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***Developing ‘Knowledge Workers’ in Mexico:  
Problems and policy options***



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## **Executive Summary**

The recent tide of Asian workers flooding onto the global labor market has meant that Mexico can no longer compete solely on the basis of low-cost labor—particularly against China, where wages are typically a third of those in Mexican industry and whose exports are now rapidly eating into Mexican clothing and electronics market share in the U.S. The administration taking office after the 2006 elections in Mexico will need to promote higher value-adding knowledge-based industries in order to continue to exploit the country's geographical proximity to the world's largest market.

However, although progress is being made in terms of information and communications infrastructure, Mexico faces an urgent and daunting human capital problem. The educational system simply is not producing the knowledge workers the country needs to make the transition to a knowledge economy.

This paper reviews the current status of human capital development in Mexico, comparing the country's education policies and results with those of countries who have been in similar economic circumstances over the last twenty-five years. These 'comparator countries'—South Korea, Poland, the Slovak Republic, Brazil, Chile, China and India—have implemented a range of policies and programs, with varying results. Based on this cross-country analysis—plus a critical review of recent domestic programs—this paper presents a series of policy alternatives and concludes with recommendations on how to accelerate the development of knowledge workers in Mexico. Included in the recommendations are public-private partnerships for technical education; increased funding to parent-teacher investment committees; increased private sector involvement and parental choice in upper secondary education; and more transparency in supplying key data on educational outcomes and explanatory variables.

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## I. Introduction

### *The economic problem*

In the run-up to the election of 2000, Mexican presidential candidates were bullish about the economic future of Mexico. NAFTA had been in force for six years and was beginning to get real traction, pushing Mexican GDP upwards at a rate of 4 to almost 7% per annum<sup>1</sup>. Mexico was setting records for exports to its northern neighbors, and the future looked bright. The winning candidate confidently assured citizens of growth of at least 7% annually going forward.

In this election year of 2006, the new President of the Republic faces very different economic and social challenges. Over the past six years, the economy has never achieved a growth rate of 7%. In fact, Mexico's GDP was virtually flat for the first few years of the Fox *sexenio*, and only managed to recover to the modest level of 3% in 2005. To put this in historical perspective, the average annual growth rate during the Fox administration will have been the second worst in the last 12 *sexenios*, surpassing only the disastrous de la Madrid administration. While part of the explanation for this reversal in growth was a downturn in the U.S. economy—there are always economic cycles—there is a more worrying feature of the current economic climate. The seemingly secure future Mexico had as the exporter of choice to the U.S. based on its relatively low labor costs has been put in serious doubt by the emergence of China, in particular, as an even lower cost producer.

Mexico now faces an uncertain future and a politically uncomfortable set of economic strategy choices. The option of competing with China on labor costs would mean further depressing the already low wage structure in Mexico, with devastating social consequences. Generating growth by accelerating foreign direct investment and privatization, *a la* the Washington Consensus, entails political problems (particularly in the energy sector) as well as executional problems (given the mixed results from previous privatization efforts).

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<sup>1</sup> Gross Domestic Product expressed in 1993 prices, as estimated by the Instituto Nacional de Estadística Geografía e Informática (INEGI)

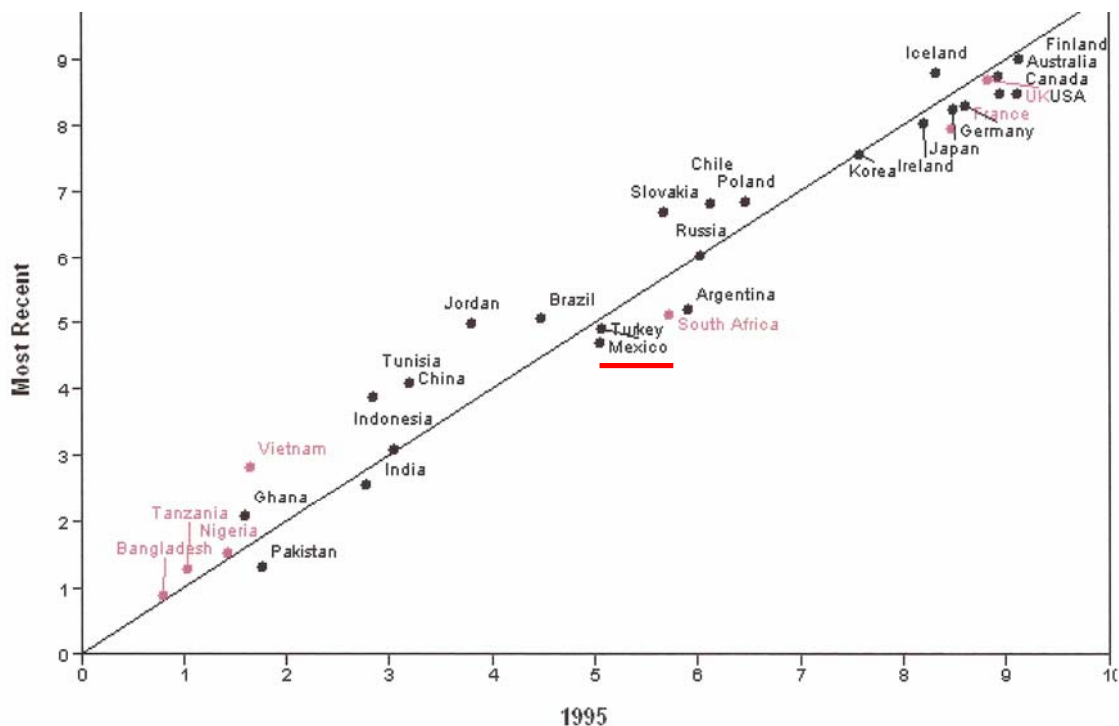
### *The human capital problem*

Another way of looking at the economic problem is through the lens of human capital. From this perspective, the data show that the application of labor in Mexico—in both the manufacturing industry and the service industry—is adding little value. In the *maquiladora* sector, the most famous beneficiary of NAFTA, the value added by Mexican labor just barely covers the wages, transportation and logistics costs in industries like textile manufacturing, shoes, furniture and electronics (Berges 2003). When China ramped up its export volumes to the U.S., there was little room to maneuver. Consequently, Mexico has lost significant U.S. market share in these sectors to China and Mexican production and employment has suffered. While Mexico may be safe from Chinese competition, for the moment, in autos and auto parts, this is not because Mexican human capital is adding value to any great degree, merely that transport represents a much more significant obstacle to China in these sectors.

More value is being added—in the Mexican economy and globally—where human capital is deployed in knowledge work, a broad description of activity that involves the gathering, analysis, manipulation and/or communication of information. The ability of a country to bring its population into the knowledge economy and prepare them to become knowledge workers has become so important in predicting value creation and economic success that the World Bank has devised a ‘Knowledge Economy Index’ to monitor performance on this dimension. A country’s performance on this measure correlates very strongly not only to GDP per capita but also to the UNDP’s Human Development Index, a broader gauge of social well-being.

In terms of preparing its citizens for life in a global knowledge economy, Mexico ranks 58<sup>th</sup> in the world—nestled between Jordan and Mongolia. Mexico is lagging most of the developed world (and much of the developing world) according to this assumedly neutral World Bank measure. More worrying is the fact that between the assessment done in 1995 and the most recent one, Mexico has actually slipped further behind (*see chart below—China, by the way, is rapidly catching up with Mexico on the KEI*).

*Graph 1: Knowledge Economy Index, 1995 versus most recent*



Therefore, given the current economic dilemma that faces Mexico, the next President must respond to two growing gaps: first, the gap between Mexico's export-led productivity and that of China, India, and other emerging markets (driven by their advantage in labor costs); and second, the gap between Mexico and the rest of the developed world in terms of human capital—Mexico's ability to equip its citizens for knowledge work.

This memo will argue that leaders in Mexico should be focusing on closing the second gap, the human capital gap, as a means of closing the gap on productivity and regaining competitiveness. The era of competition via low-cost Mexican labor would appear to be over. Economic competition in the future will focus on the manipulation of knowledge and the development of human capital.

The clients to whom this memo is directed might immediately ask whether Mexico can afford to become a knowledge society. Perhaps that is a luxury reserved for more developed nations? True, it will require investment, and not just the usual types. As the

knowledge economy has gained traction, investment in intangibles—R&D, education, software—has overtaken fixed capital investment in the OECD (Dahlman 2003). But the best answer might be to paraphrase Abraham Lincoln: “If you think knowledge is expensive, try ignorance!” Government action is required because without specific policy implementation there is evidence that this ‘technical’ problem could become a national economic and social crisis which could cost far more to resolve in the future than if we begin today.

This memo will review a number of programs and cases in developing countries related to the development of knowledge workers. It will look at comparisons of human capital in countries similar to Mexico and analyze policy differences between the countries. It will suggest new alternatives or combinations of existing programs. It will present criteria for evaluating these alternatives in terms of their potential success, both technical and political, and their appropriateness for Mexico in the near future. And of course I will make a preliminary recommendation and discuss the implementation issues.

## **II. Theoretical background**

So how does Mexican government go about creating human capital? How do we develop knowledge workers? What do we know about this area?

Let’s start with some definitions. Since the World Bank seems to be leading the way in policy research on this topic, let’s begin by reviewing one of their definitions of a knowledge-based economy. A knowledge economy, they suggest, “relies primarily on the use of ideas rather than physical abilities and on the application of technology rather than the transformation of raw materials or the exploitation of cheap labor (World Bank 2003a).” This seems very relevant to our current Mexican situation, so that will be the thrust of what I mean when I refer to a knowledge economy in the balance of this paper. Unless Mexico sees itself as being a global provider of cheap labor, or dreams that Mexican oil will last forever, Mexico will almost inevitably become a knowledge economy as thus defined. The question will be whether it does so quickly and efficiently or slowly and painfully.

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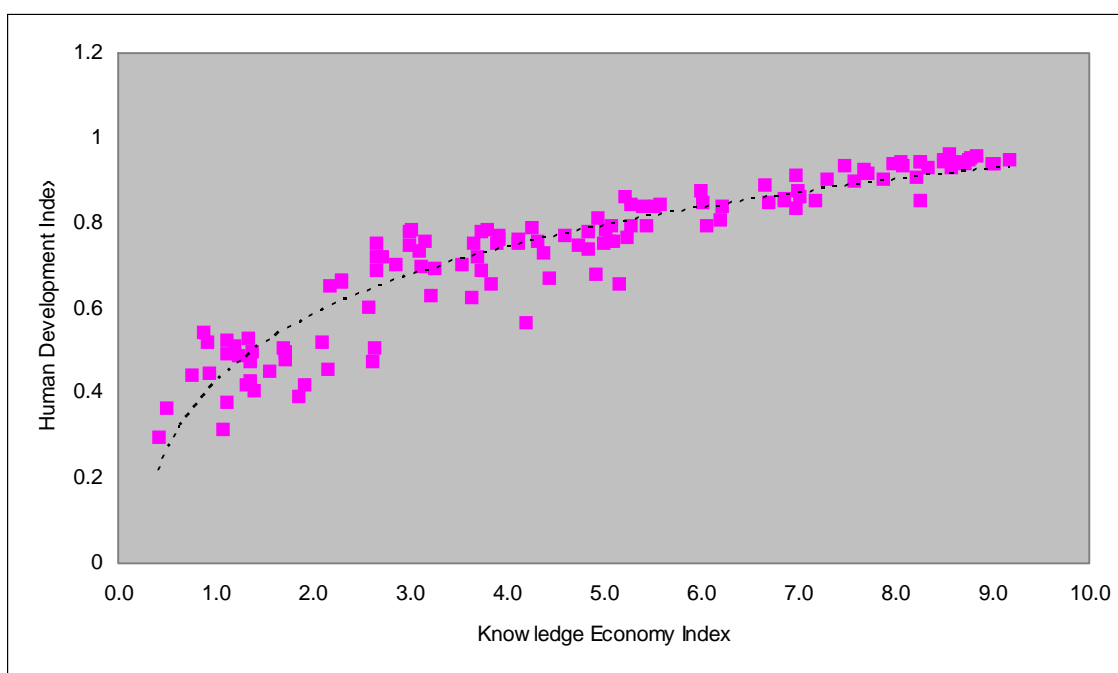
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Another definition, also from the World Bank, which seems slightly less useful but perhaps more politically correct, states that a knowledge economy is “an economy that makes effective use of knowledge for its economic and social development.” This is fuzzier, but broadens the scope of our inquiry into the social arena, which is indeed relevant in terms of political feasibility of any policy recommendation. In general, however, I will be focusing on the economic/productivity implications of policy alternatives. Having looked at the correlation<sup>2</sup> between the Knowledge Economy Index (KEI) and the most generally-accepted social well-being indicator, the UN’s Human Development Index (*see chart and regression below*), I am comfortable that a policy that improved Mexico’s performance on the KEI would almost certainly have positive social outcomes as well.

*Graph 2: Knowledge Economy Index correlation with Human Development Index*



It is also worth noting that most definitions allow for a ‘knowledge economy’ to tap foreign knowledge as well as adapting and creating knowledge for its specific needs. (Dahlman 2003) It is not exclusively about creating original knowledge, more about exploiting knowledge for national ends.

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<sup>2</sup>  $y = 0.2293\text{Ln}(x) + 0.4245$ ,  $R^2 = 0.8702$

Since the title of this memo is “Developing knowledge workers in Mexico,” it seems appropriate also to define what a ‘knowledge worker’ is. One of the first mentions of the term ‘knowledge worker’ came in Peter Drucker’s seminal work, *The Age of Discontinuity*, in which he referred to new information-intensive industries that were developing in the industrialized countries of the 1960’s by saying that “these new industries differ from the traditional ‘modern’ industry in that they will employ predominantly knowledge workers rather than manual workers.” (Drucker 1969) Other than saying they weren’t like manual workers in assembly-line manufacturing jobs, Drucker was not very specific at that time about exactly what these new knowledge workers were or did.

Many recent commentators have used the term ‘knowledge worker’ to describe professionals, like doctors, lawyers, accountants or engineers. However, I will be adopting a much less ambiguous definition, one proposed by the same Peter Drucker just a few years ago (although he now used the term ‘knowledge technologist’ rather than knowledge worker). In an article entitled “The next society” in *The Economist*, he predicted that “the most striking growth will be in ‘knowledge technologists’: computer technicians, software designers, analysts in clinical labs, manufacturing technologists, paralegals. These people are as much manual workers as they are knowledge workers; in fact, they usually spend far more time working with their hands than with their brains. But their manual work is based on a substantial amount of theoretical knowledge which can be acquired only through formal education, not through an apprenticeship. They are not, as a rule, much better paid than traditional skilled workers, but they see themselves as ‘professionals’.

Just as unskilled manual workers in manufacturing were the dominant social and political force in the 20th century, knowledge technologists are likely to become the dominant social—and perhaps also political—force over the next decades.” (Drucker 2001) Therefore, the knowledge workers I am referring to in this paper—the ones that we need to develop in order to more effectively compete in the global knowledge economy—are *not* necessarily even university graduates. They are simply formally trained and have developed specialized knowledge in a particular area and use their training and knowledge to add value in their work. And just because they use their brains doesn’t mean they don’t use other parts of their bodies as well.

Developing knowledge workers is a necessary step, perhaps the first step, in moving into the knowledge economy. Returning for a moment to the World Bank's 'knowledge for development' framework, we note that their Knowledge Economy Index (KEI) attempts to measure whether conditions in a given country are such that knowledge can be *used effectively* for economic development. Those conditions include the status of human capital in the country.

According to the World Bank (Dahlman 2003), the KEI is calculated based on the average of the normalized performance scores of a country or region on all four 'pillars' related to the knowledge economy:

1. Economic incentive and institutional regime that provides incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship
2. Educated, creative and skilled people
3. Dynamic information infrastructure
4. Effective national innovation

Clearly, all four of these so-called 'pillars' would be responsive to government policy, and a policy recommendation in any area would need to consider synergies with policy in the other three areas. That said, because of the vastness of the policy terrain that would be covered in these four areas, ranging from tariffs and taxation in the incentives area to telecoms regulation in the infrastructure area to national R&D programs in the innovation area, I will restrict my focus primarily to policy options designed to impact point two, the development of '*educated, creative and skilled people.*' However, one of the conclusions will inevitably be the requirement for more policy integration across departments and levels of government, and more integration of public and private initiatives in all four areas. I will also comment on what policies in other areas might be constructive or counterproductive if implemented simultaneously with the educational policies recommended. For example, industrial policy which provides incentives for certain new businesses that require certain workers with certain types of knowledge will fail miserably if education policy is not designed to meet the specific demand. Therefore,

policy in this area must necessarily integrate *at least* the industrial and educational aspects. It should be noted also that there is a tight conceptual relationship between commercial/industrial policy and educational policy, one view of education being that its role is to supply industry with qualified and competent employees. Therefore, educational policy must make some assumptions, at the very least, about what industries will be present in Mexico, now and in the future.

Suffice it to say that dealing with the human capital challenge will require greater coordination among government ministries than has been the case in the past.

### ***Education policy in a knowledge economy***

Regarding the theoretical aspects of education policy, there is an extensive and growing literature that focuses on what might be called the paradigm shift that is occurring in education in tandem with the global shift to a knowledge economy. When ideas and know-how are the sources of economic growth, as opposed to the classical factors of production, the requirements for education change dramatically.

To begin, I will refer again to Peter Drucker, who observed that “Information is data endowed with relevance and purpose. Converting data into information thus requires knowledge. And knowledge, by definition, is specialized.” (Drucker 1988) While this might seem a rather uncontroversial statement, it can have major ramifications for educational policy, given that most public, government-funded education is unspecialized. For example, one popular notion today is that university education is a necessary prerequisite for higher performance in knowledge-based industries, but Drucker’s statement suggests otherwise. So do numerous case studies in developing countries. It is depth of education that is critical, not necessarily length of time studying. In one case in India (Prahalad, 2004), teenage girls with eight to nine years of basic education—no more than *secundaria* in Mexican terms—were given two additional years of formal specialized schooling in reading X-rays. After several months in their new jobs as clinical analysts, they were able to out-diagnose U.K. doctors with 20 years of studies. In this case, the Indian knowledge workers were not only focused exclusively on one medical process

(reading X-rays) but also on just one area of the human body (the eye). This specialization of knowledge is similar conceptually to Adam Smith's specialization of labor which fueled the first major economic revolution in the 19<sup>th</sup> century. In the 21<sup>st</sup> century, according to this theory, individuals and states will increasingly gain competitive advantage through focusing on particular areas of knowledge and becoming the low-cost or highest-value option for that particular knowledge skill.

