

## MONTERREY: INTERNATIONAL KNOWLEDGE CITY PROGRAM ADVANCES PHASE 1 AND MASTER PLAN PROPOSAL PHASE 2

### Executive Summary

*“... a project oriented to take advantage of the opportunities the globalized world offers, and that also takes advantage of the strengths our federal entity has. It pretends to advance quickly in spaces we need to heighten up to the stature of other places in the world to transform our society quickly and to become a space of leadership in Latin America...”*

**José Natividad González Parás, Governor of the State of Nuevo Leon (2003-2009)**

*“... there is an increasing number of businesspeople that see how convenient it is to see that their companies evolve and are more competitive and profitable through knowledge transformed into technology and development of human capital...”*

**Rafael Rangel Sostmann, President of Tecnológico de Monterrey**

*“... among the most important advances to account for is the alliance achieved between the State and the private industry of Nuevo León, with the support of the federal government strengthening the local information technologies sector... the cluster that has been created and has been working in an important way... has also seen some advances in the Health Sciences... the PIIT is another important achievement... as well as the openness to work with educational institutions...”*

**Blanca Treviño de Vega, Softek CEO and President of the Nuevo Leon Software Council (2006-2008)**

*“... this project has great potential of being replicated in other Mexican regions, and in other countries of Latin America and the Caribbean interested in building a regional and/or sector innovation system. It could also go to the national level...”*

**Hyunghwan Joo, Director of the Korean Fund for Technology and Innovation**

### BACKGROUND

Based on the **vision of the Government of Nuevo Leon, strongly supported by the educational, production and social sectors** of the State under the triple axis concept model, the **Monterrey: International knowledge City (MIKC) Program** was born with the objective and conviction of fostering local growth through a model which placed strong initial emphasis on **education**. It included a bid for **research, development and innovation (R + D + i) for economic and social strengthening, focusing on the application of innovation, technology and knowledge in the social and productive activities.**

This is how MIKC became one of the five strategic projects of the Plan of State Development (PED 2004-2009). Signed on November 19, 2004, **the**

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**collaboration agreement** between the Government of Nuevo Leon and the four most important local universities (UANL, ITESM, UDEM and UR) **officially took off. Since then, it has brought in very important social and economic results in the development of Nuevo Leon.**

The foundation of the MIKC Program has a strong alliance among universities, companies and the government under the triple axis model, whose main objective it to generate economic growth through innovation. Within this context, the outlook of the Government of Nuevo Leon (2003-2009) of a knowledge city (or region) is a program that has nothing to do with continuous education, but with gaining a new edge based on innovation which constantly sets new goals for everyone to achieve; it is not a real estate project, but a key element is the construction of technological parks; it is not a university campus, but a fundamental issue is the participation of local universities and researchers; it is not a short-term project, but a change of paradigm; basically, it is not a Made in Mexico initiative, but a plan Created in Mexico.

Jose Natividad Gonzalez Paras, Governor of the State of Nuevo Leon (2003-2009) has defined the MIKC program ([www.mtycic.com.mx](http://www.mtycic.com.mx)) as follows: “... a *geographical territory in which, according to a plan and a general strategy worked out jointly by society and government, its actors have the common purpose of building an economy based on the development of knowledge...*,” while for Dr. Jaime Parada Ávila (General Manager of I<sup>2</sup>T<sup>2</sup> and the MIKC Program) the creation of an adequate environment for innovation in Nuevo León “...*has been possible due to the fact that the different actors participating in the triple-axis model -schools, government and companies- acknowledged the importance of having a long-term plan for the state to become a region of knowledge ...*”

MIKC's long term goal is **to increase the Gross Domestic Product of the State per capita to the level of the most dynamic regions of industrialized countries by fostering industries and activities based on knowledge and a culture of innovation in Nuevo Leon.**

In June 2005, the bill to create an Institute for Innovation and Technology Transfer (I<sup>2</sup>T<sup>2</sup>)<sup>1</sup> was approved. As an initial effort, executives of this institute outlined a master plan for MIKC in 2005-2006. This plan originally defined a model of general development of the knowledge region, as well as the vision and general strategies for MIKC.

However, to speed up the benefits a knowledge society and economy have for its inhabitants, the state government, together with **the Inter-American**

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<sup>1</sup> The I<sup>2</sup>T<sup>2</sup> is a decentralized organization of the Nuevo Leon State Government, within which the “Monterrey: International Knowledge City (MIKC)” program operates.

**Development Bank** and the support of the **Korean Fund for Technology and Innovation**, decided to **document, boost and replicate the MIKC model in the second phase of the master plan.**

Having the Government of Nuevo Leon (2003-2009) launched the bases for an international contest through the Institute for Innovation and Technology Transfer ( $I^2T^2$ ), **the proposal of the *Instituto Tecnológico y de Estudios Superiores de Monterrey* (ITESM or *Tecnológico de Monterrey*) was chosen to develop the proposal for the Master Plan Phase 2 (MIKC).** This proposal had been evaluated technically by the University of Texas in Austin.

In the overall, the MIKC Phase 2 is made up of the following:

- **Research, analysis and broad documentation of the advances and results of Phase 1**, to give congruency and continuity to MIKC's Phase 2. It stands for experience for other cities and regions that are interested in fostering similar programs.
- **The development of proposals of medium and long term strategies, public policies, programs, projects, joint ventures and general budgets to strengthen and boost the MIKC's social and economic scope and benefits through the Master Plan for Phase 2.** This series of proposals or deliverables are the result of an in-depth research and innovation process, and are strategic for Nuevo Leon to keep on positioning itself as an internationally renowned region and society of knowledge. **In addition, a 2009-2025 road map has been suggested, prioritizing the implementation of proposals.** (It is equivalent to an execution plan.)
- A methodological proposal for other cities and regions to boost development based on knowledge, through an orderly process, with an accurate focus and in a way that allows them to adapt and implement it faster and with more possibilities of success.
- As part of such methodology, a measurement system, indicators and follow-up called "20 Prime Indicators of Knowledge Societies" (20 PIKS) has also been suggested.
- Diagnosis of Nuevo Leon's position (as a state) and of Monterrey (as a city) within the parameters of an economy and a city of Knowledge, respectively, at the national level (state) and International level (city) **by means of two evaluations carried out by experts of the *Tecnológico de Monterrey*.** As a technological diagnosis, references and comparisons of the statistical indicators of Nuevo Leon are made to contrast them with other international Knowledge cities/regions under the parameters of the knowledge, innovation and technology sectors coming from the OECD (2004).

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- **Proposals to boost MIKC’s continuity, sustainability and success in the medium and long terms.**
- **Research on the strategies, public policies, programs and projects implemented by 6 internationally renowned cities / regions acknowledged for their knowledge-based development.** (San Francisco Bay in California –Silicon Valley-, United States; Montreal, Quebec, Canada; Barcelona, Catalonia, Spain; Melbourne, Australia, Manchester, England, and Singapore.) **Additionally, an analysis of what could be taken into account from the successful South Korean experience for MIKC Phase 2 under this development model was carried out.**
- **Diagnostic and general recommendations for the development of work programs in three Regional Innovation Systems (SRI), for the information technology, (software development), auto part industry and food biotechnology sectors.**

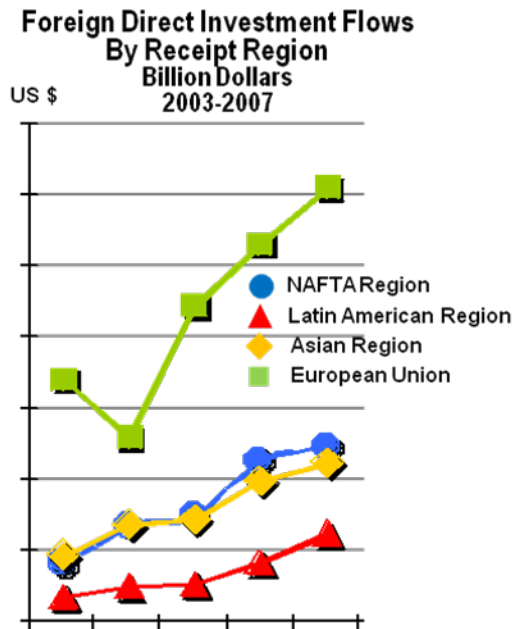
**Following, an executive summary on the parts and sections that make up Phase 2 of the program “Monterrey: International Knowledge City” (MIKC) is presented.**

## **CHAPTER 1: BACKGROUND OF A VISIONARY PROJECT**

It introduces the strong and intense environment of international competition, the economic globalization and the technological revolution. It also states how the different elements have motivated several (increasingly more) countries, regions and cities to decide for a model of economic and social development based on the creation and application of Knowledge (in its widest sense) in their productive activities. Additionally, it explains why this strategy is a key factor to improve its international competitive position.

