral and bilateral government assistance (financial and technical) for economic, social and political reform has been substantial. The international private sector has increasingly seen these countries as promising targets for investment and for new markets. A variety of non-governmental organizations have played an active role in supporting reform in the region.

In the past few years, the EU accession process has increasingly become the primary framework for and vehicle of international cooperation with, and support of economic and social reform in, these countries. The accession process drives and directs the reform and transition processes in these countries in several ways. First, the process and adopting and implementing the *acquis communautaire* serves as both the key reference point for, and a major driver of, legislative and institutional reforms and economic restructuring, and a source of political legitimacy for the more difficult aspects of these reforms. Second, the technical and financial resources that the EU provides to assist the accession process offer substantial and timely inputs of funding and expertise in areas where they are most urgently needed. Third, the impending opportunity, and challenge, of membership in a globally competitive regional economic union provides an urgent incentive for domestic firms in accession countries both to improve their own performance and to seek international partnerships that bring them resources and expertise. Just as importantly, the opportunities, and the global standing, represented by membership in the EU help provide motivation and support for the more innovative and risk-taking individuals and sectors of society.

For these reasons, the European Union has been, and will continue to be, a major source of financial and technical support for the accession countries in virtually all aspects of their effort to build knowledge economies. EU expertise supports the design and implementation of legal, administrative and regulatory reforms necessary to implement the *acquis communautaire*. PHARE funding and other EU financial resources have supported a wide range of technical assistance projects. In the next few years, over 1.2 billion Euro in PHARE funds will be mobilized in particular to support loans to small and medium enterprises

(SMEs). This will be complemented by increasing support for investment in business-related infrastructure.

Upon joining the EU, the countries of Central and Eastern Europe will benefit from access to EU structural and cohesion funds which will help them complete, and manage the social and economic impacts of, their fundamental economic reforms. Current proposals envision an accession financial package of roughly 40 billion Euros in 2004-2006, with roughly 3/4 of that total devoted to structural funding. Work is proceeding on an EU action plan to help the accession countries enhance their administrative capacity to implement EU law and policy -- still a widespread weakness. The "E-Europe plus" initiative, discussed above, provides significant technical support to the accession countries as they lay the groundwork for the information society in their countries. Individual EU member states have also been very active, through the own programs of bilateral cooperation and assistance, in the accession countries in the past decade.

The substantial and multi-dimensional support of the EU for the transition process in the accession countries is reinforced by the contributions of many other international actors. The World Bank has assisted virtually all of the accession countries with financial and technical support for many elements of their macroeconomic and sector reforms over the past decade. As the accession countries turn greater attention to creating the conditions for the growth of knowledge-based economies, the World Bank is continuing to work closely with them on a range of policy, technical, infrastructure and human capital issues. For example, several accession countries have negotiated substantial World Bank loans and related technical assistance to reform their education sectors.

The Organization for Economic Cooperation and Development (OECD) provides substantial resources for analysis, benchmarking, policy formulation and networking on a broad range of issues related to the knowledge economy. Four accession countries -- the Czech Republic, Hungary, Poland and Slovenia -- are already OECD members, able to participate fully in the work of the OECD's roughly 150 committees on a broad range of subjects. Non-members are able both to send observers to these committees and to participate in the work of the Committee on Cooperation with Non-Members (CCNM). The knowledge economy is, in fact, one of the priority themes of the work of the CCNM.

The European Investment Bank is the principal official source of external capital for the accession countries, and it has made support for the accession process a key priority of its work. Recently it started focusing its efforts in particular on projects that support human capital formation, research and development, and the growth of small and medium enterprises (SMEs) and the entrepreneurial sector of the economy more broadly. In addition to its substantial loan portfolios, its European Investment Fund is a major source of venture capital for entrepreneurial efforts in the region.

The European Bank for Reconstruction and Development (EBRD) has also been a significant source of financial support for the accession countries throughout their transition process over the past decade. It has focused in particular on targeting resources where they will advance the transition process by promoting competition and encouraging the growth of SMEs. Its Internet Framework Facility, for example, has provided substantial support for a number of new ICT-related initiatives in the region, including internet service providers and e-services companies.

The knowledge economy provides a valuable framework for greater cooperation and coordination among these international partners in their support for the transition process in the accession countries. By developing, and effectively implementing, comprehensive national strategies for the knowledge economy, the accession countries will be able to leverage more effectively this substantial international support.

Chapter 4: The Way Forward

The EU accession process provides a timely opportunity, and substantial resources and support, for the accession countries as they work to complete the task of transforming their economies and societies. Yet time is short for the accession countries if they hope to participate fully in the Lisbon Declaration's goal of creating in Europe "the most competitive and dynamic knowledge-based economy in the world by 2010." The good news is that the resources, partners and ideas available to these countries as they tackle this challenge are substantial, and their own strengths are considerable. However, in a globalizing knowledge-based economy, the old adage that "execution is all" holds particular force.