Another relevant theme in the literature is that of flexibility and autonomy. Rather than being taken through a set curriculum, once in their life, knowledge workers benefit from more continuous and more tailored learning, with different iterations in different forms over their entire careers. According to Manuel Castells:

It is estimated that a person who starts his professional career today will, during the course of his life, change not only his position but also his profession four or five times. This means that those who have the capacity to redefine themselves—those who can learn new skills—will never become obsolete. It isn't just a question of qualifications. (Castells *forthcoming*; translation by author)

Previously, education proceeded stepwise through the basic components of literacy and numeracy, and supplied the student with a set of facts about the world. Job training took place only when workers started a new job. In a knowledge economy, education focuses on learning how to continue learning, learning how to find thousands or millions of facts rather than memorizing a few. Training is continuous as technology changes.

And technology does change, constantly. That's why some 'obvious' educational policies for the new knowledge economy, like computers in every classroom, may not be so obvious once we review the literature. In India (again), the world's favorite place to outsource knowledge-based work (and where economic growth is averaging 8% annually), students are taught about computer programming without the use of any computers whatsoever. They are taught how to think logically and express concepts in symbols. These students may be more capable of adding value in the future than those who learned a specific programming language on a specific technology platform—because both language and platform are guaranteed to become obsolete within a few years. As Castells puts it:

In the seventies, when I was an undergraduate, I learned how to program in Fortran 4 and Basic. Now it doesn't do me any good. Fortunately, computers these days are easier to manage through other means. What I learned about information technology—with great effort, because I was definitely not a programming whiz—has no value, not even the logic, which was a special kind of network logic with no mathematical analogy to what is being taught these days. (Castells *forthcoming*; translation by author)

The theoretical theme here is the focus on conceptual knowledge rather than factual knowledge, allowing knowledge workers more flexibility to be trained and retrained as they move from job to job, technology to technology, and even industry to industry.

As we look at quantifying the outcomes and impacts of our policy options, we can exploit the rich and ample literature on returns to education. The international institutions have bolstered their policy recommendations to developing country governments with a vast array of quantitative analyses on this topic. If a politician (without the insight of Lincoln) should complain about the cost of bringing his citizens into the information age, we can fairly confidently inform him or her that the estimated effect on GDP of one additional year of schooling of 15-64 year olds is around 6% on average. (UNESCO/OECD 2003) While it's true that we cannot claim experimental proof of such a claim, and though there is a lot of economic noise in any analysis of such broad macroeconomic factors, we have a wealth of comparative data that enables a convincing meta-analysis.

And the linkage of investment in education and economic returns is more the case as the world's economies become knowledge economies. The correlation between educational attainment (based on international assessments) and per capita GDP is actually *increasing*. (Dahlman 2003) This puts further pressure on an area where Mexico is lagging its peers in the developed and developing world.

### ***Education in Mexico: a report card***

Thanks again mostly to the international institutions, there is a wealth of data on the performance of the Mexican educational system in relation to its international peers and competitors. The following executive summary presents a fascinating contradiction.

Education expenditure is growing faster than GDP, teacher salaries are growing faster than in virtually all OECD countries, and participation rates are rising. (McGaw 2005) Yet in terms of performance, Mexico is losing ground to most of its economic competitors, especially in Asia, and it ranks the lowest among OECD countries in some key performance measures that correlate to success in the knowledge economy.

There are no clear conclusions being drawn, or at least none being published by the international institutions. Some suggest that it's possible that Mexico is on the right track, and that it is only a matter of time before these increased investments start to pay off. One policy issue that we will examine in this memo is whether these increased resources are being allocated most effectively, and what we can learn from countries that seem to be outperforming Mexico in this area.

Another issue we will examine is who should be the service provider. Traditionally, the public sector provided most education services. Is that appropriate for the future? Which services should be provided by whom? The literature suggests that today in Mexico, based on results of national and international assessments, private education is doing a better job of developing knowledge workers than public education. This improved performance seems to be correlated with the autonomy that these private schools enjoy in terms of managing their teachers and resources, as well as better technology and funding. (World Bank 2005a)

One of the ironies of the emerging knowledge economy is that education—the knowledge factory, if you will—is one of the few industries *not* gaining in productivity through the improved use of knowledge. It's one of the most traditional sectors in the economy and, particularly in Mexico, one of the slowest to respond to innovation and change in the rest of the economy. In Mexico, productivity and quality are not improving. (World Bank 2005a)

One reason may be the *way* Mexico spends. Only 2.7% of spending is allocated to capital spending at the primary and secondary levels, compared with OECD averages of 11.6%. (McGaw, 2005) This severely constrains any improvements in infrastructure and therefore productivity. Almost all is spent on staff compensation, leaving only 5.6% at the

primary level for all other expenditures, including infrastructure and instructional materials, compared with the OECD average of 19.0%.

Completion of upper secondary is lowest in OECD. Only 25% of Mexican 25-34 year olds have attained that level, compared with the OECD average of 75%. (McGaw 2005) Meanwhile, Korea has moved from rank 24 to number 1 on this same dimension. Their per capita GDP has recently passed Mexico's as if Mexico were standing still. We will need to look at the policies employed in Korea and evaluate them for use in Mexico.

One fascinating aspect of the Mexican shortfall in secondary education, and perhaps a large part of the explanation, is that completion of upper secondary (*preparatoria*) does not lead to a higher employment rate than merely completing lower secondary (*secundaria*). (McGaw 2005) Clearly, there is no economic incentive for students to move to this next level. In contrast, there is a 20% employment premium for moving on to the tertiary level. Lo and behold, Mexico's performance gap is not so large at that level.

In terms of performance relative to its economic competitors in the OECD, Mexico obtained the lowest mean score for mathematics of all forty countries tested. (OECD 2005) According to the literature, students with mathematical proficiency below level 2 on the standardized PISA (Programme for International Student Assessment) scale are likely to encounter serious problems using math concepts in their later lives. It is difficult to overstate the importance of this particular failure in educational performance in terms of Mexico's ability to compete in the knowledge economy. Knowledge workers need to feel comfortable with numbers.

While we have clarity on the educational results, there is less clarity on the causes. Some of the explanation might be simply budgetary. For example, student-to-teacher ratios in Mexico tend to be very high compared to OECD averages, a function of the low level of absolute spend by Mexico on education relative to its OECD competitors. We know, both intuitively and empirically, that quality decreases as the number of students a teacher needs to interact with increases.

But some of the explanation might be rooted in the generic problems of managing education, problems merely exacerbated by low spending and the historic lag that characterizes much of Latin America. Education is, in Mexico like in most countries, a

public monopoly. Monopolies are usually something that economies like to avoid, but most governments have concluded that a) education is a natural monopoly, and b) that it should be managed by the state. Some of the literature suggests that state control, and in particular highly centralized control, may contribute to problems of teacher and student motivation. We do have the counterfactual of private school performance scores.

In addition, Mexican education policies tend to be *input-based* rather than output-based, supplier-driven rather than customer-focused. Requirements for expenditure are based on internal process measurements, like the number of students or last year's budget, as opposed to objective external impact targets. We will look at what is being called the 'demand-based' model as we search for policy alternatives. And we will review policy options which include allowing more discretion at the local level for how resources are allocated and better incentives for the improvement of performance.

In summary, given the amount of research and analysis conducted over the past few years, especially by international institutions attempting to support policy recommendations for country clients, we can be fairly confident about the correlations between investment in education and improvement of economic performance, but we need to be relatively cautious about prescribing specific policy options to cure the problem. As I stated earlier, we will also need to keep in mind the extreme importance of coordination of policy across departments and levels and the interaction of educational policy with policy in other areas.

Based on these caveats, we will review the following areas which fall directly out of the theory and literature of today:

- Specialization versus generalization
- Allocation of investment
- Centralization versus decentralization
- Increased privatization<sup>3</sup>, in both basic and specialized areas
- Management and incentive systems

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<sup>3</sup> I will also attempt to address equity problems that may arise as the private share increases

We will *not* be specifically reviewing or evaluating programs to increase school attendance (like *Oportunidades* in Mexico). There is ample data demonstrating that such programs work, insofar as they increase participation rates<sup>4</sup>. We are more concerned here about what happens once the student is in the school and the education begins. Does the student become a knowledge worker, or just a worker?

### **III. Methodology**

One key analytical problem in considering education policy is the long lead time. If we make changes to the educational system today for secondary school students of 15 years old, we may not know the impact on these students' income-generation capabilities for ten or more years. Plus, we will have to contend with the usual multitude of macroeconomic noise factors that make such analysis problematic in the best of circumstances with much shorter lead times. Ex-post evaluations, if we live long enough to make them, will include the impacts of many other policy decisions both within and outside of Mexico.

Therefore, I am proposing a sort of meta-analysis: the use of other countries' policies and policy outcomes to make the case for policy change in education in Mexico. As stated in the introduction, we will review a number of cases and policies in countries that are comparable, in one respect or another, to Mexico, and attempt to draw conclusions about the likely impact of such a policy in Mexico. I will try to be careful to describe why I believe the case is appropriate and relevant, and what can or cannot be inferred (analytically) from the results.

I will review both public policies and private initiatives, for two reasons. First, private initiatives, to the extent that they represent an effective model for developing knowledge workers, may be able to be translated into public policy. Second, the policy

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<sup>4</sup> Some commentators have also pointed out that such participation-only programs may be less effective than they could be in achieving their ultimate purpose of breaking the cycle of poverty because the supply side has not responded in a coordinated way. Class sizes go up, but teaching and resources are held static with a resultant lowering in the quality of education delivered.

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recommendation might involve an indirect role for the government, supporting private initiatives through some form of public funding.

Before presenting the policy alternatives, I will suggest a number of success criteria by which we can measure the effectiveness of policies whose aim is to develop knowledge workers in Mexico. Based on the outcomes of the cases and policies we have reviewed, and informed by the theoretical framework outlined above, I will then assign a very crude ‘likely impact’ score to each policy across the various success criteria. The policy recommendation will thus fall out of this process in the form of a set of policies that appear to have a likelihood of success within Mexico.

I will not attempt an *ex-ante* evaluation of the eventual impact of the recommended set of policies in terms of economic indicators, simply because I don’t believe any evaluative methodology would yield a sufficiently robust result, especially considering the interaction of educational policy with other policies, public and private. I will only be suggesting that, almost regardless of other programs and policies implemented (provided they are not counterproductive and destructive of the educational policies), Mexico will achieve significant progress on developing knowledge worker if the recommended set of policies is implemented.

### ***The ‘comparator countries’ approach***

If we are looking for potential policy solutions to the problem of developing knowledge workers in Mexico, we need first to determine what countries have successfully made—or appear to be making—the transition to a knowledge economy. It will also be useful to review what *hasn’t* worked in human capital development. Therefore, we will be comparing various countries on several of the dimensions we have selected above.

However, because of the critical role of national (and governmental) resources available for investing in human capital development, we need to restrict our comparison to countries that are roughly in the same economic league as Mexico and facing many of the same issues and obstacles. A recommendation that Mexico multiply its current level of education investment by ten in order to match the investment made in the United States

would not be a serious recommendation. However, a recommendation that Mexico manage its scarce resources in a way similar to other countries who have achieved good results in developing knowledge workers with roughly the same GDP per capita should be more realistic. Obviously, GDP per capita is not the only factor bearing upon feasibility. There are many cultural and historical factors that are at work in each society, particularly regarding attitudes toward education and human capital—*institutional* factors which we will address as well in the course of this policy review—but at least if we are in the ballpark economically we can avoid the danger of any policy recommendations being dismissed for budget reasons.

The countries selected for comparison—our ‘comparator countries’—are clustered around Mexico in terms of GDP and include both regional neighbors (Brazil and Chile) as well as European and Asian states. There are also two groups included for reference, both of which include Mexico as a member—the ‘upper middle income’ countries, and the ‘Latin America & Caribbean’ region.

*Table 1: Comparator Countries, Historical GNI per capita and growth rates*

Comparator Countries	GNI per capita 1980, PPP Current USD (World Bank)	GNI per capita 1990, PPP Current USD (World Bank)	GNI per capita 2004, PPP Current USD (World Bank)	GDP per capita growth rate, 1990-2003 (UNDP)
Brazil	\$3,550	\$5,140	\$8,020	1.2%
Chile	\$2,400	\$4,470	\$10,500	4.1%
China	\$410	\$1,310	\$5,530	8.5%
India	\$640	\$1,370	\$3,100	4.0%
Korea, Rep	\$2,580	\$8,000	\$20,400	4.6%
<b>Mexico</b>	<b>\$4,080</b>	<b>\$6,030</b>	<b>\$9,590</b>	<b>1.4%</b>
Poland	..	\$5,960	\$12,640	4.2%
Slovak Republic	..	\$8,960	\$14,370	2.4%
Upper middle income	..	\$6,810	\$10,090	..
Latin America & Carib	\$3,430	\$4,820	\$7,660	1.1%

*Sources: GNI data from World Bank (World Development Indicators); growth rates from UNDP*

As the table above illustrates, in 1980 Mexico was among the richest of the eight comparator countries<sup>5</sup>. In this sense, Mexico had a head start on most of its country cohort. If its policy at that time had been to invest heavily in human capital, it certainly could have matched the investment of any of the other countries. Today, Mexico lags in terms of per capita Gross National Income (GNI) relative to six of these countries, and two of the remaining three (China and India) are catching up fast, with growth rates far exceeding that of Mexico. It is worth noting that China started at one tenth of Mexico's per capita income in 1980 and will likely exceed Mexico's per capita income in 2012—by the end of this next *sexenio*—given current growth rates and demographic trends. Although the management of human capital was just one aspect of this remarkable advance, to have accomplished this feat in just over one generation with a population ten times as large as Mexico's is evidence that government policies can make a difference. The leaders of China did not suddenly discover oil or any other valuable natural resources. They merely organized their human resources in new ways. Based on the data we are about to review, I hope you will conclude as I have that this must now be Mexico's task as well.

Before we begin examining how these comparator countries and governments are going about the task of competing in today's global knowledge economy, let's review their ranking on the World Bank's Knowledge Economy Index (KEI). As described earlier, this index is comprised of four 'pillars' which include economic incentive regime, innovation, education and human resources (the focus of our investigation), and information infrastructure. The table shows the comparator countries in rank order based on the overall KEI, and then shows performance on each of the components.

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<sup>5</sup> Although comparable data for 1980 isn't available for the eastern European countries listed, it is likely that Mexican GDP per capita at that time was greater than Poland's—Poland still lagged Mexico in 1990—and similar to that of Czechoslovakia, of which the Slovak Republic formed a part at that time.

Table 2: *Knowledge Economy Index and components*

Comparator Countries	Knowledge Economy Index	Economic Incentive Regime	Innovation	Education	Information Infrastructure
Korea, Rep	7.57	5.72	8.18	7.62	8.75
Poland	6.86	6.36	6.15	8.32	6.60
Chile	6.85	8.90	5.72	6.24	6.51
Slovak Republic	6.70	5.96	6.70	6.65	7.47
Brazil	5.08	4.02	5.08	5.59	5.64
<b>Mexico</b>	<b>4.94</b>	<b>4.89</b>	<b>4.90</b>	<b>4.37</b>	<b>5.58</b>
China	3.90	2.95	4.74	3.60	4.30
India	2.58	2.47	3.72	2.16	1.96

Sources: World Bank Knowledge Assessment Methodology, updated December 2005

There is a wide variation of KEI scores, as well as inter-country and intra-country variation among the components. Each country has different strengths and weaknesses within the KEI methodology.

Of the comparator countries, Korea leads the way into the new global knowledge economy with an overall KEI of 7.57, leading on both innovation and infrastructure and coming second to Poland on education. It should not come as a surprise that the Asian economies tend to outperform in the area of innovation. Mexico is in sixth place out of eight, with its weakness in the area of education—hence the focus of this policy review. While Mexico scores higher on education than China and India, we must note that its per capita financial resources are (for the moment) considerably greater than either of these two poor and populous countries. When compared to Latin American countries with similar resources, Mexico lags significantly on education, scoring 4.37 compared to Brazil’s 5.59 and Chile’s 6.24.

To understand the source of this poor performance on education, we need to drill down into the variables that comprise the education indicator. The KEI uses three primary variables to assess human capital development: adult literacy rate, secondary school enrollment, and tertiary school enrollment. Literacy is described as “the percentage of people aged 15 and above who can, with understanding, read and write a short, simple statement on their everyday life.” (World Bank 2006) Secondary education would include years seven through twelve of education, roughly including both *secundaria* and

*preparatoria* in the Mexican system. Tertiary education is post-secondary education, normally four-year university courses and in some cases advanced vocational education. Gross enrollments, for both secondary and tertiary, is the ratio of total enrollment at that level, regardless of age, to the population of the age group that officially corresponds to the level of education shown.<sup>6</sup>

*Table 3: Education sub-components of KEI*

Comparator Countries	Education component of KEI	School enrollment, secondary (% gross, 2002)	School enrollment, tertiary (% gross, 2002)	Adult literacy rate (% age 15+, 2000-2004)
Poland	8.32	104.5%	59.9%	99.7%
Korea, Rep	7.62	89.8%	84.7%	97.9%
Slovak Republic	6.65	91.7%	33.7%	99.6%
Chile	6.24	88.9%	42.4%	95.7%
Brazil	5.59	110.0%	20.6%	88.4%
<b>Mexico</b>	4.37	<b>79.0%</b>	<b>22.4%</b>	<b>90.2%</b>
China	3.60	70.3%	15.8%	90.9%
India	2.16	52.8%	11.9%	61.0%

*Sources: Enrollment from World Bank (World Development Indicators); literacy from UNDP*

Here we begin to see the difference in the effects on the one hand of education policy and on the other hand of what I will call the ‘education culture’ in the comparator countries. Since, by design, the comparator countries (with the exception of China and India) all start with about the same resources available, the widely differing performance on the education must have something to do with the priorities placed within the society on the development of human capital and the effectiveness of governmental programs<sup>7</sup> to address the issue. And it’s clear that even China and India, both with a huge starting disadvantage in terms of per capita resources, have made great strides in human capital development in recent years, with China’s literacy rate now exceeding that of Mexico and their secondary participation rate catching up quickly.