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**Factors that sharpen the actual global competition**



Source: ITESM. Self-elaboration with data from UNCTAD); Ministry of Economy (Mx) and Canadian Statistics.

There basically are 2 factors that have contributed to a more complex competition of development in Mexico, particularly for each state:

- The acceleration of the globalization process, and
- The free trade, in which 152 countries, members of the WTO, already participates.

Therefore, the “fight” to:

- Access and conquest more products and service markets.
- Attract productive investments, and
- Create employment.

**Has been intensified in a geometric way in the past years.**

In addition to this country-region-and-city bid to evolve into a knowledge-based economy or society, it is necessary to have a specialization that yields in becoming outstanding and positioning itself in the global market by means of focusing on activities highly linked to innovation, science and technology. This will allow the improvement of the inhabitants’ lifestyles. The knowledge societies or economies are acknowledged for their know-how to take advantage of the global mega-trends to transform themselves and to solidly advance in their development, by using the market opportunities and by creating and applying Knowledge on products and services for which consumers are willing to pay more.

Following are introduced the foundation or pillars that have successfully promoted the internationally renowned places for their economic and social advance, which coincide with the whole and systemic knowledge bid and the active participation of inhabitants driven by visionary and engaged leadership.

- **An Educational System and Model.** It is a model characterized by its high quality, modernity and broad scope and penetration in society (using information technologies). It guarantees more years of study (tertiary education) and employability of students when becoming part of the labor market or starting businesses on their own. It should also be of high

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- pertinence in the areas of innovation and high tech, congruent with the vocation of the place but focusing on global opportunities.
- **Human Capital Development.** This development should happen from existing programs and infrastructures (public, private and mixed) that offer the population the right conditions to develop its capabilities and abilities in order for the people to get good jobs or to develop on their own.
  - Investment, in quantity and quality, with an adequate focus on **science, technology and innovation** so as to generate **knowledge and intellectual capital**. They should be economically profitable for the productive activities of the region and they should also solve the social needs and boost balanced and sustainable development.
  - The promotion of an **innovation and entrepreneurship culture** with the objective that an important percentage of the population develops these capacities and abilities (with a global focus and with social environmental responsibility). The people should apply these in their every day and professional lives.
  - A greater **investment in infrastructure and urban equipment** (transportation, roads, mobility, health care, energy, social, cultural and recreational services, etc.) for the place to be competitive and to offer its inhabitants and visitors the best living conditions. This will contribute to the human capital, economic and financial development of the city or region.
  - A sufficient and efficient structure of **public, private, social and mixed institutions** is of utmost importance to successfully articulate and implement the strategies, programs and actions that differentiate the city or region planning to found its development based on Knowledge.

In a Knowledge-based society or economy, it is essential to generate a virtuous and systemic circle (making the collaborative networks efficient) to integrate education; research and technological development; and innovation with the individual and collective participation of the different actors of society with the end of generating and implementing opportunities and benefits equitably. It should also solve the social problems, thus favoring all sectors of society. **The Knowledge regions and societies should be successful in their economic development and should have a high level of inclusion and social mobility for the programs to be more successful and sustainable in the long run.**

The strengths the State of Nuevo Leon (as well as those of Monterrey's Metropolitan Area) had at the beginning of its bid on development through Knowledge have been fostered through research, design and technological development in **10 strategic sectors** (*Computer Programs, Auto Industry, Health, Appliances, Aero Spatial Industry, Metal Mechanics, Plastics, Ceramics, Agribusiness, and Food Industry*) and through **5 technological areas** (*Biotechnology, Health Sciences, Nanotechnology, Mechatronics, Advanced*



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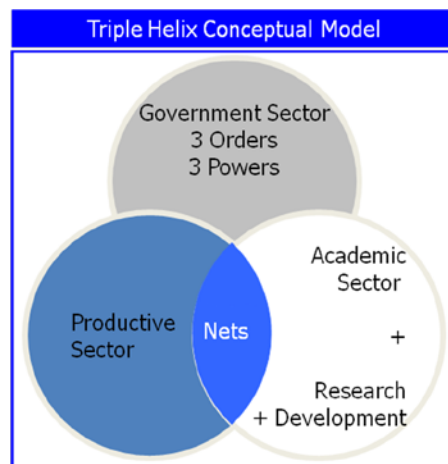
*Information and Communications Technologies*). Besides this bid, there are **7 basic strategies on which the state government has been working in coordination with Nuevo Leon's educational and business sectors throughout MIKC Phase 1.**

**The achievement of joint ventures has been a solid foundation from which Knowledge is created, transmitted, acquired and used more effectively by the people of Nuevo Leon. These have fostered the economic and social development of the communities. Based on the triple-axis model, the Government of Nuevo Leon (2003-2009) promoted the integration of the educational and productive sectors of the MIKC Program. Among the first and most important implemented projects were the research and technological innovation park (PIIT), the clusters (sector business groupings working collaboratively) and citizen councils (fully described in Chapters 2 and 3).**

**It is worthwhile mentioning the interest of the Inter-American Development Bank (IADB) to foster this kind of development programs based on knowledge which could be implemented in other Mexican, Latin American and Caribbean regions and cities.**

## CHAPTER 2: THE BEGINNING OF THE MIKC PROGRAM

**The Triple-Axis concept model and its institutionalization in Nuevo Leon to give legal formality and drive to MIKC is characterized by having a foundation of a dynamic, joint and engaged venture among the government, and the academic and productive sectors.** Likewise, emphasis is placed on the role each one of these sectors play in the MIKC Program processes, especially in the one referring to innovation and technological development.



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The mission, vision and objectives defined for the MIKC program are as follows:

- **Mission:** To increase the capacity of the State of Nuevo Leon to attract investment and human talent in order to produce goods and services of high added value. Additionally, it seeks to promote the generation, transmission or transfer of knowledge and its profitable application, oriented toward a sustainable and harmonic development of the region, by means of research, design and adequate management of knowledge ventures and the statement of accurate leading strategies.
- **Vision:** The MIKC Program pursues the vision of transforming Nuevo Leon into one of the most internationally competitive regions, capable of attracting and retaining human capital and talent; to produce goods and services of high added value from knowledge and innovation; and to offer a high quality of life standard to its inhabitants.
- **Objectives:** Signed in 2004, the agreement to foster the MIKC Program stated four objectives, some of which have already been reached by the government and the productive and academic sectors:
  - i. The promotion of technological development and the establishment of knowledge companies
  - ii. The international projection of quality education provided in the entity.
  - iii. The development of the necessary urban infrastructure.
  - iv. The assurance of high competitiveness in the government and private sectors as the driving axis of economic development.

The **14 driving** actions of MIKC Phase 1, developed with a broad participation of the State of Nuevo Leon society, are as follows:



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**Monterrey: International Knowledge City  
The 14 Promoting Actions  
Phase 1**

#	Promoting Actions
1	Law for the Promotion of Knowledge-Based Development
2	Institutionalization of the Triple Helix Model
3	Creation of I <sup>2</sup> T <sup>2</sup> and COCyTE
4	Strengthening the public budget for Science and Technology
5	Expenditure increase (public/private) for R+D+i as a percentage of the State GDP
6	Definition of the 5 strategic technological areas
7	Support for the New Business Incubators network
8	Creation of Technological Research and Development Centers
9	Technological Research and Innovation Park (PIIT)
10	Foreign investment promotion in technology and innovation areas
11	Collaboration in competence ( <i>Coopetence</i> )
12	Seed capital and risk capital funds
13	Intellectual Property Promotion
14	Boosting education at all levels

Source: Technological Innovation and Transfer Institute.

