

The Economy of Mexico: *Maquiladoras* and Monterrey's Efforts to Build a City of Knowledge

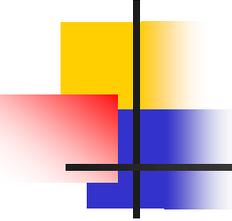
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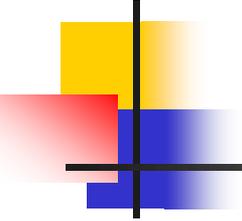
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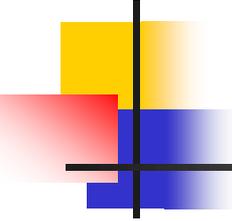
The Rio Grande Valley and the Border Corridor

- Manufacturing and maquiladoras is a major part of what we do
- Maquiladoras include Fortune 500 companies, plus small and medium size supply firms
- Key issues with border manufacturing
 - The rise of China since 2000
 - Trends in US imports from Mexico and China
 - Trends in Maquila/IMMEX employment
 - Emergence of new business models
 - Can Mexico and the maquiladoras recapture work lost to China?
 - Effect of border violence
 - Tax reform



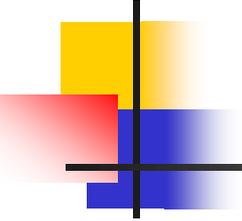
Trends in US imports from Mexico, China

	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2012</u>
■ Total				
Mexico	134,734	169,216	228,823	276,874
China	99,580	242,638	364,047	424,874
■ Electronics				
Mexico	44,401	46,712	66,520	71,756
China	29,361	96,706	144,920	165,344
■ Apparel				
Mexico	8,617	6,229	3,667	3,844
China	6,192	16,773	28,699	29,602
■ Autos/Auto Parts				
Mexico			40,082	53,250
China			7,012	9,320



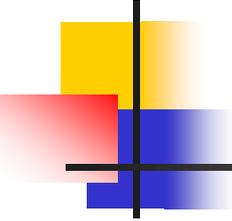
Maquila/IMMEX/INDEX Employment*

	<u>10/2000</u>	<u>12/2003</u>	<u>10/2006</u>	<u>12/2009*</u>	<u>08/2013*</u>
■ Cd. Juárez	264,241	196,933	242,485	168,011	201,608
■ Tijuana	199,428	141,938	175,925	136,957	167,770
■ Reynosa	67,275	72,492	97,779	70,454	91,640
■ Matamoros	69,989	52,201	54,328	40,035	45,918
■ Mexicali	65,494	49,373	43,344	43,732	52,274
■ Nuevo León					238,681
■ Electronic	467,508	330,378	396,544		
■ Auto parts	250,635	238,577	269,696		
■ Apparel	293,576	195,577	168,096		
■ Total	1,347,803	1,050,210	1,212,125	1,641,465	2,095,799



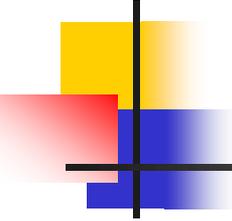
How have maquiladora industry changed, especially as a result of competition from China?

- Study One
 - Managerial interviews and plant tours at 55 established maquilas in Reynosa and Guadalajara during 2002 and 2003
- Results in Reynosa
 - Maquilas competing in global markets (8 plants, 3,972 employees)
 - Maquilas competing in mixed global/regional markets
 - Corporate shelters (8 firms, 8,733 employees)
 - Dual sourcing (5 firms, 4,100 employees)
 - Mass customization (5 firms, 2,998 employees)



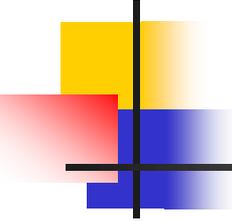
How have maquiladoras evolved, especially as a result of competition from China?

- Maquilas competing in regional markets
 - Just-in-time (JIT) producers (6 firms, 16,623 employees)
 - Zero defect producers (4 firms, 2,440 employees)
 - Low value to weight producers (3 firms, 2,310 employees)
 - Remanufacturing centers (2 firms, 2,225 employees)
- Guadalajara companies changing from “high volume, low mix” to “low volume, high mix” strategies
- Conclusion?
 - Chinese competition causing maquiladoras to contract as well as adopt proximity dependent strategies



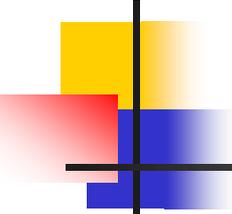
How have maquiladoras evolved, especially as a result of competition from China?