<sup>6</sup> Please note that this ratio can exceed 100% because students of ages other than the ‘official’ ages for this level of schooling may be attending this level, including adults who return to schooling at a more advanced age.

<sup>7</sup> In all cases shown here, governments have perceived ‘human capital development’ to be a type of ‘market failure’, with social and fiscal returns far outweighing perceived returns to the individual (although individual returns are also large), and hence have taken direct responsibility for funding educational programs.

With regard to participation and completion of the secondary level, it is useful to distinguish between lower secondary and upper secondary. Lower secondary, in most countries, would include seventh, eighth and ninth grades, educating students of ages 13 to 15 years old. In Mexico, this corresponds to *secundaria*. In most comparator countries, school attendance through the lower secondary level is compulsory. Upper secondary (*preparatoria*) is rarely compulsory, and focuses on preparation for tertiary education for students of 16 through 18 years of age. The OECD, in their compendium of educational data on their 30 member countries (of which Mexico is one), has this to say about upper secondary school:

Rising skill demands in OECD countries have made qualifications at the upper secondary level of education the minimum credential for successful labour market entry. Upper secondary education serves as the foundation for advanced learning and training opportunities, as well as preparation for direct entry into the labour market. Although many countries do allow students to leave the education system at the end of the lower secondary level, young people in OECD countries who leave without an upper secondary qualification tend to face severe difficulties in entering the labour market. (OECD 2005)

Through our lens of the knowledge economy, this level of upper secondary appears to be a crucial phase, where students being to analyze and source information on their own rather than merely feeding back pre-packaged information and pre-analyzed conclusions. The following table illustrates how our comparator countries perform on this level:

*Table 4: Completion of upper secondary*

Comparator Countries	Population between 25-34 that has attained at least upper secondary education (%)	Population between 55-64 that has attained at least upper secondary education (%)	Improvement, 1973-2003
Korea, Rep	97	32	65
Slovak Republic	94	70	24
Chile	63	30	33
Poland	57	40	17
Brazil	35	16	19
<b>Mexico</b>	<b>25</b>	<b>12</b>	<b>13</b>
China	..	..	..
India	..	..	..

Sources: OECD, *Education at a Glance*, 2005

There are several striking aspects of the table above. First, there is a massive gap between the leaders and the followers in terms of the percentage of young people in each country who have successfully attained this level of educational development, from 97% in the case of Korea to a mere 25% in the case of Mexico. What is perhaps even more striking, and more hopeful for Mexico, is the enormous jump made by Korea in completion of this level of schooling over the last thirty years, zooming from 32% of the population who were 25-34 in 1973—close to Mexico’s current level—to 97% of the same population in 2003.

The final part of this introduction to the global policy context using the comparator countries involves actual micro student performance, as opposed to macro government performance. It could be argued that merely getting the students into the schools, and even graduating them out of the schools, does not guarantee that they have learned anything useful. To this end, we can take advantage of recent cross-country data on standardized tests. In addition, while the previous analysis helps us understand where Mexico is today in terms of developing knowledge workers, we should also attempt to understand where we will be in the future. Based on the literature, there are several key ‘leading indicators’ of a nation’s performance in the knowledge economy. Because of the technical demands of knowledge work—remember that Drucker called them ‘knowledge technicians’—one of those key indicators is the ability of students to handle mathematical concepts and solve everyday problems.

The OECD recently compiled the results of a ‘mathematical literacy’ test given to 15-year-old students as part of its Programme for International Student Assessment (PISA) conducted among OECD member nations. According to the OECD’s report, this test “presents students with problems mainly set in real-world situations, crafted in such a way that aspects of mathematics would be of genuine benefit in solving the problem.” (OECD 2005)

In the same PISA program, students were also presented with a ‘problem-solving’ test. This problem-solving assessment, again according to the OECD, “aimed to parallel situations that students might confront in their future lives, including those that were not routine. Problem types were chosen because they are widely applicable and occur in a

variety of settings.” (OECD 2005) In other words, students in these tests were not given arcane equations nor asked to regurgitate minute details but were dealing with what we might term ‘knowledge worker problems’ of the 21<sup>st</sup> century. So how does Mexico compare on these indicators?

*Table 5: Mean scores of 15-year-olds on PISA Mathematics and Problem-solving scale (2003)*

Comparator Countries	Mean student performance on PISA math test, 2003	Mean student performance on PISA problem-solving test, 2003
Korea, Rep	542	550
Slovak Republic	498	492
Poland	490	487
Chile	..	..
Brazil	..	..
<b>Mexico</b>	<b>385</b>	<b>384</b>
China	..	..
India	..	..

*Source: OECD, Education at a Glance, 2005*

The implications of this table are quite sobering for Mexico, for several reasons. First is the sheer magnitude of the drop between the more successful students and the Mexican students on both tests. While the top mean scores cluster in the 490-550 region on both tests, Mexico’s scores are more than 100 points below its nearest neighbor. Including other OECD countries among the comparators would not help in this case, because Mexico placed 30<sup>th</sup> out of 30 countries on both tests. And while in this case we don’t have scores available for some of the countries that have suffered in comparison with Mexico in our previous analyses, Chinese and Indian students have been known to do rather well on similar math and problem-solving tests.

Second, and more worrying, is that these scores need to be viewed in the context of the previous tables, in particular in relation to which group of 15-year-olds in each country were taking the test. These tests were administered only to students. Therefore, in countries where school attendance approaches 100% for 15-year-olds, like Poland or Korea or Slovak Republic, the scores represent how the average Korean or Slovakian 15-year-old would perform, but in Mexico where only a minority of 15-year-olds are still in school, the

scores would represent not how the average Mexican 15-year-old would perform, but how the *most educated* Mexican 15-year-olds would perform.

On the math test, which included six levels of potential performance, the majority of Mexican students could not perform above level one (the lowest level). 38% of all Mexican students tested scored *below* level one—twice as many as any other OECD country with the exception of Turkey (where 27% scored below level one). In the problem-solving assessment, over half of the Mexican 15-year-olds (58%) could not solve the simplest (level one) problems. In the words of the OECD program manager, “students below Level 1 have significant difficulties in making decisions, analyzing or evaluating systems, and trouble-shooting situations.” (OECD 2005)

Finally, to return to our original theme of the impact of human capital on economic growth, the OECD tracked the per capita GDP growth of its members between 1990 and 2000. They divided this growth into three contributing factors: the increase in GDP per person employed, which can be seen as simply the increase in personal productivity of workers; the increase in the working age proportion of the population; and the increase in the employment rate of the working age population. On average across the 30 OECD member countries, the first factor, personal productivity, accounted for 80% of the growth over this decade. In only two cases was the productivity contribution less than 50%. One of these was Mexico, with by far the lowest contribution of personal productivity at 13%. (OECD 2005) Given the results of the human capital development scorecards presented above, this is not surprising. The average growth of Mexico during this period was a modest 1.5% per annum, and was driven almost exclusively by more working age people working longer hours, with no real change in the amount of work an individual could do, no real change in the value added by a human being. Human capital development in this scenario is not much more than the production of more arms and legs.<sup>8</sup>

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<sup>8</sup> Jisoon Lee (Lee, 2002) points out that empirical studies investigating how much the accumulation of human capital has contributed toward economic growth are rare. Pyo (1995), using Korean data, summarized his study with the following estimation result:  $\ln GDP = -0.153 + 0.381 \ln K + 0.399 \ln H + 0.199 \ln L$

Here K is the physical capital stock, H is the human capital stock, and L is the total hours of work. The result shows that human capital accumulation has been as important as physical capital accumulation in explaining economic growth, and confirms the hypothesis that rapid accumulation in human capital has been instrumental in the overall economic growth process of Korea.

At this point, we have established the policy problem within the context today's global economy. Although the comparator countries may be Mexico's economic peers, they are outstripping Mexico in terms of developing human capital, developing knowledge workers. We are now ready to examine in more detail the policy decisions behind these relative performances, as well as the institutional factors at work.

#### **IV. Comparator country cases**

At this point we can return to the policy options that come out of the theory and literature discussed earlier, now within the context of actual country performances. The themes were as follows:

- Specialization versus generalization
- Allocation of investment
- Centralization versus decentralization
- Increased privatization, in both basic and specialized areas
- Management and incentive systems

As we review these themes, I will try to distinguish between *technical* issues and the *institutional* issues. Some policy options have a more technical nature because their success will primarily depend on technique, analysis, evaluation and monitoring, whereas other policy options are more institutional in nature because their success will depend on the understanding and management of the underlying rules, protocols, process, habits and customs involved. This distinction is necessary at this point because there will be significant differences in policy design and implementation depending upon whether the policy option being discussed is more of the technical or institutional type. In addition, there are likely to be order effects at work here: the 'right' technical policy may be ineffective because the institutional changes necessary for its success have not yet been implemented.

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As mentioned earlier, the very different educational outcomes in the comparator countries are due to differences in both governmental policy and educational culture—i.e. institutional effects. However, so as not to provide a built-in excuse for the incoming administration or future administrations, we will show examples in this review of how *policy can affect culture*. This has been the case in several of the comparator countries. Institutions have been changed, for the better.

We must admit, from the outset, that tackling centralization or incentives or privatization from a policy perspective is to attempt to change historical institutions which often seem impervious to change. Hence, when contemplating these institutional options, the preferred course for most governments, in Mexico and around the world, is often the ‘do nothing’ option. But while institutional options will always be the more difficult choices, the rewards may also be greater. In addition, there may be evidence that desired technical options will not be effective without at least some institutional change. If that were the case, choosing to ‘do nothing’ regarding institutional change might be sentencing Mexico to a continuing slide down the competitive ranks of human capital.

With these clarifications and caveats in mind, we can begin our review of what choices other countries have made in developing knowledge workers.

### ***Specialization versus generalization***

If we intend to develop what Drucker referred to as ‘knowledge technicians,’ surely some degree of specialized technical education seems appropriate. However, according to UNESCO’s *Education Today* newsletter, “technical and vocation education and training (TVET) can be a dirty word. Principals and teachers point to the heavy expenses required to develop curricula, train staff and equip classroom for these specialized subjects, which generally cost three times more than academic courses.” (UNESCO 2003) There is a perception among parents and students as well that technical or vocational training is somehow ‘second class’ and that there is a big difference between having skills and having a job that requires those skills. There is no guarantee the training provided is what is

needed by the private sector, especially with the technical content of knowledge economy jobs changing so quickly.

“In the past, there was a supply-side vision,” comments Mohan Perera, head of UNESCO’s Section for Technical and Vocational Education, “which created serious problems for developing countries. Either they invested heavily in trying to import foreign models of higher education, which produced a surplus of white collar expectations, or they tried to set up highly specialized training schools, which didn’t correspond to labor needs.” (UNESCO 2003) This seems to describe the current situation in Mexico, where holders of university degrees who find themselves without immediate job prospects often begin working for the university from which they graduated or continuing in school in search of advanced qualifications which, it is hoped, will open some doors. Possessors of specialized vocational skills can also find themselves out of a job when macroeconomic change pushes entire industries, like textiles or electronics, to a different country where the same skills are cheaper.

Against this pessimistic background, we have the counter-example of Korea. The Republic of Korea started to make major investments in technical education only once they achieved near universal coverage of primary education in the early 1980’s. (UNESCO 2003) Technical or vocational education kicked in at the upper secondary level, where graduates of lower secondary who didn’t anticipate continuing into university opted for the vocational track. The graduates of the upper secondary technical schools either entered the job market as skilled workers, or continued for another two or three years in a tertiary technical school. Graduates of such an advanced technical school would certainly be what we would call ‘knowledge workers’ today, and given the impressive performance of primary and lower secondary school students in Korea, with their mastery of mathematics and conceptual problem-solving, we could consider even the graduates of upper secondary technical schools in Korea to be knowledge workers as well.

It should be noted that the timing of Korea’s push into technical education coincided with a period of heavy industrial expansion in knowledge-based sectors like consumer and electronics manufacturing, supported by a significant intervention by the government in the form of subsidies and tax incentives. It should be noted as well that the push into

secondary and tertiary technical education was, in a sense, a way for the government to hedge its bets in the education market. After decades of expanding opportunities in education, first in primary then in secondary, the 1980's saw a surge in demand for tertiary education. Private universities were springing up rapidly to meet the demand, but the government was concerned that there would not be enough white collar jobs to absorb the new flood of graduates. By expanding technical and vocational training, "the government planned to satisfy its forecasted labor needs while reducing pressure on universities to enroll more students." (UNESCO 2003)

Whether by luck or insight, Korean policy-makers supplied the right type of specialized education at the right time to develop human capital in synchronization with society's needs. According to a number of studies cited by Jisoon Lee in his review of the Korean education system, the rate of return on technical education at the upper secondary level exceeded the rate of return for a purely academic high school degree. (Lee 2002) This went a long way to assuaging the concerns of Korean parents—famously passionate about the career and social prospects of their children—that a technical path might be less prestigious. Today, around 35-40% of upper secondary students in Korea follow this technical path, although the curriculum is converging much more with the traditional academic curriculum, to the extent that perhaps up to 75% of the coursework is shared between the academic and technical students. (UNESCO 2003) And although most tertiary education is private in Korea, the government is also increasing public investment in tertiary technical training in an effort to buttress the social standing of this career path and fulfill labor requirements going forward.

In summary, the Korean experiences suggests that technical training, properly timed and calibrated to emerging industrial needs, can be very effective in developing knowledge workers. Any policy consideration for Mexico should carefully note the new trend toward a more 'academic' approach to technical training, with strong foundations in math and science preceding and accompanying more specialized skills training.

A major caveat with the Korean model of technical education for Mexican policy-makers is the premise that jobs will exist for graduates. For this reason, it's useful to review the Chinese model. Whereas in Korea the government was attempting to develop

knowledge workers to cope with an expected increase in demand (coincident with activist government intervention to develop industrial capacity), in China there has been and continues to be a labor surplus. This surplus is now famously keeping wage rates low around the world as more work is being outsourced to Chinese factories.

Like Mexico, Chinese not only had a labor surplus but a fiscal shortfall.<sup>9</sup> China was also struggling with an antiquated and highly bureaucratic educational machine (unlike the Koreans who were creating a new system from scratch). The approach to technical education taken by the regime in China was decidedly uncommunitistic. According to Dingyong Hou, Senior Education Officer at the World Bank, China “found an ally in the private sector.” Executives from Chinese companies are now sitting on school advisory boards in order to mandate the required areas for technical training and, of course, provide the funds. There is the expectation as well that students will move directly into apprenticeships in Chinese industry. According to Hou, “these partnerships reflect a key element of the Chinese vision of life-long learning: schools will develop and broaden students’ capacities and the workplace will provide training.” (UNESCO 2003)

If the Chinese government saw the wisdom of, in effect, privatizing<sup>10</sup> advanced technical education, it wasn’t because of any ideological shift but simply due to the need to conserve public resources to support the massive investment required for compulsory schooling, upped to nine years following the 1986 Compulsory Education Law. (World Bank 2005) They realized that technical training would be required to maintain the employment opportunities and economic growth which had kept public disorder to a minimum, but that the state not only couldn’t afford it, but didn’t know what training would be required at what time. Such a model would appear to have much relevance to Mexico.

In Eastern Europe, it is quite common for very high percentages of secondary students to attend technical or vocational courses rather than purely academic courses. Here again, we are seeing that these ex-communist regimes are embracing partnership with

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<sup>9</sup> As we discuss in the succeeding sections of this review the options for Mexican educational policy, we will *not* be advocating an increase in the percentage of governmental expenditure channeled into the educational system. Mexico already leads the world in terms of the percentage of government spending dedicated to education, at roughly 23%. (OECD, 2005)

<sup>10</sup> We will revisit the theme of privatization in a subsequent section of this paper.

the private sector in maintaining their technical skills in the knowledge economy. When the International Monetary Fund congratulated the Slovak Republic on their accession to the European Union in 2004, they included a comment on their development of human capital: “We welcome recent cooperation among the private sector, universities, and the Ministry of Education to tailor the training of graduates to market needs. The scope of these efforts should be broadened, as market needs are bound to continue changing at a brisk pace.” (IMF 2004) Although praise from the IMF is often seen as a mixed blessing in Mexican political circles, the results of Slovak education policy are irrefutable.

In terms of specialized or technical education, the lesson from countries that are succeeding in developing knowledge workers is simple. The private sector needs to be involved, both for funding and, more importantly, for ensuring that skills learned are transferable to the workplace. Another best practice would seem to be coupling technical education more closely with traditional academic education, both to maintain the social prestige of a technical education and to help technical graduates learn how to learn so that they can adapt to a dynamic knowledge marketplace.

### *Allocation of investment*

With education spending at 23% of total government spending, Mexico spends a larger proportion of its public funds on education than any other OECD country. But because public spending is relatively modest in Mexico, this only equates to approximately US \$2,000 per student—respectable for a developing country, but below the level of most European and many Asian countries. A review of more than fifty countries by the OECD demonstrates a clear positive relationship between spending on education per student and per capita GDP. (OECD 2005) The table below shows the level of expenditure, both public and private, per student enrolled at various levels in our comparator countries.

Table 6: *Annual expenditure per student, \$US PPP*

Comparator Countries	Primary	Lower Secondary	Upper Secondary	Tertiary
Korea, Rep	\$3,553	\$5,036	\$6,747	\$6,047
Poland	\$2,585	..	\$2,585	\$4,834
Chile	\$2,211	\$2,217	\$2,387	\$7,023
Slovak Republic	\$1,471	\$1,806	\$2,694	\$4,756
<b>Mexico</b>	<b>\$1,467</b>	<b>\$1,477</b>	<b>\$2,378</b>	<b>\$6,074</b>
Brazil	\$842	\$913	\$1,008	\$10,361
China	..	..	..	..
India	\$396	\$397	\$1,155	\$2,486
OECD average	\$5,313	\$6,089	\$7,121	\$10,655

Source: OECD, *Education at a Glance*, 2005

We should note, however, that although GDP per capita correlates to spend, spend does not correlate to performance. (OECD 2005) Korea spend half the amount per student as the U.S., but Korean students consistently outscore U.S. students. The absolute level of spending in Mexico does not significantly differ from that of the Slovak Republic at the primary and secondary levels, and is just behind the level of spending on upper secondary in Poland, but both European countries have a significantly better educational performance in terms of participation and quality. Our focus, therefore, will be on how our comparator countries spend their limited funds to maximum effect.