**The first public policy to promote the MIKC Program was the Law for promoting Knowledge Based Development.**

**Another very relevant public policy was the creation of the Institute for Innovation and Technological Transfer (I<sup>2</sup>T<sup>2</sup>), which is a decentralized public organization, with legal identity, and its own resources. Its mission is to foster and transfer the applied research and the technological development to meet the market needs in order to encourage economic growth and generation of quality jobs in the State of Nuevo Leon. Additionally, it has several functions, among others to organize, manage and operate the MIKC Program.**

### CHAPTER 3: ADVANCES OF MIKC PHASE 1

Due to the fact that this is an executive summary, **the main advances are mentioned in a very general fashion for the 2004-2008 period** (some data have been updated to April 2009), **in each of the pillars that characterize the knowledge regions/societies** and in 3 economic bits of information **that faithfully portray how the bid for knowledge-based development has been fruitful** even if it is still early in regards to the time when the program began. It has been working **to reach the goal to increase the State's GDP per capita to that of the more dynamic cities and regions** of the most developed countries

in the world **and to improve the quality standard of the inhabitants' lifestyles in Nuevo Leon.**

**Educational System and Development of Human Capital:**

- INNOVEC Program. It works in 11 municipalities of the State of Nuevo Leon. 16, 328 students are participating (last update 2008)
- Science within the Family Program
- Institute of High Studies and Innovation in Education
- Strengthening of the State of Nuevo Leon's technological universities.
- Study: Professional and technician requirements in Nuevo Leon. Trends and perspectives.
- Education Credit Institute in Nuevo Leon.
- World Interactive Network (Certification of competencies).
- Talent Development Institute in Nuevo Leon.
- Messages and contents related to the Knowledge Society on Nuevo Leon's Radio and Television.
- Revision and updating of study programs offered by local universities.

**Science and Technology / Knowledge / Intellectual Capital:**

- Creation of at least 37 R+D+i Centers in the PIIT and strengthening of those already in existence in public and private universities of Nuevo Leon.
- Increase in public (at the federal and state levels) and private investment in R+D+i in the coming years, standing for 1% of Nuevo Leon's GDP.
- Increase in Nuevo Leon government's resources and those from CONACYT in the Mixed Funds of Science and Technology.
- Granting of seed capital funds for innovation and technology-based projects and companies.
- Knowledge managing institutions (Coordination of Science and Technology and the Science and Technology Council).
- 2007 Universal Forum of Cultures
- Global Week of Knowledge-based Development.
- BioMonterrey. International Conference and Biotechnology Exhibition.
- Support to the strengthening of the Information Technology sector through the PROSOFT program.

**Innovation and Entrepreneurship Culture:**

- Technological Research and Innovation Park (PIIT), with a public and private investment of about \$2 billion pesos.
- Set up of strategic Knowledge clusters: Auto Industry, Household Appliances, Aerospace, Biotechnology, Nanotechnology, Specialized Health Care, Information Technologies (Software) and Agribusiness.

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- Regional Competitiveness and Innovation Program.
- INVITE Program (Regional Program of Technology Commercialization).
- Incubators and accelerators of enterprises working in the State of Nuevo Leon (13 by the end of 2007).
- Several Technological Parks fostered by universities to attract private investment and to consolidate the technological and innovation enterprises.
- Project for the creation of the Monterrey Fund, to encourage private investment with risk capital for innovative and high tech companies.

**Infrastructure and Urban Equipment:**

- Aerotechnopolis Project in MMA's airport zone.
- Updating of the Metropolitan Urban Development Plan, considering Performance of Polygons.
- *Regia Metropoli* Program
- Urban Integration: *Macropiazza- Fundidora* Park- Santa Lucia River.
- MMA Sector Program for Transportation and Roads focusing on sustainability.
- Metropolitan Loop and Radial Road System
- Ecological Road Arch of the Southeast.
- Modern infrastructure and fast crossing border lane
- Monterrey Inter-port.
- Digital Nuevo Leon (NL Digital), free wireless network.

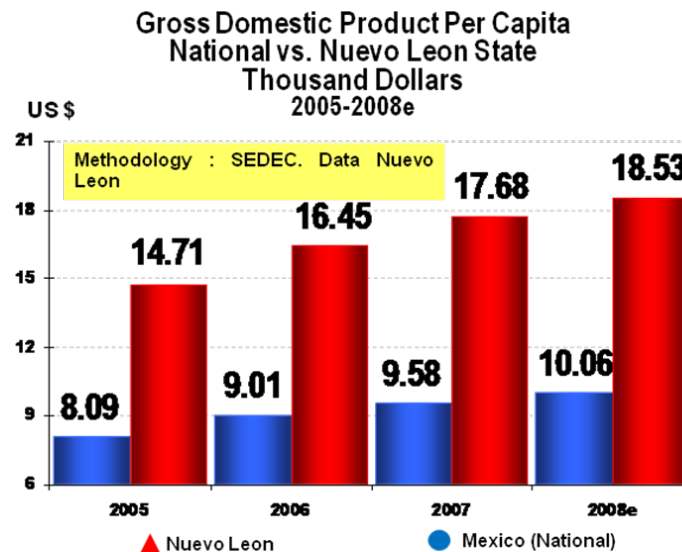
**Institutions:**

- Innovation and Technological Transfer Institute
- Strategic Projects Corporation
- Labor Relations and Productivity Council
- Institute for Training and Work Education (ICET)
- State Advisory Council of Citizen Participation for Education.
- Agency for Nuevo Leon's Urban Development.
- Agency for Rationalization and Modernization of the Public Transportation System
- Social Development Council
- Nuevo Leon's Citizen Participation Coordination
- Agency for the Environment and Natural Resources Protection
- Parks and Wild Life in Nuevo Leon
- Nuevo Leon's Tourism Development Corporation
- Nuevo Leon's Farming Development Corporation
- Nuevo Leon's Border Zone Development Corporation.

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**Following with the statistical data, the rhythm of economic growth in Nuevo Leon -which has increased in the last years and which could keep on strengthening in the medium and long terms with the MIKC program bid- has turned out a GDP per capita among the people of Nuevo Leon 1.8 times higher than the national average. By the end of 2007, it was US \$17,676 dollars a year per inhabitant.**

By 2008, in accordance with the SEDEC forecast (Data Nuevo Leon) published in a document with its own methodology and the title of which is General Yearly Report on the Economic Competitiveness and Regional Development Conditions of Nuevo Leon (February 14, 2009), the GDP per capita reached \$US 18,534 dollars a year per inhabitant.



e) Estimate

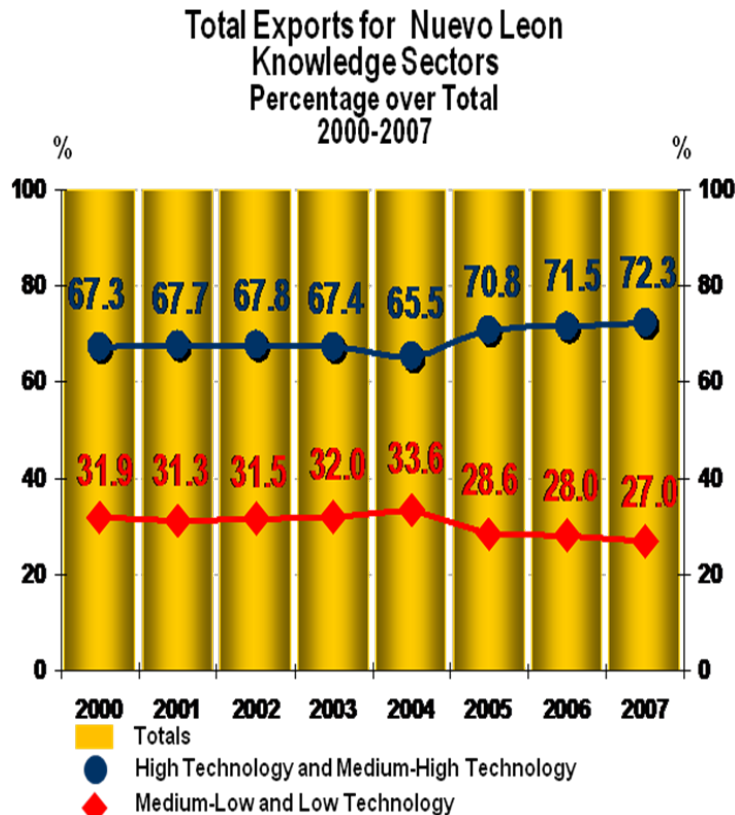
Source: ITESM. Self-elaboration with data from Data Nuevo Leon. General Annual Report of the Condition of Economic Competitiveness and Regional Development (11 February 2009).

FIX Exchange Rate (BANXICO): \$13.89 (January 2009).

**A piece of information that reflects the real advancement of the State of Nuevo Leon, as a society linked to innovation and technology, is the composition of exports from the companies in the State. According to the classification established by the OECD for the sectors of knowledge and the data of the Ministry of Economic Development of the State of Nuevo Leon (Data NL), it was determined that for the year 2007, the high tech and medium-high tech exports represented 72.0% of the total exports from the State and they were equivalent to almost US \$ 15 billion dollars.**

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It is worth mentioning that the high tech and medium – high tech exports in 2004 stood for 65.5 % of all exports. Thus, in three years, these increased in 6.5 points or US \$ 8 billion dollars in absolute figures.