The challenge for the accession countries is to devise and implement a coherent national strategy that engages all sectors of the economy and society, uses the financial and technical support of the international community in a coordinated and efficient fashion, and sets realistic goals backed up by clear policy frameworks. Consistent and timely execution of policy goals and reforms is key, since it takes time to create the "virtuous cycle" of reform, innovation, increased foreign investment, institutional and behavioral change, and growth in opportunities for both individuals and organizations, that will make these countries innovative and competitive economies within the European Union.

A recent World Bank study of the first ten years of transition in Eastern Europe and the former Soviet Union has highlighted the difficult challenge of building and sustaining a national consensus for reform in circumstances where the pain of restructuring largely precedes the gains from reform. Opening to regional and global markets, and accessing global knowledge and best practice, is a two-edged sword. It enables and requires the restructuring of uncompetitive agricultural and industrial sectors, both to make them newly competitive and to free up resources for new businesses and markets. Yet it also, inevitably, leads to short-term economic and social stresses, including substantial layoffs in uncompetitive sectors of the economy. In an economy where the conditions for innovation and new firm creation are strong, and where social safety nets and retraining schemes ease the transition for those most affected, restructuring can be the engine for new growth. Yet without those mechanisms to ease the transition, and without an economic and institutional regime that fosters innovation, reform can become "stuck" as the pain increases with little sign of gain. A broad and persistent effort at

national dialogue and inclusion becomes, in such circumstances, vital to the government's effort to deliver on reforms, and thereby to create the conditions where a new economy can flourish.

Many OECD countries have faced similar challenges themselves, and the Accession Countries can learn from their experience. Yet their situation is in many ways unique, and their responses must be as well. Learning from each other will help, as will the substantial support of the EU and other international partners. There are no magic formulas, and no quick fixes. Yet decisive action on the fundamentals, a coherent vision, and national dialogue on priorities and sacrifices, can help ease the path.

***Box 4: Building Knowledge Economies in the EU Accession Countries:
Priorities for Action***

Within the framework of a coherent and realistic national strategy for building a knowledge economy, there are several critical priorities for action that are common to most or all of the Accession Countries. These priorities span the four "pillars" of national knowledge economy strategies:

1. *Creating an Appropriate Economic Incentive and Institutional regime:* The accession countries need to continue to press forward aggressively with efforts to create the "enabling environment" for the knowledge economy. This includes:

- Strengthening legal and regulatory frameworks for competition, entrepreneurship, firm restructuring, intellectual property, emergence of new markets in products and services, and openness to trade and foreign investment, so as to permit individuals and organizations to respond to changing opportunities and demands in flexible and innovative ways;
- Strengthening financial systems, including capital markets, so that capital can flow to the most innovative and competitive sectors and firms;
- Enabling greater labor market flexibility, so that innovative firms can attract the workers they need, and to permit restructuring of less competitive firms and sectors;
- Creating an effective *and financially sustainable* social safety net to help workers make these transitions;

- Enabling and encouraging the growth of small and medium enterprises, the source of much innovation and job creation;
- Building effective and accountable government capacity to implement these policies in an efficient and fair manner, and rooting out corruption at all levels of government.

2. *Building the Human Capital of the Knowledge Economy:* Most accession countries have recognized the urgent need to reform their education systems and enable life-long learning. Yet implementation of these reforms is still uneven. Priorities include:

- Decentralizing initiative, responsibility and accountability for education at all levels, and creating opportunities and incentives for private sector investment and innovation in education;
- Focusing government intervention on key issues of quality, relevance, impact, and access for all, rather than micromanaging curricula, organizational design, and administration of educational institutions;
- Flexibly integrating formal, vocational, adult and distance education and training to provide a greater range of opportunities for life-long learning, and creating policy and regulatory frameworks, including certification schemes, that make lifelong learning opportunities attractive and easy for individuals to pursue.

3. *Building a national information infrastructure and promoting access to and use of ICTs in government, the private sector and civil society:* Most accession countries have given considerable attention to ICT issues in the past few years. Yet national ICT plans have not yet translated into substantial progress in liberalization, competition and innovation in ICT infrastructure, applications, services and products. Accession countries need to continue to move aggressively on:

- Fostering competition and private sector investment in information infrastructure and services;
- Developing independent and professional regulatory mechanisms to manage and allocate licenses and spectrum and protect broader public interests while granting maximum flexibility for innovation and new service models;
- Creating flexible legal and regulatory regimes for new forms of economic and social activity and government service made possible by the spread of ICTs, most notably e-commerce and e-government;

- Promoting broad and affordable public access, particularly among poor and rural populations, to ICTs, through a careful mix of government investments and incentives for private investment and innovation.

4. *Creating a strong and effective national innovation system and promoting research and development that brings innovations to market:* The previously-strong scientific and technical capacity of the accession countries continues to be a wasting asset for many, although some progress has been made in reforming innovation systems. Much more aggressive efforts are needed in:

- Rationalizing government funding for research and development, and making it more transparent and results-oriented;
- Improving support for innovation and networking among small and medium enterprises (SMEs);
- Encouraging greater interaction and cooperation among firms, universities, government and private research organizations, and greater contact with their foreign counterparts.