It doesn't take much investigation to discover the fundamental difference between the way Mexico spends money on education and the way our best performers spend.

Table 7: *Percentage of education expenditure on staff*

Comparator Countries	Compensation of teachers	Compensation of other staff	Total staff
<b>Mexico</b>	<b>82.4</b>	<b>12.0</b>	<b>94.4</b>
India	80.5	8.0	88.5
Brazil	..	..	80.5
Slovak Republic	61.5	13.6	75.1
Korea, Rep	63.3	8.9	72.2
Poland	..	..	71.0
Chile	..	..	68.4
China	..	..	..
OECD average	64.1	15.0	79.1

Source: OECD, *Education at a Glance*, 2005

Mexico spends a higher percentage of its education budget on staff—94% of the total—than 28 out of 30 OECD countries (the exceptions being Turkey and Portugal) and than most non-OECD countries for which we have data. (OECD 2005) Korea, Poland and the Slovak Republic, our best country performers, spend 70-75% on staff. As one would expect, when it comes to capital investment the numbers are reversed. Mexico spends a miniscule 2.7% of its budget on capital investments, compared to 17.3% for Korea, 13.1% for Chile, 7.8% for Brazil, 7.3% for Poland, and 5.0% for the Slovak Republic. Although Slovakian students may seem shortchanged as well by these statistics, since the primary capital expense in education is the building of schools, they are still getting almost twice the number of schools built per student as their Mexican counterparts.

This data would come as no surprise to the myriads of Mexican students who are attending school in shifts due to the lack of newly built schools in the country. In some cases, as many as three shifts a day are channeled through primary and secondary schools in the more marginal areas of the country. Classroom hours are necessarily shortened and teachers' salaries are amplified.

We sense intuitively that a clean, well-lit and orderly classroom can help students in their studies. We may also suspect that 'knowledge' infrastructure—libraries, books, and especially communications and technology infrastructure—is vital for developing knowledge workers. Recent research bears this out. A recent World Bank report on the determinants of learning in Mexico cites data from the PARE project (*Programa para Abatir el Rezago Educativo*) carried out in Oaxaca, Guerrero, Chiapas and Hidalgo in 1998. This project used a quasi-experimental design to test a production function for education. The conclusion was that "expenditure devoted to improving school facilities and to increasing the average number of textbooks per student has a positive effect on student performance." (World Bank 2005a) Just as the capital-to-labor ratio has been proven to tightly correlate to labor productivity, the capital-to-student ratio increases educational productivity.

We may also sense that expenditure on teachers is critical, causing us an intuitive dilemma. Fortunately, the same study had some conclusions on this point. Increasing

teacher salaries or hiring more expensive teachers with higher qualifications does *not* improve student achievement. (World Bank 2005a)

The implications on allocation of educational spend are fairly clear from this review, from a technical viewpoint. This same issue will be approached in a slightly different context, and from a more institutional perspective, when we discuss management and incentives.

### ***Centralization versus decentralization***

In 1992, the Secretariat of Education (SEP), the national teachers' union (SNTE), and the 31 governors of the states agreed to decentralize the Mexican educational system. Before that, according to a Professor of Education at the Autonomous Metropolitan University in Mexico City, the highly centralized Mexican education system was “notoriously rigid, inefficient, conflict laden, unresponsive to the needs of local schools, unable to improve the quality of education, and frequently dominated by the National Teachers Union.” (Ornelas 2000)

In 2005, a study of the Mexican educational system by the Rand Corporation on behalf of an NGO concluded that nothing much had changed. The 1992 agreement (and its 1993 enactment into law) was mostly a shuffling of administrative duties according to the report, and “teachers and school administrators have little autonomy.” Control of key decisions—like the curriculum, textbooks, teacher qualifications and school evaluation—was retained by the federal government. Professor Ornelas, in his own post-mortem, described the results as follows:

In brief, with this model of decentralization, SEP continues its control over the major policy decisions while the states are assigned the responsibility for carrying out tasks, but within central government guidelines. In other words, there has been a decentralization of management functions, but a centralization of decision-making power. For this reason, one can hypothesize that the institutional changes promoted by the decentralization of education do not attempt to dismantle the corporatist pact between the State and the teachers' union but only improve its operational characteristics. (Ornelas 2000; translation by author)

The Rand study's authors support this view of the unabated power of the union, claiming that "neither principals nor parents have any official authority regarding personnel decisions such as hiring, firing or placement of teachers." (Santibañez 2005)

Although the seeds of decentralization may have been sown in 1992, there has been no harvest, and this is a continuing concern for Mexican education. The examples from our comparator countries are clear. The movement is toward more autonomy at the local level, albeit with standard-setting and assessment usually remaining a centralized function.

In Poland in 1990, Minister of National Education Henryk Samsonowicz set new targets for educational achievement while offering teachers and administrators maximum flexibility in choosing how to achieve them. New education laws called for the "autonomy of schools as societies of students, teachers and parents," with final responsibility for instructional content and methods. (Library of Congress 2003)

In China as well, devolution of methodology was the key. In 1985, the old Ministry of Education was replaced with a new State Education Commission, a name that suggests regulatory rather than executive control. Central authority was maintained in the form of standard-setting, but considerable autonomy was granted to regions, provinces and municipalities to experiment with variations in management approach, and control by the government of teaching assignments was ended. (Library of Congress, 2003) This more flexible approach was seen as facilitating the rapid rollout of compulsory nine-year education which became Chinese law in 1986.

In the Slovak Republic, the government decided to decentralize the ownership of primary and secondary schools to municipal and regional governments, who were left with wide discretion in the management of educational institutions. In an report on the Slovakian economy in 2004, the OECD commented that "international experience suggests that this is an appropriate choice." (OECD 2004)

In Chile, a massive decentralization took place during the education reforms of the 1980's under the military regime. Responsibility for public school management was transferred from the Ministry of Education to local governments, and virtually overnight teachers became employees of municipalities. (Carnoy 2000) However, because this

devolution of authority was coupled with a radical change in the funding of education, we will treat this case more fully in the section on privatization.

What we are seeing emerge as international best practice, therefore, is a combination of central standard-setting—including regular and often internationally-standardized testing—alongside devolution of management autonomy to the local level. Econometric models back this up. Using data on more than 260,000 students from 39 countries, the World Bank (2005a) claims that “positive effects on student performance stem from centralized examinations and control mechanisms, school autonomy in personnel and process decisions, competition from private education,<sup>11</sup> scrutiny of achievement and teacher influence on teaching methods.”

That’s a nice summary of the *technical* bottom line on the right mix of central and local authority to promote better educational outcomes. But policy in this area will be dealing primarily with institutions and attempts to change them. The institutions in question date from the era of *corporativismo* in Mexico when political power was consolidated on the foundation of workplace sectors like the teachers’ union. Technical insights only matter if the political will exists to move away from institutional structures that may have served the country well at one point in its history but may be hindering its progress in another.<sup>12</sup> We will come back to this in the section on policy recommendations and implementation challenges.

As an aside and in relation to institutions, there seems to be a link between over-centralization, particularly as related to management of teachers, and a lack of transparency. One of the policy issues surrounding education in Mexico has been the lack of data on education on which to base policy decisions. The reader may have noted the extensive reliance upon international sources for information on Mexico. The Rand report claimed that “only in 2002, with the new transparency laws, has it been possible to see how much SEP spent on teachers.” (Santibañez 2005) It’s still hard to determine the actual number of teachers at work in this country. There are rumors that absenteeism in Guerrero and Oaxaca reaches 50% in some municipalities, but these cannot be confirmed or denied

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<sup>11</sup> This will be treated in our next section on ‘privatization’

<sup>12</sup> The World Bank (2005a) also states that empirical evidence demonstrates that “a large influence of teacher unions on curriculum scope has negative effects on student performance.”

with existing data. (Velez and Lopez-Acevedo 2002) And since most official research on Mexican education is funded by SEP, it's difficult to find an independent view.<sup>13</sup> A move toward less central control of information about the system itself would unquestionably help policy-makers formulate better education policy.

### ***Privatization***

As long as we are tackling institutional questions, we might as well address the role of private investment in education. In a sense, there have always been conflicting theories about the proper role of the state in education, both supported by ample evidence. There is no question that returns to education are high and that not all of these returns are captured within the consumer-education provider transaction. Educated citizens have higher incomes and produce more wealth for society as a whole and pay higher taxes. They are healthier and represent less of a cost to welfare programs. There is also evidence that education contributes to reducing inequality, particularly in countries like Mexico where returns to education are highest for people at the bottom of the wage distribution. (World Bank 2005a) All of these factors justify intervention on the part of government, and there is little talk even in these neoliberal times of asking the government to abdicate its role as primary education provider in society.

However, when education is run as a monopoly, it can suffer as an industry from all the inefficiencies and social maladies of a monopoly. Where there is no competition, costs can easily rise while value stagnates, and these costs can and will be passed back to the education consumer, whether directly or via taxes. In developing countries this inefficiency is even more worrying given that it represents a massive opportunity cost of having to

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<sup>13</sup> Hope was raised by the establishment of the 'independent' Instituto Nacional para la Evaluación de la Educación (INEE) in 2002, but communication from this body has tended to urge a 'go slow' approach to educational change and support for the status quo in terms of system and organization. In the words of the director general, as he presented the Mexican student results on the international standardized PISA tests, "Hay que evitar tomar decisiones que pretendan alcanzar resultados espectaculares corrigiendo en poco tiempo deficiencias ancestrales." (Rizo 2003) If the educational establishment, now including INEE, has not been intending to achieve spectacular results, then based on the data presented in this memo I think we can conclude that they have succeeded.

forego other valuable government investments—consider the 23% of total government spending dedicated to education in Mexico. It is worth remembering as well that, technically, education is not a natural monopoly—there are no water pipes or electric cables that need to be installed once and for all at great fixed cost. There may be a limit to how many schools could be built to serve a single neighborhood, but Mexico need not worry about breaching that limit for many years, if ever.

There is also an emerging theory that a large role for private participation in supplying education produces better education outcomes than public investment alone. We have a nice variation in mix of expenditure within our comparator countries which may shed some light on this theory.

*Table 8: Relative proportions of public and private expenditure on education, 2002*

Comparator Countries	Public sources	Household expenditure	Expenditure of other private entities	All private sources
Chile	54.8	44.3	0.8	45.2
Korea, Rep	58.3	33.7	8.0	41.7
India	71.9	26.2	1.8	28.1
<b>Mexico</b>	<b>81.0</b>	<b>18.7</b>	<b>0.2</b>	<b>19.0</b>
Poland	89.2	10.8	..	10.8
Slovak Republic	95.3	2.2	2.5	4.7
Brazil	..	..	..	..
China	..	..	..	..

*Source: OECD, Education at a Glance, 2005*

Two countries, Chile and Korea, lead the way in terms of the role of private investment in education. From Table 4, we may recall that these two countries also showed the greatest improvement over the last thirty years in completion rates for upper secondary school, a key threshold for students wishing to become knowledge workers. This similarity in outcome, however, masks a significant difference in approach between the two countries.

Chile's approach to privatization was radical and abrupt, and heavily influenced by the thinking of neoliberal economists like Milton Friedman who had long speculated that public education monopolies were inefficient and education markets would work in much the same way as product markets. (Friedman 1955) As mentioned earlier, in the educational

reform of 1980, the military government of Chile transferred the responsibility for public school management from the Ministry of Education to local governments. Coupled with this decentralization, the way schools were financed was drastically altered. Under the reform, parents with children at every level of the educational system were allowed to choose which schools they wanted their children to attend. The Ministry of Education then made ‘fixed voucher’ payments to schools based on the number of students that chose them. Private schools which did not charge tuition would receive the same per-student voucher fee as public schools. Thus, both public and private schools were suddenly competing for students in an open education market.

The voucher program prompted a massive shift in enrollment toward private schools. In 1980, around 15% of Chilean students attended private schools. By 1986, the figure was 34% and rising<sup>14</sup>. The new private schools tended to establish themselves in more affluent areas with higher levels of parent education, on the (correct) assumption that these parents would exercise their newly acquired freedom of choice to opt out of standard public schools. The superiority in educational performance of the private sector in Chile is often attributed to this self-selection factor. (Carnoy 2000) Although it is extremely difficult to disaggregate the particular effects of the voucher system, and although the fact that the implementation happened by *fiat* under an authoritarian regime makes it hard to apply this case to a normal policy process, it remains true that Chile is the most privatized education market in the world and has experienced rapid improvement in both educational and economic performance over the last 30 years.

The case of Korea is also unique. Few countries in the world have a larger role for private investment in education than Korea. The data presented in this and other education policy reviews also suggest that Korea has also made more progress than any major country in recent history, developed or undeveloped, in terms of improving both participation and quality as measured by graduation rates and test scores. While a causal relationship is not asserted here, it is certainly instructive to examine the details of how investment in Korean education works.

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<sup>14</sup> Throughout this period, tuition-charging private schools continued to attract 5% to 9% of students.

A merely statistical review of private participation in Korean education would show that as of 2000, the enrollment shares of the private sector were 20 percent for middle schools, 55 percent for high schools, and 78 percent for four-year colleges and universities. (World Bank 2002) But this does not tell us much about how private education works in Korea. For that we need to go step by step.

In Korea, most nursery schools and kindergartens are private. They charge competitive rates and market attractive programs to parents. Most primary schools are public and do not charge tuition, and most Korean children attend the school in their neighborhood. However, classrooms tend to be crowded, and private options do exist. In addition, 30% of parents report that they hire private tutors—at the *primary level*—to give their children a head start on competition for places in the best universities. (Lee 2002)

Public schools dominate at the secondary level as well, but private investment also, paradoxically, increases dramatically at this level, in the form of special after-hours preparatory classes and tutoring. There are a significant number of private high schools in Korea but they are merely vestiges of a historic period in which private schools offered better education for the privileged classes. Unlike in Chile, in Korea there is no parental choice involved and therefore very little true competition between schools. All high schools, public or private, charge the same tuition and offer the same educational product. Students are assigned to a school randomly by computer based on their address. Whereas previously private schools had relied on fees and contributions from parents, once this so-called ‘leveling’ was mandated by the government in the 1970’s private schools were given incentives to remain in operation via tax incentives (e.g. property tax exemptions) and direct financial support. (World Bank 2002)

So what exactly does ‘private’ education mean in Korea, if not choice and differentiation among schools? The answer lies in the investments made by parents in education outside the school. Lee (2002) estimates that in 1994 parents’ contribution toward education was 7.5% of GDP, in contrast with public spending of only 3.8% of GDP. He also provocatively suggests that students learn more outside of school from tutors and special preparatory courses than in school, by a ratio of 70% to 30%.

Although some commentators (including Lee) find serious fault with the Korean system for not being able to provide all that is needed educationally within the classical confines of the public school, one could also point out that the *broader* Korean educational system—comprising public and private schools, teachers moonlighting after hours as tutors, special evening and weekend schools for drilling students in math or English, and even parents serving as tutors themselves—has provided an excellent education to Korean students, just not in the traditional manner.

We must consider the role of institutions here again at this point, particularly the non-formal institution of social networks in Korea. Parents in Korea invest extraordinary amounts of time and money in education because educational attainment is perceived to be the key to acceptance into exclusive universities (78% of which are private) and for entry into prestigious careers. Without this obsession about education, the situation in Korea would be vastly different.

In Mexico there are institutional issues as well, working in the opposite direction. Parents' organizations are still underdeveloped, and private providers play a very limited role. (Santibañez 2005) The private providers that do exist have the most impact at the top of the educational pyramid. Although 87% of upper secondary students are in public schools, private schools occupy 46 out of the top 50 places in terms of student performance on the nationally standardized *Ceneval* achievement test which is used primarily as an entrance examination for tertiary education. Interestingly, shortly after this information was published by the director of Ceneval, Salvador Malo Álvarez, he was informed that he would not be nominated for another term as director.<sup>15</sup> (Aranda and Cruz 2006)

In conclusion, our analysis of comparator countries suggests that both public and private investment have a role to play in education. Public expenditure dominates education in Eastern Europe and progress has been good. Progress has been even more impressive in countries where private spending has soared in the past thirty years. Policy in this area will have to take into account institutional factors in these countries and in Mexico.

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<sup>15</sup> Malo's version is as follows: "Lo que me dijeron es que 'estaba mal hacer esas publicaciones' (dar a conocer los resultados de las evaluaciones de secundaria), y que no existía una 'coordinación adecuada' con el Secretario de Educación."

### *Management and incentive systems*

To a degree, we have touched on these issues within the discussions on allocation of investment, decentralization and privatization, but a few further points should be made before we turn to the task of developing a ‘knowledge workers’ policy for Mexico. Here, perhaps most of all, we are looking at fundamental institutional change.

Let’s start with the basics. Why don’t more Mexican children go to school, study hard and become productive workers in the knowledge economy? It may be that they don’t want to, or that they see no reason to attend school. But perhaps it’s also because they don’t have to go to school. One of the assumed benefits of public control of education is that the state has various means of supplying incentives for children to go to school. Theoretically, the state can use its legitimate monopoly on the use of force to compel children to go to school. Just as the child’s parents might impose some punishment if the child refuses to do his homework or lies about going to school, the state has the authority to impose penalties on parents or children or employers who refuse to obey compulsory education laws.

However, there is evidence that legal institutions in Mexico—with education laws being no exception—are not accompanied by the same sanctions that exist in other countries and cultures. The Federal Research Department of the U.S. Library of Congress, in their analysis of Mexican education, commented that “the length of compulsory education was raised from six to nine years in 1992, but in practice this new law is largely ignored.” (Library of Congress 2003) We may recall from our earlier discussions that nearly a third of Mexican students entering first grade will never complete the nine years of ‘compulsory’ education. And we only have to look through our windscreen at a stoplight to realize that many school-age children have simply decided to opt out of education, and that they do so with impunity.