Source: ITESM. Self-elaboration with data from Data Nuevo Leon.  
Knowledge Sectors Classification: OECD 2004.

The MIKC's advances also reflect on the State's competitiveness. By September 2008, in accordance with the data of the last evaluation carried out by the Mexican Institute for Competitiveness A. C. (IMCO), in its document: 2008 State Competitiveness Index: Aspirations and Reality, it stated: For a second consecutive time, the State of Nuevo Leon has achieved the second place among the most competitive federal entities in Mexico, only below the Federal District. It is worthwhile mentioning the advance it had in the market competitiveness factor, where it climbed two positions, and in the factor of efficient governments, where the state climbed 5 rungs, becoming the State of the country with the most competitiveness in this area.

This document states that "... Nuevo Leon's competitiveness outgrows the national average in 10 sub-indexes, reaching the best positions in

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*competitiveness. The entity presents a great advantage in three factors (World Class Precursor Sector, Vigorous Competition Sector and Appropriate Use of International Relations) and only one factor stands in the way for its competitiveness (Market of Efficient Factors). In regards to the five states of the Northeast region, Nuevo Leon is the most competitive...”*

Therefore, the MIKC Program is a bid that is contributing importantly to achieve a good, decent life for the personal, family and social development of the inhabitants of Nuevo León.

**State of Nuevo Leon Competitive Ranking  
in regards to rest of Sates  
per Competitiveness Factor  
2006-2008 Ranking**

Competitiveness Factor	2006 Rank	2008 Rank	Change	Positions
Legal system	1 <sup>st</sup>	1 <sup>st</sup>	--	--
Environment	2 <sup>nd</sup>	2 <sup>nd</sup>	--	--
Educated society	2 <sup>nd</sup>	3 <sup>rd</sup>	▼	- 1
Stable economy	7 <sup>th</sup>	11 <sup>th</sup>	▼	- 4
Political system	11 <sup>th</sup>	11 <sup>th</sup>	--	--
Factors market	15 <sup>th</sup>	13 <sup>th</sup>	▲	+ 2
Precursor sectors	2 <sup>nd</sup>	2 <sup>nd</sup>	--	--
Efficient governments	6 <sup>th</sup>	1 <sup>st</sup>	▲	+ 5
Foreign affairs	4 <sup>th</sup>	5 <sup>th</sup>	▼	- 1
Economic sectors	2 <sup>nd</sup>	2 <sup>nd</sup>	--	--
Global	2 <sup>nd</sup>	2 <sup>nd</sup>	--	--

Source: ITESM. Self-elaboration with data from the Mexican Competitiveness Institute (IMCO). State Competitiveness Index 2008.

**CHAPTER 4: EVOLUTION TOWARD PHASE 2**

*“...MIKC is a program for the coming generations...”*  
**Jose Natividad Gonzalez Paras, Governor of the State of Nuevo Leon**  
**(2003-2009)**

The marrow part of the proposal for this master plan is the evolution to Phase 2 of MIKC. Its prime objective is to boost the program by means of strengthening what has been developed and to implement new proposals made up of strategies; public policies; programs; projects; actions; infrastructure projects and urban equipment; institutional strengthening; and recommendations relative to economic and budgetary investment resources.



**In summary, the proposals and objectives are as follows:**

### **Human Capital Education and Development**

- **Project: Education Ecosystem for the Knowledge Society.** Its main objective is to transform and redefine the educational concept and systems in the State of Nuevo Leon through the opening of spaces for knowledge access and education from whatever place and for the whole population. It should lead Nuevo Leon to the improvement and welfare of its community. Innovation should be an element to transform and foster development.
- **Project: Educational Content Factory linked to MIKC.** The first educational content factory in Nuevo Leon will be one of support, by means of using information technologies for the State's educational system at the preschool, elementary, secondary and high school levels. This should allow bringing education closer and in a preferential way, in the subjects related to science, math, skills development, and values to all the students in these levels while boosting their learning.
- **Program: Easy Math for All.** It has been suggested to adopt the methodology from Singapore (First place in the 2003 TIMMS tests). It should begin with a pilot program, but pursuing to make it a mass program in public and private elementary education schools. Other supplementary proposals have been suggested. These should allow strengthening and deepening the process, methodologies, techniques, and the teaching of math contents from preschool, to elementary, to secondary school in all private and public schools in Nuevo Leon. Likewise, it has been proposed to adapt the study plans and programs for them to be more oriented to the teaching of Math, for students to be competent and highly qualified; the creation of companies that facilitate the teaching of Math amongst the children and young population and the use of educational tools adequate for students and teachers.
- **Program: Programming and Playing.** It is proposed to adopt several programming teaching tools for different educational levels. This should develop and strengthen the interest and the abilities for programming among children and youngsters, as of elementary education in all schools (public and private) in Nuevo Leon. This should increase the possibility of educating a greater number of students in the technical programs and universities related to information technologies and software development.
- **Integral Program: Quality Education for a Knowledge Society.** This program should strengthen the advances achieved so far in the educational evaluation of the State of Nuevo Leon. This should be done by making some changes and adjustments in the present structure of the Technical Council to strengthen the citizen and parents participation.

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- ***Integral Program: Communication for Knowledge***. This program seeks to strengthen the Nuevo Leon TV and Radio broadcasting with contents that foster scientific and technological knowledge. Additionally, it should support the adequate spread of the innovation and entrepreneurship culture. Furthermore, it proposes to take advantage of the summoning power of mass media to support the spread amongst society of the MIKC advancements as a model of development, with results and good influence in the life of the people of Nuevo Leon; thus encouraging them to participate.
- ***State program: Vocational orientation and educational relevance***. With the objective of updating, strengthening, and boosting educational congruency and appropriateness for the knowledge society and economy of Nuevo Leon, in order for it to be, on the one hand, a profound and effective vocational orientation tool for all the young close to enrolling in technical studies or the university and, on the other hand, be a strategic forecast instrument for the technical and professional labor market and for opportunities in the development of independent technical and professional activities.
- ***Program: Development of labor abilities and competences***. In order to have a quality and highly qualified workforce in the productive areas of knowledge (strategic sectors and technological areas of Nuevo Leon) through the strengthening of the following:
  - i. The Institute for the Development of Talents in Information Technologies (IDETI), to support other knowledge sectors.
  - ii. The Labor Relations and Productivity Council of Nuevo Leon, and
  - iii. The Labor Training and Education Institute (ICET).

### **Science and Technology: Knowledge and Intellectual Capital**

- ***Program: Nuevo Leon, a magnet for talents***. Through this program, the necessary conditions to generate an attractive and favorable environment to boost the development of activities linked to knowledge will be created. Strategies are established to attract and retain highly qualified talents, complementary to local talent, who are necessary to stimulate the generation of ideas, intellectual property, innovation and undertakings.
- ***Project: Technology promotion and commercialization center***. To identify the best technologies available at national and international levels, those of which will support competitiveness and growth of the local productive sector, as well as boost the creation of new technology-based enterprises and bind the strategic values of technology and innovation in the State.
- ***Project: Two great annual science and technology events***. To promote, spread, exhibit and link all the information related to MIKC's strategic sectors and the society's interests to different actors of science

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and technology (entrepreneurs, businessmen/women, researchers, media and opinion leaders).

- **Appendix: *Technological research and development opportunities and their linking to technological areas and sectors.*** Appendix II details the opportunities, areas and niches for technological research and development linked to MIKC's strategic technological areas and sectors, based on a general analysis of Barrios Sierra's classification system.

### **Innovation and Entrepreneurship Culture**

- **Program: *Education for innovation and entrepreneurship.*** To implement, from preschool and elementary, classes and contents with the best international methodologies (those that are feasible and attractive to the public and private educational institutes of Nuevo Leon) related to the promotion of innovation and entrepreneurship. This program seeks that Nuevo Leon eventually have young people and adults capable of incrementing local economic, social, cultural and political development through innovation and entrepreneurship capabilities, attitudes and skills.
- **Program: *Intellectual property for knowledge-based development.*** To increase the participation of local authorities in decision-making regarding the allotment of support federal funds for science and technology areas. This program's objective will be to foster a pilot program so Nuevo Leon may achieve a greater patent generation, registration, commercialization and use to reach a greater influence by the state government in the assessment and approval of projects through FOMIX (Mixed Funds) and Sector Funds supported by CONACYT (National Council of Science and Technology), as well as granting scholarships and other existing support instruments to achieve greater appropriateness in Nuevo Leon's technological areas.
- **Program: *Technological businesses, finding opportunities.*** To boost an *ecosystem* that will support entrepreneurs and businessmen/women of Nuevo Leon so they have the best tools to identify and evaluate business opportunities which have more technological content and innovation levels. Additionally, to generate the mechanisms that will enable larger investment allotment in these sectors to benefit the State's GDP growth, as well as generate more and higher quality jobs.
- **Program: *Capital for innovative enterprises.*** To foster the evolution of Nuevo Leon's economy by gradually guiding it toward the generation and expansion of businesses in sectors with more added value, innovation, and technological content and, therefore, enterprises that generate better remunerative and profitable jobs. Its implementation is intended through a mix of instruments that will boost the participation of private investors, which will be backed (initially) by a governmental contribution, which in turn will grant:

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- i. **Seed capital**, to support technology-based project at initial stages (preferably, those detected at incubators) and
- ii. **Risk capital**, to support the expansion of operating businesses which have important growth rates and which require capital injection, through private risk capital funds.

The main role of the public contribution will be to encourage private capital participation by reducing the risk faced by private investors, especially when they participate in projects at the initial stages. Therefore, it is proposed that it act only as third-party contributor, letting investors be the ones to perform the adequate assessment of projects they encounter. This will allow shareholder businessmen/women to organize into **clubs of angel investors and different risk capital funds, according to project demand and degree of specialization.**

- **Program: Collaboration for competence (coopetence).** Creation of a decentralized public organization (DPO), sectorized to the Ministry of Economic Development of Nuevo Leon (SEDEC) and with great involvement of the I<sup>2</sup>T<sup>2</sup>, to coordinate and follow up a master plan from each cluster. Additionally, to evaluate the recommendations adopted in the programs, projects, supports and other actions to ensure the successful incorporation of each of the current (and future) productive clusters that have been fostered and organized in Nuevo Leon and which are closely linked to MIKC.
- **Appendix: Recommendations to strengthen the current Law for Promoting Knowledge-based Development.** A fundamental aspect of knowledge and economy based societies is to maintain the integral and sustainable vision of all the programs implemented to achieve that goal. The current proposal for amendments to the Law for the Promotion of Knowledge-based Development is very positive, especially regarding the promotion of Knowledge and technological innovation. However, the *Tecnológico de Monterrey* work team consider very important to further strengthen transversality of the strategies, objectives, projects, actions and participation of other areas not present in the proposal. Therefore, we recommend to study in depth and incorporate aspects within the scope of social involvement; urban development planning; urban infrastructure and equipment; environment and sustainability; strengthening education and human and institutional capital development.

### **Urban Infrastructure and Equipment**

- **Institutional Reform: For a better metropolitan development.** A legal and institutional framework to carry out strategic projects related to urban development planning and management for Monterrey's Metropolitan Area (MMA) is needed to foster MIKC Phase 2, which will be achieved by means of:

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- i. A strategic plan for MMA.
  - ii. A metropolitan development administration system.
  - iii. The creation of a metropolitan observatory.
- **Program: Sustainable mobility.** To satisfy the demands for sustainable, competitive and quality journeys (commuting and urban transport) within MMA, by means of improving the metropolitan coordination system and the urban mobility and environmental regulations and laws in force; aided by the application of successful transportation and mobility models from other cities in the world, but translating them to fulfill the city's lifestyle. Additionally, MMA's mobility system is to be integral, inter-modal, modern, flexible and attractive, and its traffic design favoring public transportation, which will enable efficient and reasonable inter-connectivity of the whole metropolis. With these advantages, the community will manifest its preference for public transportation over the automobile, which will contribute to a sustainable and competitive mobility system and a controlled growth in the number of automobiles.
  - **Program and project proposals: New urban coexistence.** To rely on all the elements to be able to offer a dignified and decent life to all MMA's inhabitants by means of rehabilitating or constructing suburban areas and mixed neighborhoods, well-equipped, with recreational and healthy coexistence areas, close to working areas, and educational and commercial establishments. In other words, to reinvent the city through innovative, humane and competitive policies.
  - **Program and project proposals: Sustainable and healthy city.** To guarantee, for all MMA's citizens, a healthy and sustainable environment with the priority of preserving natural resources; the strategic planning of their use; and the care of ecosystems, where the city's inhabitants develop and interact, as collective goods for future generations.
  - **Program and project proposals: Urban identity and image.** To reinforce MMA's identity so it may achieve national and international renown for its image; its resources; its variety of options and cultural and recreational infrastructures available, always focusing on local customs, so they are attractive to residents and national and foreign visitors. To take advantage of the closeness of the United States, trying to increase not only business tourism, but also recreational, and for events and conventions, seeking to offer more alternatives linked to culture and folklore indigenous to the region and the Mexican in general.
  - **Program and project proposals: Regional and urban equipment and infrastructure for MIKC.** Project proposals are made to improve infrastructure in Nuevo Leon, especially in MMA, so that framed within the MIKC program, its insertion in the global economy and the commercial and knowledge network be strengthened, additionally to maintaining the local economy's competitiveness levels, and open the gates to new



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- businesses associated to knowledge industries and sectors that wish to be promoted in MMA.
- **Infrastructure: High performance computing centers.** As a complement to the Digital Nuevo Leon program (NL Digital) we propose to foster the creation of this high performance computing center by means of a strategic alliance between the government (Federal, State and Municipal) and the business and academic sectors. The center's infrastructure will provide the technological conditions to support R+D+i mega-projects from the universities (public and private) and from the productive sector. It would also support Si<sup>3</sup>NL's technological platform; intelligence computing research for actions related to crime prevention and public safety; models and calculations related to transport mobility efficiency in MMA, among other services.
  - **Program: Computer and Internet for all.** To foster access availability to the Internet and computer systems for the greatest number of schools (public and private), businesses (especially SME's) and households in MMA, because of their great advantages as facilitators to accelerate our evolution toward a true Knowledge society. To increase infrastructure installation in public areas to enable free access to the Internet and achieve a larger coverage of information systems webs in most of MMA, at internationally competitive prices, to allow capitalization of the advantages offered by ICT's and, therefore, improve Nuevo Leon's society's development and level and quality of life.
  - **Project: Building commercial and popular culture centers.** Due to the problems caused by MMA's ambulatory trade, it is essential to foster reconversion, rehabilitation and construction of a modern and efficient popular commercial infrastructure (with a mix of business lines, from foods to household appliances, including recreational and cultural activities) which, through very attractive financial programs, will motivate ambulatory traders to relocate with the opportunity of owning the commercial establishment and, therefore, improve urbanism, cleanness, hygiene, and the legalization of these activities.
  - **Appendix: Promoting the building of more theme and recreational parks in MMA.** The economic, social and cultural importance of theme parks has awakened the interest of the cities that wish to position themselves as knowledge societies, to offer attractions for local and foreign talents. The first projects to be considered for MIKC are:
    - i. Mexican Folklore Park.
    - ii. TECHNOVITAE-style Park.
  - **Appendix: Project proposals to be promoted during Phase 2 of the Paseo Santa Lucia project.** It is very important, to integrally foster a knowledge society in Nuevo Leon, that the second part of the *Paseo Santa Lucia* development be complemented by the following projects:



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- i. Areas for small and medium enterprises related to culture and the arts.
  - ii. Options for local entrepreneurs to present innovative proposals for some service segments, such as restaurants, board and lodging and recreational activities.
- **Appendix: *Legal opinion on public policies and initiative proposals to amend the Law for Urban Development in Nuevo Leon (PhD Carlos A. Gabaurdi)***. A technical-legal analysis of the constitutional consistency of the public policies and amendment proposals for the legislation of urban development in the State of Nuevo Leon.