Contrast this situation with the Chinese approach to the same issue:

As a further example of the government's commitment to nine-year compulsory education, in January 1986 the State Council drafted a bill passed at the Fourteenth Session of the Standing Committee of the Sixth National People's Congress that

made it illegal for any organization or individual to employ youths before they had completed their nine years of schooling. The bill also authorized free education and subsidies for students whose families had financial difficulties. (Library of Congress 2003)

Both carrots and sticks have been used in China to effect a massive institutional change in the last twenty years, a true cultural revolution that dwarfs Mao's attempts at cultural change during the 1960's.

Besides Mexico's institutional problems with incentives, there are technical problems with incentives in education as well. Almost uniquely within all countries for which data is available, in Mexico there is *no economic return* on upper secondary school for the individual in terms of more or better-paid employment. (OECD 2005) Returns are as expected for both primary and lower secondary levels of education in Mexico, particularly for the most marginal populations, and significant for tertiary education, but there is a gap at upper secondary. For a student pondering whether to invest another three years to attend *preparatoria* or to go get a job, the answer that the market is giving him or her is clear: get a job. Yet, both the literature and common sense suggest that this level of education is critical for developing the knowledge workers that will be needed by Mexico in the future. This is not a case of institutional bias against this one particular level of education, but rather a market failure that is susceptible to further analysis and targeted government policy.

In terms of administrative strategy, we have noted earlier that educational policy in Mexico tends to be input-based. Next year's budget is requested based on how many teachers are employed in the state, how many students are attending school, and what last year's budget was. School managers may be told to cut costs or increase enrollment, but rarely are they told that their job relies on improved performance of their school. The perception is that there are just too many variables at play to allow holding individual managers or teachers accountable for student performance. But while we know that socio-economic factors are important, we can control for this variable analytically when making our plans. And while we know that parental support is critical and often out of our hands, there are many variables that are relevant, tractable, and within the remit of a school

manager or governmental director. This is another opportunity for a realignment of incentives.

Finally, it is difficult to successfully implement any incentive-based program, or hold anyone accountable for performance, if performance is not systematically and robustly measured. We have discussed some of the issues involved in gathering data on the Mexican school system. Without improvements in transparency and a larger investment in evaluation relative to program expenses, no incentive program will bear fruit. We will discuss this in the context of criteria for evaluating policy options in the next section.

As we review criteria and then propose several possible policy alternatives for Mexico, we will return more than once to the subject of adjusting incentives, both technically and institutionally, in order to change the behavior of the key players in the educational system—the students, the parents, the teachers and the administrators.

## **V. Criteria for evaluation of policy options**

In this section, we will look at proposed criteria for evaluating policy alternatives for developing of knowledge workers in Mexico; we will consider how to measure the effectiveness of any programs that are implemented; and we will consider how the programs might be implemented in an experimental or quasi-experimental framework.

### ***Criteria***

Determining which policy alternatives best solve our problem depends upon on how we define the problem. Our problem was first presented in economic terms. Coming out of its import substitution period and following a substantial liberalization of its economy, Mexico had been positioning itself as an export-driven economy with a low wage structure and proximity to the world's largest market. Then, as the millennium turned, the game changed. Vast new pools of (mostly Asian) workers began entering the global market, undercutting Mexico on unit labor costs and more than offsetting the proximity advantage. Lowering the wages of Mexican workers is not an attractive or feasible political option, so

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we concluded that Mexican workers must become more productive, more valuable. We therefore redefined the problem in terms of human capital—bluntly stated, we don’t have enough knowledge workers.<sup>16</sup>

In recapitulating the problem, my intention is to emphasize the competitive nature of the human capital issue in Mexico. Mexico will need to respond rapidly to the dramatic change in the economic landscape or be bypassed in the competition for export markets and foreign direct investment. Lost markets and missed investments can have a massive and prolonged cost in social as well as economic terms.<sup>17</sup> If our analysis is correct, developing knowledge workers in Mexico should not be an ambiguous or long-term goal. Our evaluation criteria should respond to the urgency of the economic issue. The educational system needs to begin producing knowledge workers instead of mere workers—sooner rather than later.

Given all this, we need to evaluate our options in terms of timing. Ideally, a policy to develop knowledge workers should be able to produce results within a relatively brief period. For both economic and political purposes, a single *sexenio* seems a good choice for this period. So our first criterion for success might be phrased as follows:

- **Generates significant impact within six years<sup>18</sup>**

Allied to this ‘speed-to-market’ criterion is another related to timing, related not to *economic* urgency but to *political* urgency. Given that the policies implemented in relation to education will probably require the expenditure of a tremendous amount of political capital on the part of the government, the government will need to deliver some tangible

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<sup>16</sup> While it’s true that infrastructure and economic institutions are also key components of the transition to a knowledge economy, human capital is a particular weakness in Mexico and hence the focus of this policy review.

<sup>17</sup> On the other hand, ‘won’ markets and investments can have very positive short- and long-term economic effects due to the phenomenon of path dependence. Such was the case when Costa Rica secured a major investment from Intel in competition with Mexico in 1997, to which I refer in the box on page 56. For a complete analysis of the positive impact of the Intel investment on the Costa Rican economy, see Larrain, Lopez-Calva and Rodríguez 2000.

<sup>18</sup> This criterion, and those to follow, will obviously require some form of measurement, but we will review that subject in the next section.

benefits very quickly after program implementation, both to placate (and marginalize) its opponents and to reassure its supporters. When looking for this sort of ‘quick win,’ form is sometimes as important as content, and ‘micro’ is often just as valuable as ‘macro.’ The role of a ‘quick win’ is to send a signal that the policy might be able to produce the favorable changes desired, that things are starting to move forward. An example might be the decision of a multinational company to invest in a region. Although the company might be on the smallish side, and the economic impact might not be material, and the reasons for the decision might not even be strictly related to the policy, the value of the decision as a *signal* might be enormous. A ‘quick win’ obviously has to come faster than six years, so we might express this criterion as follows:

- **Generates at least one ‘quick win’ within 18 months of implementation**

Creating impact quickly, however, is not the only goal. As stated earlier, educational results necessarily happen over many years. Policies for developing knowledge workers will need time to produce meaningful and lasting changes in the economy of Mexico. Therefore, the best policy options will be equipped with a sort of political armor, some means to ensure survival over successive administrations, regardless of the affiliation of the executive or legislative branch. We can summarize this quality as follows:

- **Benefits from strong foundations and built-in ‘self-defense’ mechanisms**

Linked to the idea of ‘self-defense’ and political sustainability is the concept of equality—or more precisely, the problem of inequality. Any policy or program that exacerbated the existing inequality in Mexico, regardless of any measurable impact or quick wins, would be hard to defend, both politically and ethically. Although the gap between Mexico’s performance and Finland’s performance on the Knowledge Economy Index (KEI) is huge, it is likely that there is an even larger gap between the best-performing and worst-performing regions within Mexico. Last year, a team at Tec de Monterrey in Guadalajara devised a way to adapt the KEI to the individual Mexican states. (Robles

2005) Unsurprisingly, regions like Nuevo León and the Distrito Federal did reasonably well, scoring above 7 points on the new Mexico-specific scale, while the perennially underperforming southern region was lagging with scores under 3 for Chiapas and Guerrero and a woeful 1.86 for last-place Oaxaca. The right policy options should not only help Mexico compete with other countries but should help underperforming regions within the country catch up—or at the very least not fall further behind. We can express this goal as follows:

- **Does not favor one region over another and promotes convergence**

Another key criterion involves cost. As we noted earlier, Mexico is already spending a relatively large percentage of its federal budget on education. Although Mexico still lags more developed nations in terms of absolute education spending, a policy which required an immediate increase in expenditure, or expenditure that grew over time, might not be feasible without some major overhaul in government finances. Although such fiscal reforms might be desired or envisioned by current or future administrations, the country's human capital program should not be conditioned upon the success of fiscal reforms. Therefore, the ideal policy:

- **Does not require a step-function increase in government spending**

Earlier in this review we also referred to an implicit requirement of policy in this area related to synergy with other policies. In order for Mexico to advance as a knowledge economy, human capital development should dovetail with infrastructure, investment and incentive development. While our recommendation in this review will only directly cover human capital, some policy alternatives will have more synergy with efforts in these other policy areas. Wherever we can we should envisage policy linkages across departments, and to the extent possible we should provide ready-made 'hooks' in human capital policy to facilitate these linkages. Thus, we can say that a good policy for developing knowledge workers also:

- **Creates synergies with industrial, infrastructure and incentive policies**

Finally, the right policy for developing knowledge workers in Mexico will not necessarily be a clone of something that was successful in Korea or Poland. As we have seen, cultural factors are important and relevant in education. Programs for developing human capital can be ineffective if the social capital is missing. Unlike Korea, for example, Mexico cannot (at present) rely on peer pressure to push parents into making extreme sacrifices in order to get their children into socially prestigious institutions. Nor are literacy and fluency in the Spanish language as vitally important to the identity of a Mexican as mastery of the Polish language is to a Pole. On the other hand, there may be options in Mexico that wouldn't work in other countries. Therefore, we can safely state that the best policy:

- **Plays to Mexico's strengths and does not rely on dramatic cultural change**

In order to succeed when evaluated against these criteria, policy options will need to come equipped with strategies that respond to the criteria. Ideally, these strategies will be inherent in the option and not merely bolted on. As we review specific options, we will look at the specific strategies inherent in that option and if and how it could be stretched to better meet each criterion.

In summary, then, our ideal policy for developing knowledge workers in Mexico will fulfill the following success criteria:

- **Generates significant impact within six years**
- **Generates at least one 'quick win' within 18 months of implementation**
- **Benefits from strong foundations and built-in 'self-defense' mechanisms**
- **Does not favor one region over another and promotes convergence**
- **Does not require a step-function increase in government spending**
- **Suggests synergies with industrial, infrastructure and incentive policies**

- **Plays to Mexico's strengths and does not rely on dramatic cultural change**

### *Measurement approaches*

Whenever we talk about policy impact or the concept of convergence, we need to supply some metrics. We started this review by referring to the World Bank's Knowledge Economy Index, a ready-made metric which has firmly-established international roots and a growing body of supporting analysis. Clearly we need to continue to monitor Mexico's performance on this broad measure, and our recommended policy should result in an improvement on this metric—within six years or sooner, according to our speed-to-market criterion. While it is true that independent action regarding infrastructure development and industrial policy could also have a dramatic effect on improving Mexico's KEI, we should definitely see an uptick in the human capital component as a result of our policy implementation and, given our synergy criterion, we may also attribute to our policy some of the sympathetic movement on the other components.

However, the Knowledge Economy Index, even on a state-by-state basis, is not a fine enough tool for monitoring the progress of policy in this area. Even the human capital component itself is fairly crude, consisting only of adult literacy and gross enrollment in secondary and tertiary education. On the basis that you tend to achieve only what you measure, restricting ourselves to these broad measures of human capital could result in unintended and undesired consequences. For example, through the *Oportunidades* program the government is effectively paying people to attend primary and lower secondary school. So, focusing on the KEI human capital metrics, we might simply decide to extend the program and pay people to attend upper secondary school or university to push the enrollment rates in those key areas. But from our analysis of the Mexican educational system and our comparator country case studies, we know that getting someone into the classroom is only step one in creating a knowledge worker. If the student can't think logically or handle numbers or solve technical problems after leaving secondary school, or has no applicable skills for knowledge industries after leaving university, we will have wasted valuable time and resources.

Therefore, we should be looking for outcome metrics that give us a sense of whether or not we have developed a knowledge worker. Test scores are one such measure, and Mexico has already gone through a benchmarking process with the Programme for International Student Assessment (PISA) tests conducted among OECD member nations. Such testing becomes more valuable with each iteration as the database of explanatory variables expands. PISA also has the advantage of measuring the performance of students in their last year of lower secondary school, a crucial threshold in the development of knowledge workers. By this time, students should have mastered the basics of math and be able to analyze everyday problems. From this point onward, theoretically, the student will be able to learn on his own and develop the kind of specialized knowledge that is becoming so valuable in the knowledge economy. Mexico also has a good history with the Ceneval test for upper secondary school graduates, which can provide an assessment of the value added by the next three years of schooling. Standardized testing has its detractors, and the argument becomes more persuasive when such testing is the *only* metric used to determine allocation of educational resources, for example, but as part of a wider set of metrics for measuring progress in developing knowledge workers it is justifiable to include well-constructed tests of verbal reasoning, numeracy and problem-solving.

Since our human capital policy goals are related to economic performance, it is also reasonable to include some economic outcome measures in our evaluation kit. At a high level, our success in developing knowledge workers should be measured by productivity. An hour of work should create more economic value if it involves the head as well as the hands.

To more precisely track the return on our investment in developing knowledge workers, we should also track the *value added* by education, as expressed in the incremental earnings acquired by graduates of successive levels of education. In particular, since we will be measuring educational outcomes as of the end of lower secondary school (with PISA), and since our assumption is that education through age 15 provides the ‘problem-solving platform’ upon which further education can build, it would seem to be important to track how much benefit these students now receive from subsequent levels of education, i.e. upper secondary and tertiary schooling. In other words, for example, after

we implement our policies and programs, how much more productive will someone who completes upper secondary school be when compared to someone who only completes lower secondary school? Today, in Mexico, the answer seems to be that upper secondary education adds little or no value. (McGaw 2005) Lacking economic incentives, it is therefore not surprising that only a minority of Mexicans complete this *preparatoria* level. Our policies aim to change this dynamic; therefore, we need to measure it. Information on these metrics—personal income differentials generated by upper secondary and tertiary education—can also be extrapolated to give us a general idea of overall return on our policy investments in terms of global social and fiscal returns using standard assumptions in the field.

Another key economic benefit is the ability of Mexico to attract and retain investment in knowledge-based industries. One case in point is the substantial investment Intel made in Costa Rica in the 1990's, a brief synopsis of which follows this section in a boxed mini-case study. A substantial commitment to developing knowledge workers on the part of the Mexican government should lead to increases in investments in key knowledge-based industries. Such investments should be a planned policy outcome, and specific industries should be targeted in conjunction with programs being implemented. Investing in human capital without attracting financial capital will produce meager returns and societal frustration. Attracting financial capital without having developed human capital will generate commercial frustration and eventually be nearly impossible to do. The combination of human capital and financial capital is without doubt the winning ticket in today's global knowledge economy.

In terms of which industries might be targeted for investment, one approach would be to analyze and classify industry types based on knowledge content. The U.S., Canada and Mexico have shared in the development of a new system for classifying business activity called the North American Industry Classification System (NAICS). NAICS was developed to provide new comparability in statistics about business activity across North America, and is managed as a continuing project by the U.S. Bureau of the Census. NAICS industries are identified by a 6-digit code in contrast to the 4-digit Standard Industrial Classification (SIC) code which it replaced. The longer code accommodates the

larger number of sectors and allows more flexibility in designating subsectors. This appears to me to be an ideal starting point for research and evaluation of policy related to the knowledge economy. NAICS provides a simple and consistent way of classifying business activity at level of precision which would allow us to make reasonably robust assumptions about knowledge-based activity at each level of the hierarchy. The same NAICS codes would then be used to track investment in and penetration of specific industries in Mexico in conjunction with both human capital policy and industrial and trade policy.

Our set of recommended metrics is summarized in the following table which lists what we will measure as well as who will do the measuring and how often they will do it. Ideally, those who do the measuring should *not* be those who develop and implement the policy, for obvious reasons. Our table shows that in most cases we can rely on objective measuring agents—in many cases, compilers of international data who take pains to interpret and normalize data they receive, allowing for local customs and correcting for local biases. Another advantage is that the cost of measurement is borne by these international agencies. This provides an efficient, reliable and inexpensive set of tracking metrics by which to judge the progress of our policies.

*Table 9: Proposed evaluation metrics for policy alternatives (Developing Knowledge Workers)*

<i>Metric</i>	<i>Source</i>	<i>Frequency</i>
Knowledge Economy Index (KEI)	World Bank	2-3 Years
Knowledge Economy Index, by Mexican state	ITESM	2-3 Years
Adult literacy	World Bank (KEI Education component)	2-3 Years
Upper secondary gross enrollment	World Bank (KEI Education component)	2-3 Years
Tertiary gross enrollment	World Bank (KEI Education component)	2-3 Years
PISA mathematics scale	OECD	2-3 Years
PISA problem-solving scale	OECD	2-3 Years
Ceneval	SEP/INEE	Annual
Productivity (output per hour of labor)	Banco de México	Annual
Value added of upper secondary	OECD	2-3 Years
Value added of tertiary education	OECD	2-3 Years
Foreign Direct Investment (by sector)	Banco de México	Annual

*Source: author*

### *Evaluation model*

In concluding this section on criteria and metrics, we need to consider whether our evaluation objectives would be best met by adopting a rigorous experimental model or using a quasi-experimental model, such as propensity matching or regression discontinuity methods. On one hand, our desire to make our policies immune from political manipulation in the future argues for the experimental approach. Proving the value of a program by establishing strict experimental controls over its implementation—as was done with *Oportunidades* during the Zedillo administration—makes it very difficult for its detractors to derail the program for purely political motives. On the other hand, creating such experimental control entails both political and technical problems. Depriving a large control group of what appears to be a successful program requires an analytical vision that most non-academics do not possess. But even when the political will exists, there may be technical barriers. Where policy implementation is solely a function of direct government action—as was the case with *Oportunidades*, where no one else was going to intervene to pay parents to send their children to school—analysts can be fairly certain about drawing cause-effect inferences within an experimental design. However, because we are including direct economic measures in our evaluation model, and because there may be externalities that materially influence outcomes—like foreign direct investment in a ‘control’ region—we may be unable and indeed unwise to insist upon purity of experimental design in our case. While we should strive to control variables and create as robust a case for cause and effect as is possible, we should probably resign ourselves to sharpening our tools of inference to make our case regarding policy outcomes in as messy an area as economic performance.

### **Costa Rica versus Mexico: Human capital and the Intel case**

In the technology sector, there is increasing evidence that assessments of local human capital play an important role in determining the destination of foreign direct investment. One of the most studied recent cases is that of the Intel Corporation, which in the mid-1990's was looking for a site for a major semiconductor assembly and testing plant (ATP). The decision eventually came down to a choice between Mexico and Costa Rica, and Costa Rica came out on top, to the surprise of many. With no local market to speak of and serious drawbacks in terms of infrastructure, how did Costa Rica snatch this FDI prize from Mexico?

Both countries offered a free-trade regime—NAFTA in the case of Mexico, the Caribbean Basin Initiative in the case of Costa Rica—and proximity to the U.S. head office. But the consensus seems to be that Costa Rica's educated workforce coupled with stable political institutions compensated for its small size. (Larrain, Lopez-Calva, and Rodríguez-Clare 2000) Perceptions of human capital could have been the deciding factor.

What is most relevant for Mexico in this case is not that Costa Rica won the deal, but how Costa Rica responded to Intel's challenge to develop knowledge workers. Although education levels in Costa Rica were already substantially above average for developing countries, there were still serious concerns expressed by Intel. Costa Rican officials responded by developing and implementing two new one-year programs for graduates of upper secondary school. Students were awarded certificates or associate degrees based on acquiring technical skills specifically tailored to Intel requirements. Special English language courses for technicians were also developed. Spar (1998) reports that this commitment by Costa Rica to improve upon an already solid human capital foundation was one of the deciding factors in the Intel deal.

The results of Intel's investment in Costa Rica, in terms of economic growth and spillover effects on the knowledge economy, were "unambiguously positive." (Larrain, Lopez-Calva and Rodríguez 2000)

## **VI. Developing knowledge workers in Mexico: Policy alternatives**

Up to this point, the perspective of this policy review has been intentionally international. Our premise has been that to achieve the primary goals of public policy in the 21<sup>st</sup> century—to raise the standard of living of the average Mexican and especially that of the less-advantaged Mexican—we must learn how to compete in the 21<sup>st</sup> century. That means positioning Mexico effectively in a global knowledge economy, and that means developing a new generation of knowledge workers. We have explored how other countries with similar resources have approached the problem of human capital

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development, with the implicit assumption that there may be some policy lessons for Mexico.

Before we formally extract those international lessons, however, we should review the set of domestic policies that have similar goals to our own. If there is evidence that existing programs are getting traction against the problem—as we have defined it and using the criteria and metrics we have proposed—then such programs should be recognized and past results and possible future outcomes analyzed. What follows, therefore, is a *brief* review of current domestic programs in this policy space.<sup>19</sup> However, it should be noted that considering current performance and recent trends against our metrics it is not obvious that any existing programs and policies are getting sufficient traction to justify sticking with ‘business as usual’ in Mexico.

To facilitate this review of the main current domestic programs, we will classify each according to its main objective. Some programs focus on increasing *participation* in education, some focus on increasing the *quality* of the education received, and others focus on *assessment* of the education system itself.

### ***Current programs: Participation focus***

The preeminent program in terms of encouraging participation in education in Mexico is *Oportunidades*, which started life as *Progresa* in 1998 under the Zedillo administration. So strong were its preliminary results that the program successfully made the transition to the Fox administration with only cosmetic changes (namely, the name). *Oportunidades* gives small cash grants to disadvantaged families conditioned on their children’s attendance in school. The grants are calculated to offset the opportunity cost of the child’s participation in school rather than work. Part of its successful ‘self-defense’ must be attributed to its robust experimental design, as mentioned earlier in this review. Matched regions were used as test and control to assess whether school attendance and related outcomes were achieved. By the end of the experimental phase in 2000, about 2.5

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<sup>19</sup> For more detailed evaluation of these current programs, there are many good sources in the bibliography that follows, especially World Bank 2005a and McGaw 2005.

million families in 2000 municipalities were receiving aid, and today the number of families has plateaued at around 5 million. ([www.progresa.gob.mx](http://www.progresa.gob.mx)) The vast majority of these families are in the poorest quintile of the population (World Bank 2003), and the program ranks among the most progressive in Mexico—in the technical sense of delivering a disproportionate benefit to the most needy.

The stated objective of *Oportunidades/Progresa* was and is to “promote the development of capacities in families in extreme poverty,” and results are positive. Primary school enrollment among the participants increased by 1% and secondary enrollment increased by 8% among girls and 5% among boys. It is estimated that the educational attainment of participants in *Oportunidades* increases by around 10% which a concomitant 8% increase in future earnings. (World Bank 2006a) There are also many nutrition- and health-related benefits of the program.

However, when reviewed in relation to our policy goal of developing knowledge workers, the results are less encouraging. There is evidence that the new students are often entering schools that are themselves poorly performing and ill-prepared for the new influx of students, especially students who themselves are unprepared. (World Bank 2006a) This syndrome would be typical of any demand-side intervention. School test scores in many instances actually drop, due to a combination of less teacher time per student as enrollment rates increase and the generally lower level of acquired learning skills of the new *Oportunidades* students. Thus, while the program is achieving its aim of addressing inequality and providing ‘opportunities’ for children in poor families to escape poverty and attain a better future income, there is little or no evidence that the program is creating an *overall* improvement in educational performance. We must look elsewhere to develop knowledge workers in Mexico.

### ***Current programs: Quality focus***

Because there is growing awareness of the limitations of demand-side programs in improving educational outcomes in general, several supply-side programs have been implemented recently in Mexico. These are generally termed ‘compensatory’ programs

because they focus on providing schools in disadvantaged and isolated communities with more resources, including free lunches, free textbooks, extra teacher training, early childhood education, and similar benefits. It should be noted, however, that although such programs aim to improve the quality of schooling for their participants, their participants are generally children from poor or indigenous families, and the social goal of these programs tends to be, again, reducing inequality. That said, if such programs actually improve educational outcomes such as test scores and future earning potential, then there could be important lessons that could be applied to our goals of developing knowledge workers.

The primary instrument for such compensatory programs in Mexico is the Consejo Nacional de Fomento Educativo (CONAFE), a division of the education secretariat (SEP). Its mission is to improve the performance of poorly performing schools by channeling extra resources to the state governments that are now responsible for managing such schools. Compensatory programs cover about 30% of all primary students in Mexico.

Due to problems in evaluation design, it is difficult to draw conclusions. However, the World Bank (2006a) gives a good summary of findings thus far and notes some positive impacts. In rural and indigenous schools test scores seemed to improve. However scores dropped in urban schools in the program, probably due to implementation flaws. One review of compensatory programs across several Latin American countries demonstrated that libraries and distribution of textbooks are correlated with improved learning, but it is somewhat intuitive that students in schools without libraries and textbooks would have been disadvantaged.

More significant is research that attempted to detect synergies between demand-side programs like *Oportunidades* and compensatory programs that focus on improving supply. The assumption would be that compensatory programs would provide the required injection of resources to compensate, as it were, for the challenge of educating more students with less preparation. Unfortunately, at present there is no evidence that such synergies are occurring between the programs. After controlling for the effect of *Oportunidades*,

compensatory programs show no statistical impact on schooling outcomes.<sup>20</sup> (World Bank 2006a) There is some evidence that compensatory programs take time to achieve results, but given the urgency of our present human capital crisis, this would not provide a strong endorsement of compensatory programs as a primary means to our end of developing knowledge workers. Again, it must be noted that these programs are aimed more at reducing inequality, so a shortfall when assessed against our criteria is not a shortfall in the program itself.

One interesting and relevant implementation of CONAFE's supply of additional resources to schools is through a program of school management grants called *Apoyo a la Gestión Escolar* (AGE). These grants are channeled through parent-teacher associations, and are primarily spent on small-scale improvements in infrastructure. Nearly half of primary schools in Mexico have an AGE program (World Bank 2006a). Although there are few controlled tests, two apparent outcomes are consistently mentioned by researchers. First, because of the *category* of investment, schools with AGE grants have better infrastructure. This is important, although not a surprise, because as we noted earlier in this review Mexico's investment in education is disproportionately weighted toward current expenditure (primarily salaries for personnel) and there is strong evidence that capital investment is critical to improved learning outcomes, particularly in the area of technical training. Second, because of the *channel* of investment, parents have become more involved in their children's education. Qualitative research (World Bank 2000) suggests that AGE's in Tabasco contributed to reducing teacher absences. Parents who invest their time as well as the government's money are more likely to monitor teacher attendance as well as their own children's performance. This result is of singular importance, and we will explore this theme in several of the alternatives we construct in the next section.

One final program in this category that is worth a comment is the *Programa Escuelas de Calidad* (PEC). Again, the program is directed mainly toward underperforming regions and schools, but it covers far fewer schools than the previously mentioned programs because it requires more formal preparation and coordination. Parents and staff of schools that qualify (using a poverty index criteria similar to that of

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<sup>20</sup> Outcomes are measured in terms of failure, repetition rates and midyear dropouts.

*Oportunidades*) are asked to prepare a five-year plan for improving the school, and then are given a significant grant. Whereas AGE's typically receive USD \$500 to \$700 per year, PEC grants have been up to \$15,000. Again, focus is on infrastructural improvements, although a portion of the grant is earmarked for teacher training in the last year or two of the five-year plan.

Performance of students in PEC schools seems to improve, but only slightly. Although no hard and fast statistical claims can be made, it appears that the largest gains in test scores come where the scores were previously most depressed, among poor students. (World Bank 2006a) While this is a positive outcome in terms of equality, it is not moving the needle significantly for our purposes of developing knowledge workers.

The findings from PEC's, AGE's, and other quality-oriented programs sponsored by CONAFE give meaningful support to the theory that infrastructure is important and that the personal involvement of parents and staff in making improvements to the school climate can be useful. However, none of these programs, as currently structured, would be likely to produce the rapid step changes in performance that our criteria require.

### ***Current programs: Assessment focus***

Assessment is a critical part of a winning strategy for developing knowledge workers. There has been progress in this area lately in Mexico, with the formation of the Instituto Nacional para la Evaluación de Educación (INEE). Although there has been a movement to decentralize and devolve the management of the education system in Mexico—with strong evidence from both inside and outside Mexico that this is a move in the right direction—the assessment of educational outcome is rightfully and necessarily a central function. Although since the 1992 decentralization it is up to the states to interpret and exploit the results of assessments (and they are doing so to very different degrees and with different effects), the measurements of achievement in the various states and municipalities must be made with the same yardstick to be useful. For that matter, even the federal level in Mexico might be perceived to be too 'local' given the international context of our mission to develop knowledge workers. Fortunately, INEE has been participating in

a number of international assessment initiatives, including the PISA testing that we have referred to on several occasions in this review.

While it should be clear that measurement *per se* is vital to our mission, both to track progress toward our goal as well as to defend our use of public funds, and that therefore the existence of an agency like INEE is a welcome prerequisite to the achievement of our overall policy goals, the first question we should pose here is whether INEE itself is constituted in such a way as to provide an efficient and reliable assessment of our programs to develop human capital in Mexico.

Before we can answer that question, we should define what we mean by assessment and what we intend to measure. To take a classic social science approach, we might agree that there are two basic components we are interested in: dependent variables and independent variables. Dependent variables for our purposes are well represented by the set of metrics outlined above, things like literacy rates, enrollment rates, and standardized test scores. This is what we are solving for when we implement programs in this policy space. Most educational evaluation agencies, including INEE in Mexico, do a pretty good job of administering tests and monitoring enrollments. The problem is that they focus almost exclusively on the dependent variables. Independent variables are equally important to monitor and report on, because they give us clues as to how to influence the dependent variables. The explanatory factors of human capital development include things like teacher training and behavior, community and home environment, parental involvement, school infrastructure and climate, as well as any and all programs we implement to try to move the needle on our dependent variables.

If we were to assess the assessor in Mexico, we might give INEE a ‘B+’ on dependent variables, but a ‘D’ on independent variables. INEE has produced moderately objective reports that detail Mexico’s performance on both national and international testing programs and reports other ‘dependent variable’ data as well. However, the agency is firmly within the grip of the education establishment in Mexico, with the head of its board of directors coming from the education ministry (SEP) and strong representation of the teachers union and other vested interests. This is probably why there is very little tracking and reporting of explanatory data, and little linkage of dependent variables with

independent variables. If a parent wanted to know how his child's school fared on standardized tests, and also what the level of teacher absenteeism was in that same school during the same period, and the level of government funding that the same school received, it would be almost impossible to find out from the agency responsible for education evaluation. To a large degree, even brilliant reporting of dependent variable information provides very little of real use for parents or policy-makers. That would be like trying to improve a football team merely by looking at the scores of the last 20 games. Along with the scores we need to know who the winning coaches and players are and how they perform their functions.

The good news is that although federally-managed assessments are necessary, individual states can and do go beyond centralized assessments. States that operate a rigorous evaluation system with systematic feedback to schools are improving learning outcomes in Mexico. (World Bank 2006a) We will discuss best practices in this area when we review alternatives and recommendations in the next section.

Before we turn to our new policy alternatives, synthesized from both international and domestic best practice, let's summarize how existing educational programs and policies might perform against our proposed criteria. In the following table, I have rated each program against our criteria. I have used a crude system of pluses and minuses, where '+' indicates that the program meets the criterion and '-' indicates that it does not. When a program has a particular strength related to the criterion, it receives a '+' and where it has a specific weakness related to the criterion, it receives a '-'. To summarize how well the program meets all seven criteria, I add up the pluses and minuses, with each plus adding one point and each minus subtracting one point. Based on the review of current policies, here's how the programs might respond to our criteria:

*Table 10: Current education policy ratings on criteria for Developing Knowledge Workers*

	<i>Oportunidades</i>	<i>Apoyo a la Gestión Escolar</i>	<i>Programa Escuelas de Calidad</i>	<i>INEE</i>
Impact within six years	-	-	-	-
'Quick win' within 18 months	-	-	-	-
Built-in 'self-defense' mechanism	+ +	+	-	-
Promotes convergence	+	+	+	-
No major spending increase	+	+	+	+
Synergies with industrial policy	-	-	-	-
Plays to Mexico's strengths	-	-	-	-
<b>Total</b>	<b>0</b>	<b>-1</b>	<b>-2</b>	<b>-6</b>

*Source: author*

We might say that this table represents the 'do nothing' alternative which is always one that we must consider in public policy. Doing nothing, according to this rough evaluation, doesn't move the needle in terms of developing knowledge workers.

Although this rating system is obviously somewhat subjective, I have tried to provide the support for these ratings in my commentary on each program. What is important as we now begin to discuss new alternatives is that we attempt to rank these alternatives in a consistent fashion against explicit criteria.

### ***Policy alternatives: synthesis of international and domestic best practices***

We will now become more specific about what might work to develop knowledge workers in Mexico, using the issue-by-issue process we used to review the policy experiences of our comparator countries. Some policy alternatives will address more than one issue—and that's good—but the options that follow will usually respond to one central issue that has arisen in our previous analysis. We'll start with the issue of specialization and technical education.

Our best role model on this theme appears to be China, where the fiscal shortfall and labor surplus mirror the Mexican dilemma. The approach taken was to enlist the private sector as allies—both strategically and financially—to develop workers for their industries. Here's how a Mexican version of this policy might operate:

#### ***A. Public-private technical education alliance***

Concept: Technical education at the upper secondary level is a 50/50 joint venture between industry and government.

Possible implementation: The management of existing technical and vocational schools at the state level is transferred to a Technical Education Board consisting of representatives of the education ministry (SEP) and executives of firms operating in the state. The private sector provides 50% of board members as well as 50% of funding. One-, two- and three-year technical diploma programs are offered based on the requirements of industry. The board determines what technical skills will be taught, what investments will be made, and who will teach the courses. Investment made by the companies is deductible from their future expenses in employing graduates of the program. In essence, the government is reimbursing companies for training their own future employees. Program could be tested then rolled out on state-by-state basis.

##### Pros:

- Technical training will be relevant to industry's needs
- Program could be used to attract both domestic and foreign investment
- High probability of productive employment following training
- Little or no incremental government funding
- Private provision of funding and expertise provides rationale for requiring more flexibility from SNTE

##### Cons:

- Companies may not be equipped to manage such a program
- Education may be too narrow if board dominated by a few strong companies
- Possible friction with SNTE if board wants to change teaching methods or teachers

The next issue we reviewed was that of allocation of investment in education. Mexico spends a disproportionate amount on staff and very little on capital investment, resulting in a lack of the technical tools so important for knowledge work as well as a

generally poor school climate. Best practice in this area is simply a matter of reallocating spend toward infrastructure investment. An extended version of CONAFE's current *Apoyo a la Gestión Escolar* (AGE) program might be able to address this issue, as follows:

### ***B. Accelerated AGE***

Concept: Reallocate educational expenditure toward AGE's and expand program.

Possible implementation: Increase per student AGE spend from current level of \$5.86<sup>21</sup> to \$10.00; expand program from targeted (disadvantaged) schools to universal coverage. Program could easily be implemented in experimental or quasi-experimental context.

#### Pros:

- Increased infrastructure investment
- Increased parental involvement
- Increased teacher involvement
- Little or no incremental government spending

#### Cons:

- Possible negative reaction from SNTE related to allocation decision (away from salaries)
- Possible political problem regarding extending program to non-disadvantaged areas

If we now turn to the issue of decentralization, the best practice is clear—more autonomy at the local level, coupled with centralized standard-setting and assessment. Commentators have noted, however, that Mexico's recent structural changes aimed at decentralization did not “dismantle the corporatist pact between the State and the teachers' union” but merely streamlined its operation. That said, decentralization models from other countries may be difficult to adopt in Mexico because of the complexity and idiosyncrasies of governmental structures. Therefore, we will content ourselves with embedding the concept of increased local autonomy in many of the policy alternatives we will present

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<sup>21</sup> As estimated by the World Bank (2006a)

related to other issues. For example, the concept of a Technical Education Board represents a distinct step forward in local decision-making. The increase in funding to AGE's provides a *very* local component of school management. We should see further decentralization as a theme in most of our policy proposals.

Turning now to privatization, we looked at two extreme examples in Chile and Korea. The Chilean voucher program provoked a massive structural change and produced significant and rapid improvements in educational and economic outcomes. In Korea, public education is routinely supplemented with private tutoring, to the extent that parents virtually pay twice for the education of their children—but the results seem to be worth the investment. Since Mexico lacks the Korean fanaticism for education, the Chilean model may be more relevant (but with some strong caveats regarding institutional obstacles). The key driver of improvement in outcomes in the voucher program was choice and competition. Schools were funded based on the parents' choice of school, and therefore offered educational experiences that enticed parents to opt out of the standard public schools.