### **Strong Institutions**

- **Program: *Creation of the Integral Information and Intelligence System of Nuevo Leon (Si<sup>3</sup>NL)***. The evolution of Nuevo Leon Data is strategic to MIKC Phase 2. At present, Data NL has a very limited structure and resources to become the Si<sup>3</sup>NL, a decentralized public organization (DPO), with legal identity, its own resources, mixed governing board and a vanguard technological infrastructure to become a powerful and efficient source of decision-making information for all sectors involved in MIKC.
- **Project: *Creation of the Integral Financing System of Nuevo Leon***. It seeks to satisfy the needs of SME's and entrepreneurs of Nuevo Leon through a single office which integrates product and service offer, and designs and implements new credit mechanisms that multiple banking does not offer. The proposal considers the design of innovative instruments, both for savings deposits attraction and loan placement, for local SME's, and seeking to preferably serve enterprises in the strategic sectors of knowledge and those with higher innovation and technological levels.
- **Project: *Accelerating the creation of the Education Credit Institute***. To accelerate and boost Nuevo Leon government's project for the creation of the Education Credit Institute, which will support people and families that require financing for education, with very accessible terms and interest rates. For this plan, an adequate mix of direct resources from state and federal governments is proposed, together with the implementation of warranty fund plans (supported by governmental resources) to achieve a more competitive funding (such as pension funds or the emission of bonds), which will significantly increase the expected resources and their impact.
- **Project: *Promoting the creation of the Energy Efficiency Agency of Nuevo Leon***. Create a local agency to help enterprises and institutional and residential consumers decrease the impact that the high cost of energy is having around the world and with important effects in Nuevo

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Leon, by adopting efficient energy use techniques and technologies. The intention is that this agency have a strong link to and alliance with the Federal Government through the National Energy Saving Commission (CONAE) and the Energy Saving Trust (FIDE), together with different programs that may support their efforts, as well as international organizations that support and promote efficient energy use, and the competitive financing of needed investment, because of its great benefits to competitiveness and the environment.

- **Project: Establishing the integral budget for MIKC promotion.** To accelerate the achievement of MIKC goals for Phase 2, and rely on a control system for projects which require investment and direct expenses from the Government of Nuevo Leon, those of which are linked to each of MIKC's strategies, programs or goals. This monitoring will be conducted by the Treasury of Nuevo Leon in coordination with the I<sup>2</sup>T<sup>2</sup>, and the participation of different government offices in the State. We also consider that, once budget allocations directly linked to the MIKC program are identified, both from the State Government and the private sector, a realistic annual raise goal (minus inflation) be set as high as possible, which will accelerate the process and obtaining results for the goals programmed.
- **Appendix: Strengthening addiction control and prevention programs.** To strengthen institutions (in the public, private and social sectors) responsible for these programs and increase the coordination among them. A Knowledge city needs people with a good quality of life; people with addictions will see their life affected in all aspects, from family and friends, to their economy, their state of mind and their work performance.
- **Federal proposals to promote MIKC and other cities or regions that wish to develop based on knowledge.** Through an important package of initiative and proposal actions by the Federal government, and some legislative reforms at the federal level, a greater promotion for the MIKC Program may be achieved, making it easier for other national cities or regions to proceed under better institutional and legal conditions if they decide to foster their integral development based on Knowledge. These actions and reforms cover aspects such as finance and budget; regulated improvement and decentralization; legislation regarding employment promotion; science and technology; education; infrastructure; international talent attraction, and encouraging the generation, spreading and application of intellectual property.

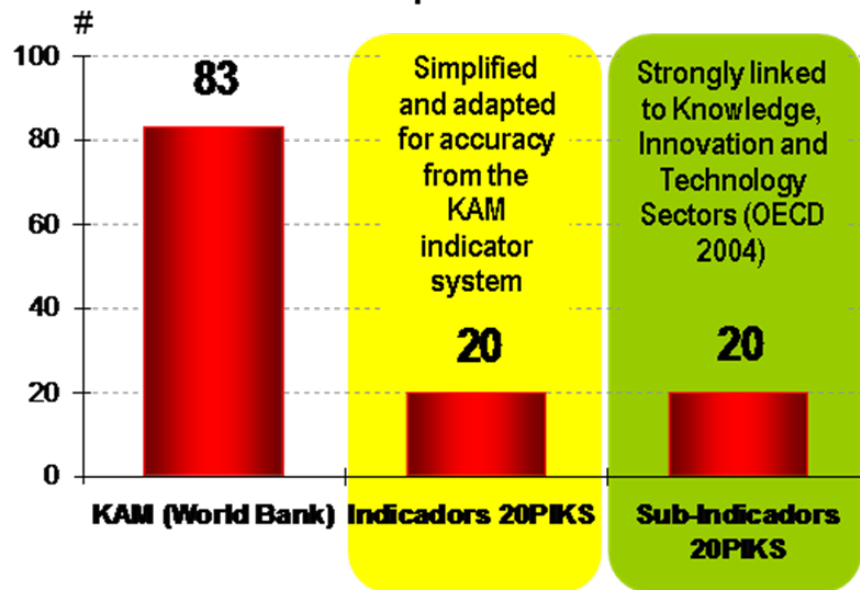
Another essential element for MIKC Phase 2 are the “**20 Prime Indicators for Knowledge Societies (20 PIKS)**” which is the *Tecnologico de Monterrey* work team's proposal for the MIKC Program's measurement, indicator and follow up system. Chapter 4 briefly summarizes the **20 PIKS**, but appendix IV is where

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they are analyzed and described, and sets a 2025 forecasting Road Map. Chapter 5 highlights the importance of this system as part of the methodology for replicating the knowledge-based development model for the benefit of other cities or regions.

The **20 PIKS** are a simplified indicator system that considers factors such as the **World Bank (WB) Knowledge Assessment Methodology (KAM)** and proposes new ones where more precision is sought through an in-depth approach of **20 sub-indicators strongly linked to knowledge, innovation and technology sectors (based on OECD 2004 classification)**. Its application may lead to more accurate results, enabling a larger impact by promoting strategies, public policies, projects and related actions linked to knowledge-based development programs, the result of which will derive in a focalization of actions from the general to the specific.

**20 Prime Indicators for Knowledge Societies  
Indicators and Perspectives  
Comparison**



Source: ITESM. Self-elaboration.

Therefore, the **20 PIKS** are the basis to quantify the short, medium and long term goals of the public policies, programs, projects and actions proposed in MIKC Phase 2 and those which will be subsequently defined, as well as some of the goals established during Phase 1 of the program.

The **20 PIKS** general objectives are:

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- To constantly and permanently assess the impact (in the short, medium and long terms) of the MIKC Program actions over the economy and the society of Nuevo Leon.
- To be a reference to Nuevo Leon's evolution in the context of Knowledge economy, region and society.
- To detect windows of opportunity for the MIKC Program, and refocus the strategies implemented or design and apply new public policies, programs and projects so Nuevo Leon may reach, in the least time possible, the position, renown, characteristics and values proper to a Knowledge city (region).
- To encourage that economic and social benefits of the program reach all the population, through the monitoring of 4 social integral indicators.
- To monitor a fundamental aspect required by any region's economic and social development to be sustainable and viable in the medium and long term, such as the care and preservation of the environment, through an environment sustainability index.

The following table lists the variables that constitute the **20 PIKS**, divided into indicators and *20 sub-indicators (identified in Italics)*:

**“Monterrey: International Knowledge City” Program**  
**20 Prime Indicators for Knowledge Societies (20 PIKS)**

Code	Indicator /Sub-indicator	Measurement Units
Area: Economy		
AEC01	GDP NUEVO LEON	Millions (US \$) / Annual Variation (Δ%)
AEC01.1	<i>GDP NUEVO LEON in Knowledge sectors</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>
AEC02	GDP Per capita NUEVO LEON	Dollars (US \$) / Annual Variation (Δ%)
AEC03	Goods and Services Exports	Millions (US \$) / Annual Variation (Δ%)
AEC03.1	<i>Exports made by enterprises based in NUEVO LEON</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>
AEC03.2	<i>High Tech Exports</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>
AEC03.3	<i>Mid to High Tech Exports</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>
AEC03.4	<i>High Tech Exports (enterprises based in NUEVO LEON)</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>
AEC03.5	<i>Mid Tech Exports (enterprises based in NUEVO LEON)</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>
AEC04	Credits for NUEVO LEON's production sector	Millions (US \$) / Annual Variation (Δ%)
AEC04.1	<i>Credits in Knowledge sectors</i>	<i>Millions (US \$) / Annual Variation (Δ%)</i>