In Mexico, a concept as radical as this would probably not be feasible for primary or lower secondary education. But an opportunity might exist in the case of upper secondary school, which is not compulsory and where there are fundamental problems of return on investment at present. As we have noted, investing in these three extra years of education does not lead to increased earnings for the individual, and therefore does not translate into fiscal revenues for the state. Since the state bears a cost for these three years, upper secondary education in Mexico must be one of the few examples worldwide of negative returns on public education. Perhaps because of these problems of return, only 25% of the population between the ages of 25 and 34 has completed *preparatoria*, and there has been little improvement in this percentage over the last thirty years. (OECD 2005) This aspect of Mexican education is not working, so there would be little risk in experimentation. Here's how introducing choice and competition at this level of education might work:

### ***C. Preparatoria voucher program***

Concept: Upper secondary schools will now receive governmental funds based on the ‘votes’ of parents, using the Chilean voucher program as a model. Both public schools and new private schools would be eligible to receive public funds.

Possible implementation: Upper secondary schools are required to publish specific data on their performance in local newspapers at specific times during the year so that parents may make an intelligent choice between schools and register their preferences with the municipal authorities. Private schools could be established that don’t charge tuition and rely on public voucher funds for operation, or they could choose to charge a modest tuition surcharge in order to provide a special experience. Parents could use their voucher funding for public schools, private non-tuition schools, or private tuition-charging schools. Program could be implemented using control and test populations, perhaps on a per state basis.

#### Pros:

- Immediate improvement in quality of education (via competition) of upper secondary, a critical stage for developing knowledge workers
- Probable significant increase in enrollment rates in upper secondary<sup>22</sup>

#### Cons:

- Political obstacles, particularly with the SNTE (many private schools would be employing non-union teachers)
- New private schools would focus on serving more affluent neighborhoods
- Logistical and systems costs
- Problems managing the voucher system at municipality level and regulating the quality of new private schools

Just as the concept of autonomy and decentralization runs through several of our policy alternatives, our last broad area of concern—management and incentive systems—is more an overall theme than a specific issue. The incentives in the Mexican educational

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<sup>22</sup> Chile experienced a 33% increase in completion rates for upper secondary between 1973 and 2003, compared to Mexico’s 13% increase during the same period. (OECD 2005)

system—for students, for parents, for teachers, and for administrators—are not currently creating a positive dynamic for improvement of outcomes—at least not on the scale and within the timeframe that is required for Mexico to make up lost ground in preparing its citizens for life in a global knowledge economy. There are no real sanctions for young children who choose not to attend school during the years of ‘compulsory’ education, nor for their parents who put them to work on the streets; whereas there are economic rewards for skipping the last three years of secondary education. There are no real sanctions for teachers who arrive late or not at all for classroom duties; yet salaries and benefits provided to members of the SNTE union are abnormally high and are growing. And there are no apparent electoral sanctions for politicians and political parties who ignore this set of perverse incentives.

Action in this arena will require a considerable investment of political capital and perhaps some temporary social ‘adjustment’ pain, but without action on incentives other policy initiatives will be unlikely to bear fruit.

Some shifting of incentives is implicit in our previous proposals. Research suggests that giving parents some control over infrastructure investments in their child’s school provides an incentive for those parents to monitor both their child’s attendance and the teachers’ attendance. Letting parents choose where their child attends upper secondary school should also increase commitment on the part of both the choosing parent and chosen school. However, there is an additional policy option we should consider which would help consolidate and accelerate the sense of accountability that is now missing in Mexican education. It relates to information and assessment.

In order for students, parents, teachers and administrators to be held accountable for educational outcomes, they require two things: information about what factors influence those outcomes, and the authority to make changes in those factors. Any attempt to adjust incentives—whether rewarding positive outcomes or sanctioning negative outcomes—without first supplying these two capabilities will be doomed to failure.

Our proposal here is to mandate the first capability—information—and then experiment with the second. This approach to providing basic information—that is, data on both objectives and strategies—can be viewed as part the general trend in Mexican

government toward improved transparency. For this reason, this ‘transparency first’ policy may be the most feasible avenue of approach toward our larger institutional goals.

There are many ways to structure an ‘education information mandate,’ and the proposal below is by no means the only or even best approach. But it encompasses the main findings from the extensive literature on dependent and independent variables in education, and something like this will be required for real improvements to take place over time. Improving quality, by definition, is a function of measuring what is happening now, understanding why it is happening, and then communicating this to people who can make changes.

#### ***D. National Education Database (NED)***

Concept: A totally independent body<sup>23</sup> is formed to monitor and report on the performance of schools in Mexico.

Possible implementation: By law, both federal and state governments would be required to provide clear targets on a range of education-related indicators<sup>24</sup> to the NED, with timeframes for their achievement, and the NED would then put in place independent research to monitor and report progress on these indicators. In addition, each school in Mexico, public or private, would be required by law to provide an Annual Report to the NED, including specific information on the both the outcomes achieved by the school (failure rates, test scores, student attendance rates, etc.) as well as explanatory data (infrastructure spending, teacher qualifications, teachers teaching out of their field, teacher absenteeism, teacher tardiness, etc.). These individual school reports would be analyzed and schools would be ranked by the NED on both the relevant outcomes and explanatory factors. The NED, via its website and other means, would publish for public inspection both the government targets and achievements, as well as the school

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<sup>23</sup> This would be along the lines of INEGI or even IFE; government agencies and stakeholders, like the Education Secretariat and the SNTE, would have some say over the election of members, but sitting members would not be employees (or would cease to be employees) of any of these ‘interested’ parties. The Instituto Nacional de la Evaluación de Educación, therefore, does not meet these criteria.

<sup>24</sup> These indicators could simple be a set of metrics much like the ones presented in the earlier section on evaluation.

reports. In this way, any policy-maker could review the progress in the education sector, and any parent could immediately and at no cost get a complete picture of the performance of the school her children attend.

Pros:

- Citizens and policy analysts would be better able to hold public officials accountable for performance on education objectives
- Parents would be able to hold schools accountable for their performance
- As and when choice became available to parents, a strong foundation for making rational choices in education would be in place
- Government officials and education authorities would be ‘named and shamed’, providing implicit incentives for improvement in their performance
- Public debate would be fostered based on information provided by a neutral party

Cons:

- Political obstacles would be raised by those parties with a vested interest in withholding such information (SEP, SNTE)
- Maintaining the integrity of the NED and its members would require constant vigilance

As noted, providing the information required to make intelligent policy and parental choices is the first step. Ideally, the presence of this valuable independent database would provoke not only discussion but also some reassignment of authority—either to local administrators or to parents or to both—in order to make the changes deemed necessary to achieve the stated goals. The data—even the mere effort and intention to gather and report the data—would serve as a valuable tool for convincing both internal and external skeptics that progress in Mexican education was now on a firm footing, and could be used as a sort of merchandising tool for attracting business and industry to areas where the performance was good and getting better. As we know from the analysis of the Knowledge Economy Index on a state-by-state basis in Mexico, there are already many states and municipalities where performance is significantly above that of Mexico as a whole. The National

Education Database would serve to provide instant recognition and reward to those administrators, teachers and students whose performance is already world-class, and would serve as a public goad for those who lag.

To summarize the results of our policy review, we have now synthesized four policy options based on both domestic experience and international results. I have tentatively rated these options based on our agreed criteria. Because the way that each proposed alternative interacts with our criteria may not be immediately obvious, I will summarize my rationale for each policy alternative following the table.

*Table 11: Ratings of policy alternatives using criteria for Developing Knowledge Workers*

	<i>Public-private education alliance</i>	<i>Accelerated AGE's</i>	<i>Preparatoria voucher program</i>	<i>National Education Database</i>
Impact within six years	+	+	++	+
'Quick win' within 18 months	+	-	+	+
Built-in 'self-defense' mechanism	-	+	+	+
Promotes convergence	-	+	-	+
No major spending increase	+	+	+	-
Synergies with industrial policy	++	-	-	+
Plays to Mexico's strengths	-	+	-	-
<b>Total</b>	<b>+2</b>	<b>+3</b>	<b>+2</b>	<b>+3</b>

Source: author

*Public-Private Education Alliance:* This policy option would clearly have the potential to produce measurable impact on our metrics within six years as well as a quick win or two. Because of the focus on upper secondary technical schools, we would expect to see gross enrollments improve, and perhaps a shift in FDI in regions where the program was successfully launched. And one can easily imagine news articles about companies hiring program first-year graduates. Although private funding would later be reimbursed via offsetting social security and other employment costs for graduates, increased cashflow from private sources would offset program administration costs, leaving no significant net cost to the taxpayer. The program's outstanding benefit would be the synergy with industrial policy. Conversely, because of its extensive involvement of the private sector, the program could not be expected to address convergence issues (although other fiscal

instruments could help steer it in that direction), nor would it necessarily have the test-control features required to defend results against succeeding administrations. Also, private sector involvement in typically ‘public’ areas like education is not a strength in Mexico.

Accelerated AGE’s: Although direct benefits from current compensatory support programs have been difficult to measure, it could be anticipated that a doubling of resource would create positive outcomes that register on the radar screen within six years. That said, we should not expect quick wins. Rigorous implementation could provide sufficient control of variables to produce defensible results, and because we know that such results are disproportionately large in poorer regions we should expect some convergence to take place, even though the program is rolled out universally. The proposed doubling of expense for AGE’s would be funded by reductions (over time) in personnel expenses—a reallocation strategy, rather than incremental expense. There is no particular synergy with industrial policy, but because of the history of the program we can say that it is not inconsistent with the Mexican culture or policy approach.

Preparatoria voucher program: Based on the Chilean experience, among others, we can anticipate a major shift in enrollments and quality achievements at the upper secondary level within a few years of program implementation, and some immediate public relations wins in terms of the number of new schools being opened. State-based testing of the program would allow firm conclusions to be drawn which could be used to defend the program, and it is likely that the program would produce a fiscal profit, since money now spent on upper secondary education is not creating incremental earnings, tax revenues or social welfare benefits at present. There may however be a negative impact on convergence, given the private sector focus on more affluent neighborhoods. There are no obvious synergies with industrial policy, nor can we say that this sort of policy approach plays to Mexico’s strengths.

National Education Database: This major transparency initiative should provoke substantial changes in both policy and management in the education space well within the six-year success criterion. There will undoubtedly be opportunities in the short term as well to chalk up ‘wins’ for the program as journalists begin to sift through the information and turn it into both positive and negative news stories. It is likely that once established,

the program would be difficult to unseat, in the same sense that INEGI or IFE would be hard to revoke because of their ethical stature. The data would help policy-makers focus on gaps among states and regions and therefore probably aid efforts in convergence, and would clearly encourage industrial investments to be made where progress was evident. There would be an incremental cost, however, both financially and politically.

## **VII. Recommendation**

Our problem is that we are not developing knowledge workers in Mexico, or at least not developing enough of them to help secure our economic future. Based on our analysis of the state of human capital in Mexico today, and the progress being made in countries with similar resources, we can now fairly confidently propose policy solutions. In this case, however, because of the magnitude of the problem and the brief historical moment we have in which to reorient ourselves in a rapidly evolving global economy, we should not feel limited to selecting only one of the alternatives. In fact, there is a strong possibility that these four alternatives—covering school management, investment and assessment—will create natural synergies if implemented as a set of policies focused on our core goal of developing knowledge workers.

In short, our recommendation today is to proceed to the next stage on all four policy options, i.e. a fuller feasibility analysis of each proposed program. What is critically missing from this review is the feedback from professionals in this policy space on our specific conclusions and proposals. That feedback could substantially alter or even eliminate one or more of these options, so it would be prudent to push all four forward at this juncture. Good policy design will also require more work on each proposal in terms of how we expect to target the programs, what options we have for limited and controlled implementation, and exactly how we intend to apply the agreed metrics to each. In addition, although we discussed in the early sections of this review the difficulties of *ex-ante* evaluation of education policy given the long timeframes and complex interactions with other policy, we should attempt to model these programs so that we have a clearer idea of return on investment.

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## VIII. Challenges of implementation

The policies recommended above are based on an analysis of a variety of programs implemented at different times in different countries and in different contexts. Therefore, there is inevitably some softness in the conclusions, which suggests that we need to pay more attention than usual to political and administrative feasibility issues. But even if this investigation had produced statistically irrefutable conclusions based on test versus control data generated wholly within Mexico in the last five years, there would still be major implementation challenges because change in this policy space requires action on both technical and institutional levels. In this final brief section, I will touch on what I perceive to be the primary challenges of implementing the recommended policies.

At the risk of over-simplifying a long and elaborate process of analysis and synthesis, our policy recommendations can be said to have one common feature. They all contribute to the *disintermediation* of the educational process. For example, rather than have political officials, union officials and education administrators guess at what skills are required for the knowledge economy, our *Public-Private Education Alliance* brings the eventual employer of those skills directly in contact with the process of developing those skills, perhaps even employing company employees to do the training. The *Accelerated AGE* program allows parents to make direct financial and personal investments in their children's schools and to have direct contact with and, to a degree, control over the school climate and the teachers' behavior. The *Preparatoria Voucher Program* brings decision-making on funding back to the parent, bypassing layers of bureaucracy and instantly rendering incremental input-oriented budgeting obsolete. And to a large degree, the *National Education Database* is the facilitating engine for all of this disintermediation, providing the information required for decisions to be taken by the people on the ground, closest to and most affected by the educational outcomes.

Such disintermediation has a direct and obvious impact on the national educational infrastructure—the hundreds of thousands of people whose jobs and identities consist in providing the intermediating function in education. Hence, there will be challenges in implementation. To address these challenges, policy-makers need to be aware not only of

exactly what levels and layers of *infrastructure* they are affecting—in order to prepare and perhaps even compensate these individuals for the change that is about to take place—but also of what aspects of the educational *superstructure* they are affecting. This superstructure, consisting of beliefs and ideologies about how education should be delivered and by whom and when and where, needs to change in conjunction with changes in the infrastructure in order to minimize the transaction costs of these policies. The agendas of those who operate within the educational infrastructure—the unions, the politicians, the academics—are nearly always linked to one or another aspect of this superstructure. Rather than simply confront one agenda with another, it will be useful to focus first on adjustments to assumptions within the superstructure, and then to revisit agendas, hopefully with some common ground already mapped out.

This gentle and perhaps too-abstract suggestion as to how to implement institutional change is based on a combination of situational analysis and personal negotiating experience. In essence, it is simply a reminder to policy practitioners that they are not dealing with purely technical problems in this policy space, and therefore purely technical solutions will not be convincing or effective.

Barrington Hill

Cuernavaca

El 24 de abril de 2006

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## Appendix A

### Knowledge Economy Index (+ four components) & GNI/capita (World Bank 2005) Human Development Index (UNDP 2005)

Rank	Country	Knowledge Economy Index	Economic Incentive Regime	Innovation	Education	Information Infrastructure	GNI/Capita (US\$ '000)	Human Development Index
1	Sweden	9.17	8.05	9.68	9.19	9.76	29.77	0.95
2	Finland	9.02	8.44	9.73	9.21	8.71	29.56	0.94
3	Denmark	9.00	8.31	9.36	8.87	9.46	31.55	0.94
4	Iceland	8.83	8.55	9.14	8.42	9.20	32.36	0.96
5	Australia	8.77	8.10	8.71	9.18	9.07	29.20	0.96
6	Switzerland	8.75	8.21	9.42	7.73	9.66	35.37	0.95
7	UK	8.72	8.00	8.60	9.00	9.28	31.46	0.94
8	Netherlands	8.62	8.18	8.72	8.60	8.99	31.22	0.94
9	New Zealand	8.58	8.36	8.32	9.00	8.64	22.13	0.93
10	Norway	8.56	8.08	8.89	8.95	8.34	38.55	0.96
11	USA	8.50	7.61	9.43	8.22	8.74	39.71	0.94
12	Canada	8.50	7.97	9.01	8.39	8.61	30.66	0.95
13	Germany	8.33	7.77	8.76	7.94	8.83	27.95	0.93
14	Japan	8.26	7.40	9.27	8.08	8.30	30.04	0.94
15	Estonia	8.26	8.77	7.29	8.14	8.83	13.19	0.85
16	Belgium	8.25	7.66	8.49	8.86	7.98	31.36	0.95
17	Singapore	8.21	9.50	9.06	5.33	8.95	26.59	0.91
18	Austria	8.08	7.92	8.21	7.84	8.37	31.79	0.94
20	Ireland	8.05	8.03	8.00	8.15	8.04	33.17	0.95
22	France	7.98	7.19	8.35	8.36	8.01	29.32	0.94
23	Slovenia	7.88	7.01	7.91	8.58	8.00	20.73	0.90
24	Israel	7.72	6.70	8.37	6.93	8.90	23.51	0.92
25	Spain	7.68	7.30	7.65	8.10	7.68	25.07	0.93
27	Korea	7.57	5.72	8.18	7.62	8.75	20.40	0.90
28	Italy	7.48	6.88	7.03	7.53	8.47	27.86	0.93
29	Portugal	7.30	7.35	7.07	7.37	7.42	19.25	0.90
30	Lithuania	7.17	6.91	6.46	8.32	7.01	12.61	0.85
31	Hungary	7.01	6.42	7.00	7.65	6.98	15.62	0.86
32	Czech Republic	7.00	6.01	6.92	7.10	7.96	18.40	0.87
33	Latvia	6.98	6.65	6.12	8.11	7.02	11.85	0.84
34	Greece	6.97	6.75	6.73	7.61	6.77	22.00	0.91
35	Poland	6.86	6.36	6.15	8.32	6.60	12.64	0.86
36	Chile	6.85	8.90	5.72	6.24	6.51	10.50	0.85
37	Slovakia	6.70	5.96	6.70	6.65	7.47	14.37	0.85
38	Cyprus	6.66	6.48	6.18	6.25	7.74	22.33	0.89
39	Croatia	6.22	4.31	7.12	6.55	6.91	11.67	0.84
40	Bulgaria	6.19	6.05	5.94	6.73	6.03	7.87	0.81
41	Russia	6.05	3.01	7.47	7.85	5.88	9.62	0.80
42	UAE	6.01	6.98	5.92	4.35	6.79	21.00	0.85
43	Barbados	5.99	5.69	3.23	7.73	7.34	15.06	0.88
44	Kuwait	5.58	5.99	5.20	4.55	6.60	19.51	0.84
45	Uruguay	5.51	6.05	3.12	7.02	5.86	9.07	0.84
46	Malaysia	5.44	5.41	5.13	4.27	6.94	9.63	0.80
47	Costa Rica	5.40	5.62	5.41	4.19	6.37	9.53	0.84
48	Romania	5.27	4.37	5.20	5.60	5.93	8.19	0.79
49	Bahrain	5.27	5.80	2.80	5.76	6.73	18.07	0.85
50	Ukraine	5.23	2.83	5.82	7.98	4.31	6.25	0.77
51	Argentina	5.22	1.94	6.10	7.40	5.44	12.46	0.86
52	South Africa	5.15	6.10	5.34	4.17	5.00	10.96	0.66
53	Armenia	5.10	4.90	5.72	6.00	3.77	4.27	0.76
54	Brazil	5.08	4.02	5.08	5.59	5.64	8.02	0.79
55	Lebanon	5.06	3.59	5.96	5.22	5.46	5.38	0.76
56	Belarus	5.02	1.40	5.83	7.64	5.20	6.90	0.79
57	Jordan	5.00	4.33	6.01	5.18	4.49	4.64	0.75
58	Mexico	4.94	4.89	4.90	4.37	5.58	9.59	0.81
59	Mongolia	4.91	6.95	2.30	6.06	4.31	2.02	0.68
60	Jamaica	4.85	3.81	4.90	4.31	6.40	3.63	0.74
61	Thailand	4.85	4.52	4.18	5.61	5.06	8.02	0.78
63	Turkey	4.73	4.50	4.89	4.19	5.35	7.68	0.75
64	Saudi Arabia	4.60	3.60	5.53	3.61	5.66	14.01	0.77
66	Moldova	4.43	3.91	4.43	5.40	3.97	1.93	0.67

**Knowledge Economy Index (+ four components) & GNI/capita (World Bank 2005)  
Human Development Index (UNDP 2005)**

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67	Georgia	4.39	1.75	6.07	6.43	3.30	2.93	0.73
68	Philippines	4.32	4.59	3.37	5.34	3.98	4.89	0.76
69	Mauritius	4.25	4.51	2.21	3.86	6.43	11.87	0.79
70	Botswana	4.20	7.99	2.52	2.73	3.54	8.92	0.57
71	Peru	4.11	3.39	3.37	5.08	4.59	5.37	0.76
72	Tunisia	4.11	3.33	4.72	3.77	4.61	7.31	0.75
73	Kazakhstan	3.92	1.47	4.07	7.11	3.05	6.98	0.76
74	Venezuela	3.91	1.00	4.56	5.20	4.87	5.76	0.77
75	China	3.90	2.95	4.74	3.60	4.30	5.53	0.76
76	Egypt	3.84	3.13	4.36	4.51	3.35	4.12	0.66
77	Colombia	3.80	2.87	3.31	4.40	4.60	6.82	0.79
78	Bolivia	3.74	4.93	1.62	5.43	3.00	2.59	0.69
79	Oman	3.74	5.88	1.89	3.12	4.06	13.25	0.78
80	El Salvador	3.70	5.60	1.72	3.11	4.38	4.98	0.72
81	Sri Lanka	3.65	4.91	3.31	4.01	2.38	4.00	0.75
82	Namibia	3.63	6.07	1.73	2.89	3.81	6.96	0.63
83	Kyrgyz Rep.	3.53	3.09	1.79	6.53	2.70	1.84	0.70
84	Uzbekistan	3.26	1.40	3.77	5.64	2.23	1.86	0.69
85	Morocco	3.21	3.02	3.96	1.87	3.99	4.10	0.63
86	Ecuador	3.15	2.09	2.58	3.77	4.15	3.69	0.76
87	Indonesia	3.11	3.65	2.58	3.34	2.85	3.46	0.70
88	Iran	3.09	2.71	2.66	3.71	3.26	7.55	0.74
89	Bosnia and Herzegovina	3.02	2.62	1.02	4.00	4.45	7.43	0.79
90	Dominican Republic	3.00	3.06	0.31	4.01	4.61	6.75	0.75
91	Albania	2.99	2.66	1.65	4.81	2.82	5.07	0.78
92	Vietnam	2.85	2.03	2.51	3.99	2.88	2.70	0.70
93	Syria	2.71	1.64	3.21	2.79	3.22	3.55	0.72
94	Nicaragua	2.65	4.38	0.74	2.85	2.65	3.30	0.69
95	Paraguay	2.65	2.23	0.74	4.16	3.48	4.87	0.76
96	Algeria	2.65	1.28	3.53	3.58	2.21	6.26	0.72
97	Zimbabwe	2.63	0.58	4.00	2.60	3.33	2.18	0.51
98	Kenya	2.62	1.54	4.66	2.00	2.28	1.05	0.47
99	India	2.58	2.47	3.72	2.16	1.96	3.10	0.60
100	Honduras	2.30	3.48	0.95	2.40	2.36	2.71	0.67
101	Guatemala	2.29	3.17	0.51	2.16	3.33	4.14	0.66
102	Tajikistan	2.18	1.71	1.22	5.36	0.43	1.15	0.65
103	Senegal	2.15	4.00	1.13	0.71	2.74	1.72	0.46
104	Ghana	2.09	3.45	1.57	1.76	1.58	2.28	0.52
105	Cote D'Ivoire	1.91	1.15	3.09	1.32	2.08	1.39	0.42
106	Zambia	1.86	3.40	1.10	1.63	1.31	0.89	0.39
107	Mauritania	1.72	3.87	0.39	0.82	1.81	2.05	0.48
108	Madagascar	1.71	5.27	0.17	0.87	0.54	0.83	0.50
109	Uganda	1.69	3.61	1.16	1.16	0.82	1.52	0.51
110	Nigeria	1.55	0.23	2.74	1.79	1.43	0.93	0.45
111	Malawi	1.40	2.90	1.42	1.05	0.23	0.62	0.40
112	Cameroon	1.37	1.02	1.11	1.82	1.54	2.09	0.50
113	Haiti	1.35	1.53	0.08	1.18	2.62	1.68	0.48
114	Benin	1.35	2.29	1.26	0.84	1.00	1.12	0.43
115	Pakistan	1.34	1.15	2.30	0.82	1.10	2.16	0.53
116	Tanzania	1.32	2.21	1.06	0.92	1.09	0.66	0.42
117	Yemen	1.24	1.15	0.24	1.87	1.68	0.82	0.49
118	Sudan	1.19	0.39	0.59	1.69	2.11	1.87	0.51
119	Mozambique	1.13	2.92	0.43	0.34	0.83	1.16	0.38
120	Nepal	1.12	1.35	0.85	1.73	0.56	1.47	0.53
121	Djibouti	1.12	1.69	0.00	0.87	1.91	2.27	0.50
122	Burkina Faso	1.07	2.87	0.81	0.16	0.42	1.22	0.32
123	Angola	0.94	0.21	2.11	0.45	0.99	2.03	0.45
124	Bangladesh	0.92	0.89	0.55	1.50	0.73	1.98	0.52
125	Laos	0.87	0.92	0.16	1.79	0.61	1.85	0.55
126	Eritrea	0.75	1.29	0.20	0.97	0.55	1.05	0.44
127	Ethiopia	0.49	0.65	0.63	0.58	0.11	0.81	0.37
128	Sierra Leone	0.41	0.73	0.28	0.34	0.27	0.79	0.30

**Appendix B*****Knowledge Economy Index by Mexican State (Robles 2005)***

<b>#</b>	<b>Entidad</b>	<b>Índice</b>
1	Nuevo León	7.63
2	Distrito Federal	7.50
3	Baja California	6.85
4	Jalisco	6.77
5	Querétaro	6.46
6	Sonora	6.35
7	Coahuila	6.33
8	Chihuahua	6.20
9	Tamaulipas	6.04
10	Aguascalientes	6.00
11	Baja California Sur	5.68
12	México	5.63
13	Colima	5.42
14	Morelos	5.29
15	Puebla	5.18
16	Guanajuato	5.17
17	Quintana Roo	5.04
18	Yucatán	4.90
19	San Luis Potosí	4.62
20	Sinaloa	4.34
21	Durango	4.29
22	Veracruz	4.00
23	Tlaxcala	3.95
24	Campeche	3.77
25	Hidalgo	3.50
26	Michoacán	3.44
27	Nayarit	3.42
28	Tabasco	3.25
29	Zacatecas	3.15
30	Guerrero	2.68
31	Chiapas	2.26
32	Oaxaca	1.86

## Confidential Postscript

Dear Mr. President,

“If our aim is to produce a new stratum of intellectuals, including those capable of the highest degree of specialization, from a social group which has not traditionally developed the appropriate attitudes, then we have unprecedented difficulties to overcome.”

The words above were written by Italian socialist Antonio Gramsci in 1930, from his prison cell. He was talking about how to turn uneducated manual laborers into a revolutionary force in an Italy ruled by Fascists and decimated by depression. But he could have been talking about Mexican education in 2006. In the main body of the policy memo, I have reviewed the technical aspects of this challenge, which are daunting enough. In this section of the memo, intended only for you and your closest advisors, I'd like to discuss priorities and politics. Gramsci and the Italian socialists were never able to overcome their 'unprecedented difficulties.' I believe you can.

The good news, of course, is that following your election, the nation's hopes are high. You will never have more political capital than you have today. The bad news is that you're going to have to spend a good portion of it, quickly, in order to be able to leave behind tangible achievements as your legacy and as a foundation for your party to retain this office.

You can achieve something in this policy space. The proof is the success of Progres-Oportunidades, arguably the best-designed and most effective anti-poverty program of the last decade in any developing country. Zedillo and his team did it. Fox and his team couldn't deny its value, and so continued it. (Your administration should continue the program. Rename it again, if you want, but don't kill it.) But your legacy will be something much more. Progres was the first shoe. The second shoe has not yet dropped. Progres got the kids off the streets and into the classroom. Your job is to make sure they

learn something useful. Until Mexico starts living with its head as well as its hands, 'progress' will be just another empty slogan.

Let's now focus on the numerous natural enemies of any new program or set of programs in this policy space. Then we will address your friends, who won't be many.

Your primary obstacle may be the teachers' union, the Sindicato Nacional de Trabajadores en Educación (SNTE). However, they are not as formidable as they once were. Until 2000, they were a key component of the PRI electoral machine. In 2006, they have become close to irrelevant, splitting off from the PRI to form the ineffectual breakaway faction Nueva Alianza. Although we cannot be sure of the final electoral calculus in terms of party alliances in either the upper or lower legislatures, it is unlikely this faction will exert any significant control. Therefore, you have much more freedom of action than you might have expected. However, there are more than a million teachers, and they can still cause considerable problems, particularly given the public respect they command.

The approach I would recommend for preempting and sidelining the SNTE relates also to priorities. Of all the recommended programs, the first to be announced should be the National Education Database (NED). This will be your primary means of setting the new education agenda in Mexico and putting the SNTE on the defensive. You will announce this *not* as a fantastic new instrument for changing the face of education in Mexico (which it is), but simply as part of your transparency and 'honesty in government' initiatives. There should therefore be other transparency-type programs announced at the same time so as not to highlight the radical nature of the information that will now be available on school and teacher performance.

Despite your low-key implementation of the NED, there will be many in the SNTE who will realize how powerful this information will be in the hands of the media and, worse, the concerned parents of school-age children. They will recognize that this program will undermine their 'information asymmetry' advantage and threaten their ability to call the shots in the educational system.

This is a fight you can win. Transparency cannot be a bad thing, you will say. It's more than your policy, or even your party's policy. Transparency has become the way

Mexico wants to govern itself. Surely the union and its political supporters don't want to do away with the fantastic advances in transparency achieved over the last twenty years?

You do not have to enter into a debate about what use the new information will be put to. You can be admirably unbiased. Standardized international tests are not perfect, but they may help us see how we're competing in the wider world. Teacher absences are often unavoidable, but there will be some areas where they are unreasonably high. In order to improve our educational system, we need to know more about how it is operating.

There will also be concern raised from within the government, in the education ministry. This is because they, along with the teachers and school administrators, will be exposed as perennially poor managers of the education of our children. Long-time 'experts' in the field will claim that such data can be misleading and fall into the wrong hands. They will point out the administrative costs of compiling the data. Your response can be simple: this is just a transparency initiative, similar to INEGI, one of the jewels of Mexican public administration. Let's put it into operation and then monitor the costs and problems as they arise.

Selecting the leader of the NED is a critical part of the overall strategy. The leader should have impeccable academic credentials, but not be part of the SNTE or allied with the education bureaucracy in the federal government. This person needs to be able to publish and defend—with the most sophisticated statistical tools, if necessary—the 'truth' that will emerge from the data.

The media is your best friend in this reform process. They will catch hold of the more incriminating elements of the data—teacher absences, falling test scores, little or no investment in buildings—and start their own enquiries and campaigns. Your office should facilitate this, even to the extent of 'leaking' some of the juiciest and most damning data on poorly-performing schools or areas—and somehow reward the most active and incisive use of the data to raise the public consciousness about the dire state of education.

The low-key launch of the NED will be a slow-burning fuse under the educational system in Mexico, and is the critical first step for all of your subsequent moves in this policy arena.

The next step, which can be taken quickly (and which will not cause too much anxiety among potential adversaries) is the extension of CONAFE's existing program, *Apoyo a la Gestión Escolar* (AGE). In this case, you will be taking a targeted program and generalizing it. It is often far more difficult to defend a highly targeted program from claims of exclusion and political manipulation, so in this case you can use the arguments against exclusion and manipulation in your favor. It will be hard for anyone to object to making the benefits of extra infrastructure spending and parental support more widely available. Since the program exists and has widespread support from the academic and NGO community, you should have little problem pushing this through.

Implementing the NED and the expanded AGE's is phase one, and should be tackled immediately with whatever expenditure of political capital is necessary to see these programs through without material compromise. Once these are in place, an interesting and productive synergy between the two programs should develop. Parents will start to receive from the NED—in the form of annual school 'report cards' and in-depth web-published comparison data—previously unavailable (and highly provocative) information about school and teacher performance at the same time as the more activist parents are becoming involved with the AGE's in school-based management. This cocktail of increased information and increased parental control and involvement in school affairs should start a broader dialogue on what is wrong with our educational system.

This is where other friends should enter the picture. Aside from our allies in the media, we can now look to state governments to become involved, seeking to reap political gain from the debate that is forming around school performance. They may criticize federal bureaucrats, they may propose radical initiatives in their own areas, and they may even challenge the SNTE's continuing control of personnel decisions. *All* of these actions should be encouraged by your administration. First, you have nothing to defend. If there is mismanagement in the education ministry, that's exactly what you were hoping to find out via the NED. If there are radical and divergent ideas forming in the states and municipalities, that's exactly the kind of innovative thinking you were hoping to see.

Your primary mission with these first two programs is to start a heated debate around the shortcomings of the system, in order to weaken the resistance of the natural

enemies of reform. I would recommend taking the pulse of the public on educational issues at regular intervals after the implementation over the first two years. We should track the perception not only of your administration on this issue but also public perceptions of the SNTE.

When you consider the timing to be opportune—that is, when the educational system (including the union) is perceived to be ‘broken,’ that will be the time to implement the more radical fixes we have in mind—the public-private partnership on technical education, and the voucher system for upper secondary. These should not be implemented together, for administrative as well as political reasons. Ideally, one of these new and radical programs should be implemented first and a few quick wins should be scored to prepare the ground for the second program.

It is probable that the private participation in technical education should come first, because you may be presented with (and then exploit) the ideal conditions for its implementation: budget constraints. Private co-funding of technical education will be vehemently opposed by the left of the political spectrum, but you may be ‘forced’ to consider such radical options because of pressures on government spending from increased social programs, reduced oil prices or any of the potential fiscal problems that will inevitably arise. In this case, the State’s problems are your allies. You can propose to rescue our technical education with OPM: Other People’s Money. In reality, the strategic logic behind the public-private partnership in technical education is not financial—the problem is poorly designed and implemented technical education programs that produce workers that don’t have jobs when they graduate. Private involvement ensures more relevant training. But you don’t need to disclose this aspect of the strategy—the financial rationale should be sufficient.

The public-private partnership in technical education will be the Trojan horse of our educational reform program. It will be the first time that non-union teachers have received public money. If we are successful in pushing this forward, we will have achieved a historic rollback of the union’s power and doors will open to other similar initiatives.

It will be crucial to demonstrate—and publicize—a quick win from the technical education program. The most logical win would be a major FDI initiative signed and

sealed because of the promise of highly-focused and government-supported training for future workers in the industry in which investment is planned. You should assign one of your trade directors to go out and make this happen alongside the SEP executive in charge of the technical program. If other incentives are required, so be it, but the headline of the news story should be “Success of technical education program lands Microsoft plant.”

Once the union is on the back foot and the education reforms are seen to be a) necessary and b) bearing fruit, you should have more flexibility in extending the programs and bringing in the most controversial of all, the voucher program. In order for this to be palatable, your administration should plant the seeds of the concept of parental choice, and then wait for a partner to step forward—a state or municipality with an axe to grind or a point to prove. This sort of program is ideal for implementation on a local level, where mistakes can be made and, if necessary, the onus put upon the specific implementation rather than the concept itself. For example, an aggressive young governor of a northern state might want to push the envelope (and attract more U.S. investment) by implementing something as radical as the effective privatization of upper secondary schools. Mexican upper secondary education, as reported in the memo, is unusual in *not* producing economic returns, i.e. salaries don’t increase when students complete *preparatoria*. Technically, therefore, there is little to lose in innovating in this area. However, this will be the most politically sensitive and institutionally complex program to implement; hence its position at the tail end of the reform program, once the opposition has been softened by media activists and ambitious local politicians.

Sir, my goal in outlining this political strategy is not to make the reform process seem easy, but merely to demonstrate that it is feasible. As Gramsci predicted, there will be unprecedented difficulties to overcome. But we have no choice. If Mexican workers don’t begin to add more value, the nation will not be able to make the other critical investments required to resolve social problems. Without improved competitiveness, all other policies will be living on borrowed time, literally. We must start living with our heads as well as our hands. It’s up to your administration to use its best heads to get this done.

Respectfully, Barry