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Code	Indicator / Sub-indicator	Measurement Units
AEC05	Public/private budget for MIKC	Millions (US \$) / Annual Variation (Δ%)
AEC05.1	Public Budget for MIKC	Millions (US \$) / Annual Variation (Δ%)
AEC05.2	Private investment in MIKC	Millions (US \$) / Annual Variation (Δ%)
Area: Social		
ASO01	Social security Salary mean	Actual annual growth (Δ%)
ASO02	Mobility and quality of urban road infrastructure <i>Percentage of the population that <u>does not</u> travel in private vehicles</i>	Percentage of NUEVO LEON population (%)
ASO03	Recreational and cultural infrastructure	mts <sup>2</sup> /NUEVO LEON inhabitants
ASO04	<i>Environmental Sustainability Index</i>	Index
Area: Innovation		
ASI01	Direct Foreign Investment (DFI) influx	Millions (US \$) / Annual Variation (Δ%)
ASI01.1	<i>FDI in Knowledge sectors</i>	Millions (US \$) / Annual Variation (Δ%)
ASI02	R+D+i expense	NUEVO LEON's GDP Percentage (%)
ASI02.1	<i>R+D+i expense in strategic sectors</i>	NUEVO LEON's GDP Percentage (%)
ASI03	Availability of seed capital/ and risk capital	Millions (US \$) / Annual Variation (Δ%)
ASI03.1	<i>Risk/seed capital in Knowledge sectors</i>	Millions (US \$) / Annual Variation (Δ%)
ASI04	Patents (registered both by IMPI and USTPO)	New patents per year
ASI04.1	<i>Evaluation of the patents' commercial potential</i>	Millions US \$
ASI04.2	<i>Patents linked to Knowledge sectors</i>	New patents per year
ASI05	Innovative and Technological Enterprises	Number of enterprises / Annual Variation (Δ%)
ASI05.1	<i>Enterprises/Sales/Employment/Utilities</i>	In accordance with each sub-indicator
Area: Education		
AED01	Enrolment in tertiary education	Number of students \$) / Annual Variation (Δ%)
AED01.1	<i>Enrolment in higher technical education</i>	Number of students \$) / Annual Variation (Δ%)
AED01.2	<i>Enrolment in engineering and exact sciences</i>	Number of students \$) / Annual Variation (Δ%)
AED01.3	<i>Enrolment in Knowledge-related majors</i>	Number of students \$) / Annual Variation (Δ%)
AED02	Access to internet in schools	Coverage percentage
AED03	Quality in the teaching of mathematics and sciences	PISA test results
AED04	Brain drain	Rate of return (%)
AED04.1	<i>Talent Retention</i>	Rate of return (%)

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Code	Indicator /Sub-indicator	Measurement Units
AED04.2	National and Foreign talent attraction	Number of people/year
Area: Information and Communications Technologies		
ATI01	Internet Users per each 1,000 inhabitants	Connectivity percentage (%)
ATI02	Extent and use of the Internet in formal business	Connectivity percentage (%)

Source: ITESM

It is very important to emphasize that for the design, construction, updating, follow up and publication of the **20 PIKS**, it is necessary, as a first step, to set in motion the **Integral Information and Intelligence System of Nuevo Leon (Si<sup>3</sup>NL)**; due to its organic functions, it is the ideal organization to be in charge, in coordination with the I<sup>2</sup>T<sup>2</sup>, of the design, integration, update, follow up, as well as issuing a technical proposal, for the success indicator and measurement system.

As a 2025 strategic vision for MIKC Phase 2 (or Road Map), 3 phases are recommended: initial, development and consolidation for the aforementioned proposals. The objective is to expand the results and impact over the MIKC Program Phase 2 in the short term (2009-2010), medium term (2011-215) and long term (2016-2025). **The road map is detailed in appendix III: 2009-2025 Road Map – Plan.**

For **MIKC's continuity, through the strengthening of society's participation, some of the most important actions would be:**

- The **active incorporation and participation of the different municipalities** that integrate MMA, as well as the State Congress of Nuevo Leon and the Judicial Power.
- A **greater empowerment of the business sector, the universities and society** within the MIKC program.
- A **large-scale spread of information among the population** regarding the program's benefits at the individual and collective levels, given the importance of their participation in the evolution toward a Knowledge society.

Other **important topics, derived from the interviews with actors in the executive and legislative powers, and from several Nuevo Leon society leader**, which require analysis and possible initiatives to support the strengthening of the MIKC Program are:

- The **convenience of extending the current municipal government terms**, to avoid that, due to its 3-year period, their capability for planning and



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execution in the medium and long term be diminished (an essential aspect required by a Knowledge city and society).

- **Promoting that certain public services' responsibilities be provided to the citizenship through a metropolitan organization**, enabling a more standardized and efficient supply.
- **Assessing the implementation of the Career Civilian Service in the State**, so that public servants with certain responsibilities requiring a higher-demand technical and professional profile, at the state and municipal levels, not be replaced with every new administration, unless there are sufficient grounds and there are procedures for selecting substitutes based on professional, rather than political, criteria.
- **Reviewing and strengthening the current urban development laws and that of promoting Knowledge-based development**, therefore encouraging efficient response to the integral objectives for the economic, social and environmental sustainability of Nuevo Leon and MMA, caring for the balance needed for their success in the long term.

#### **CHAPTER 5: THE MIKC EXPERIENCE FOR THE BENEFIT OF OTHER CITIES AND REGIONS**

The methodology for replication of the MIKC experience for the benefit of other cities and regions that decide to base their development on the application of Knowledge to productive and daily life activities includes some foundations, specifics and processes recommended to be followed, and which are listed below:

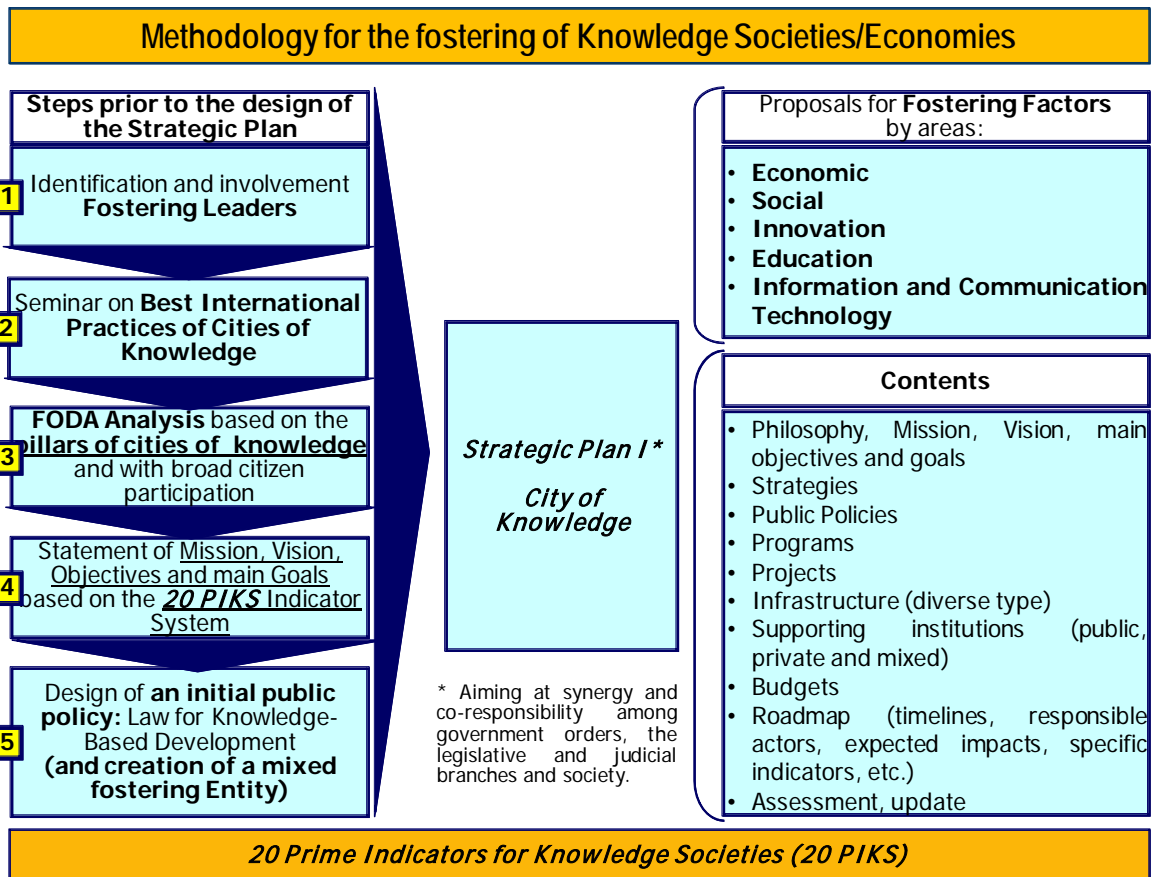
- **It seeks to be easily and practically replicated**, by key leaders or actors in other national or international cities or regions interested in fostering their development based on Knowledge.
- It considers the **main existing factors surrounding the development of knowledge cities and regions around the world**, especially those related to main public policies, programs, institutions, indicator systems and projects recommended for implementation.
- It proposes **the use of the indicator system: 20 Prime Indicators for Knowledge Societies (20 PIKS)**.
- The methodology proposed is **adequately flexible and considers each city's or region's particular characteristics**, so the program's strategic plan for a knowledge city or region be implemented based and **depending on the factors and priorities identified by the Strength-Weakness-Opportunity-Threat (SWOT) analysis**, or other similar diagnoses.

To achieve greater success when applying this method, it is necessary that the strategic objectives for the plans or programs of other regions seeking to implement their Knowledge-based development model pursue the following:

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- **Create and distribute wealth and improve life conditions and its quality for the whole of society.**
- **Engage the necessary and essential initial participation of key leaders and actors.**
- **Build the model based on joint work and participation.**
- **Include the needed cooperation, synergy and co-responsibility of the three branches of government.**
- **Incorporate universities, the business sector and researchers as a fundamental aspect for development.**
- **Give special attention to the investment of economic resources to implement a first phase (Strategic Plan I).**
- **Transmit the advantages and benefits of a Knowledge society, using very simple and concrete aspects, throughout the citizenry.**
- **Make the best effort to engage the participation of the media.**

Following is an outline that synthesizes the general replication methodology proposed in MIKC Phase 2:



**Listing of MIKC Phase 2's 8 appendixes' content:**

**I. Progress and challenges from the perspective of some MIKC actors.** It contains the most outstanding points of view and recommendations emerged during the 38 interviews conducted by the *Tecnologico de Monterrey* work team with key actors and leaders during MIKC Phase 1, particularly with those outside of Nuevo Leon's government.

**II. Details of the proposals and the master plan for MIKC's phase 2: public policies, programs, projects, institutions and resource investment.** This appendix thoroughly details the proposals presented in Chapter 4 regarding MIKC Phase 2. Each proposal consists of a justification; a general objective; its description; its main components; and an indicator subsystem to measure their performance. Additionally, the 2009-2025 road map is outlined for better understanding, as well as budgetary recommendations within the scope of this elaboration.

**III. 2009-2025 Road Map - Plan.** It describes the 2025 strategic vision for MIKC Phase 2 (or road map) through the establishment of initial, development and consolidation phases for the proposals made for MIKC Phase 2.

**IV. Measurement of success: Indicators, follow up and feedback system.** It describes the **20 Prime Indicators for Knowledge Societies (20 PIKS)** as the basis to quantify the short, medium and long term goals for public policies, programs, projects and actions proposed for MIKC Phase 2. It also includes forecasts for most of the **20 PIKS as the 2009-2025 road map to guide the work of those in charge and responsible for MIKC.**

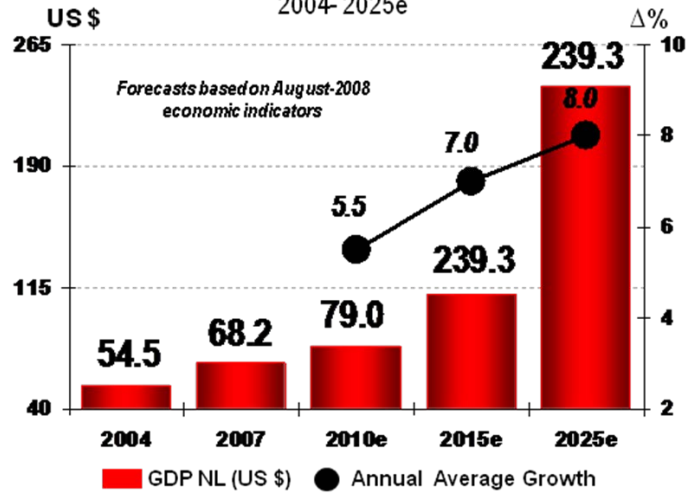
**It is important to include in this executive summary two charts with the forecasts elaborated** by the *Tecnologico de Monterrey* work team, to assess the importance of the MIKC project's continuity in Phase 2, framed within the road map proposed:

- **The first refers to the forecast for 2025 regarding the Gross Domestic Product (GDP) per Capita (per inhabitant) in the State of Nuevo Leon.**
- **The second refers to the total GDP forecast for the MIKC Program implementation**, compared to the non-continuity scenario, of strategies, public policies, programs, projects, public and private investment, and other actions related to fostering the development of Nuevo Leon based on Knowledge:

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20 Prime Indicators for Knowledge Societies  
Gross Domestic Product of Nuevo Leon

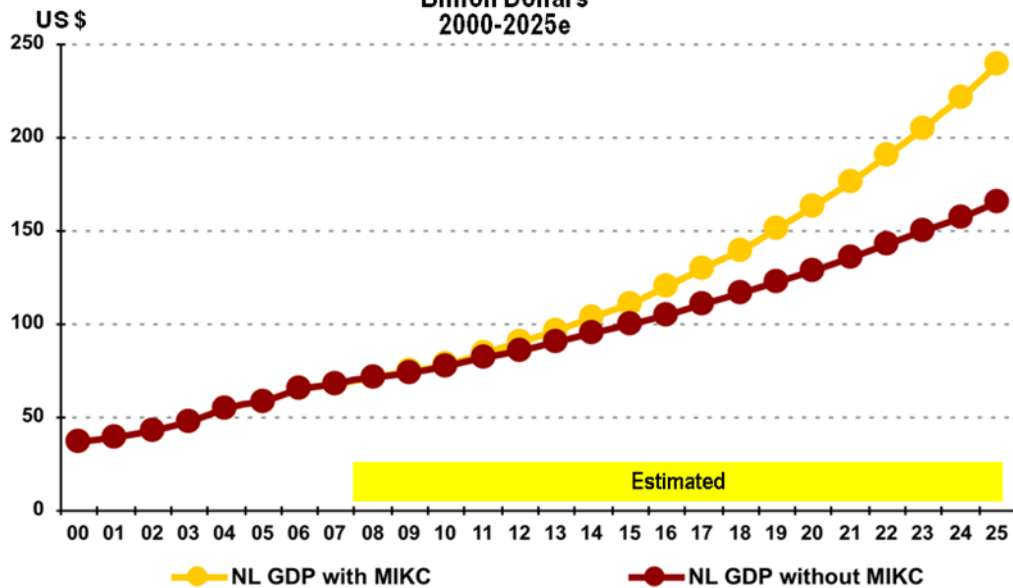
Forecast / Trends  
Billion US Dollars  
2004- 2025e



e) Data estimated to the end of the period.  
Exchange Rate Peso-US Dollar \$10.64 (August, 2008).  
Source: ITESM.

Gross Domestic Product of Nuevo Leon  
Forecast with/without MIKC

Billion Dollars  
2000-2025e



e) Estimated  
Source: ITESM. Self-elaboration with data from INEGI; SHCP; BBVA-Bancomer.  
Forecast based on economic indicators from August, 2008.

**V. Successful experiences of other international Knowledge cities.** To integrate MIKC Phase 2, master plans; antecedents; priority actions; linkage of best practices for MIKC and strategic information from 6 internationally renowned knowledge cities/regions were researched, including **San Jose, California (USA); Montreal (Canada); Melbourne (Australia); Manchester (United Kingdom); Singapore (Singapore) and Barcelona (Spain)**. This appendix contains the information collected.

**VI. Nuevo Leon in the national context and Monterrey in the international context.** To diagnose Nuevo Leon's (State) and Monterrey's (city) ranking as a Knowledge economy/city, *Tecnologico de Monterrey* experts in the field were engaged who elaborated the following documents:

- **Diagnosis of Monterrey as a Knowledge City.** Committed to the Knowledge Systems Center (CSC), which used the Capitals System methodology, the coordinator of which was PhD Francisco Javier Carrillo Gamboa.
- **Nuevo Leon and the Knowledge-based Economy. 2008 Knowledge-based Economy Index.** Committed to the Strategic Studies Center (CEE) at *Tecnologico de Monterrey's* Guadalajara Campus, with self-elaborated methodology, the coordinators of which were Mr. Alfredo Molina Ortiz and PhD Hector Robles Peiro.

**VII. Betting on collaborative work and competitiveness through the Regional Innovation Systems.** This appendix describes the analysis of three clusters (Software, Food Biotechnology and Auto Parts) in an exercise to apply the Regional Innovation Systems (SRI) model. Presented here are the diagnoses and points of agreement for these sectors, being analyzed based on current needs and innovation opportunities, with the purpose of having the SRI support the evolution of Monterrey (Nuevo Leon) toward a knowledge economy.

**VIII. Methodology for the work performed.** It specifies the process followed to incorporate the advancements of MIKC Phase 1 and the master plan proposal to the program's Phase 2, with a 2025 forecast.