- Study Two
 - Managerial interviews and plant tours at 36 startup, rapidly expanding, and premier Mexico EPZ plants in Reynosa, Guadalajara, and Monterrey during 2004 to 2006
 - MNCs continuing to invest in Mexican EPZ sector follow proximity dependent business models and technology on the shop floor ranging from low to very high



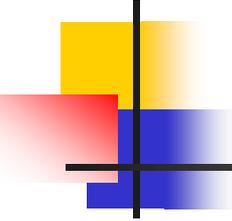
How have maquiladoras evolved, especially as a result of competition from China?

- Study Three - Has maquila mortality been concentrated primarily in low-tech, medium-tech, or high-tech plants?
 - Data collection conducted in Cd. Juarez (1993), Cd. Chihuahua (1993), Guadalajara (1995), Monterrey (1995-1996), and Reynosa (1998-2000)
 - Combined sample of 101 Mexican EPZ plants employing over 87,000
- Results
 - 30 of the 101 maquilas no longer operating
 - No significant statistical relationship found between survival and technology intensity
 - Several examples in sample of large, technology intensive MNC subsidiaries that have left Mexico and relocated to China



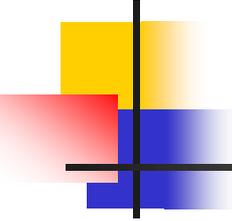
What role will manufacturing and maquiladoras have in the future of the border corridor?

- Mexico/China competition will continue to evolve
 - Chinese manufacturing wages have risen rapidly
 - BLS estimates average hourly compensation costs for urban manufacturing employees in China has rising from \$0.95 in 2002 to \$2.85 in 2009
 - Chinese currency continues to revalue
 - Chinese foreign reserves stood at .41 trillion in 1/2004, 3.66 trillion in 11/2013
 - Dollar/Yuan exchange rate \$1/8.5 in 2002, now \$1/6.1
 - Unclear when the exodus of low mix, high volume manufacturing out of China to Mexico and elsewhere will begin
 - Apparel



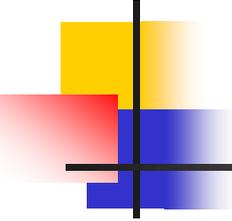
What role will manufacturing and maquiladoras have in the future of the border corridor?

- Border violence is having a clear effect on the ability to recruit new firms
 - Existing firms better utilizing existing capacity
 - 2011 Border Corridor class
 - Shelter operator



What role will manufacturing and maquiladoras have in the future of the border corridor?

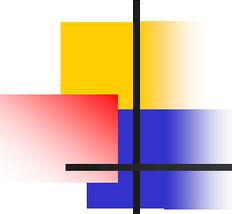
- Mexican tax reform and border manufacturing
 - IVA/sales on goods imported into country, refunded at some unknown date after exportation
 - Increase in corporate income tax from 17.5 to 30 percent
- Small maquila operator
 - “I do not really pay attention” until the last minute
 - Major MNCs lobby Mexican government resulting in incremental not paradigm shifting changes
- Entire industry on both sides of the border that benefits from tax scares
- I am personally in favor of changes that discourage minimum wage, minimum contribution manufacturing operating in Mexico



Let's change topics . . .

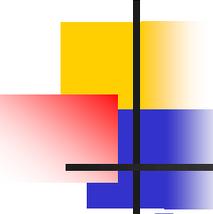
Regional efforts to join the creative class

- High wages and the knowledge economy are nearly synonymous terms
- Regions around the world are competing to create the next generation of innovation intensive entrepreneurial firms
 - Can we systematically create and grow technology companies in the border corridor?
 - The Austin example
 - One of the “hottest” tech markets in the world for small, medium, and large firms
- A great example of the type of firm needed to spark the RGV knowledge economy
 - FibeRio Technology Corporation
 - <http://www.fiberiotech.com/>



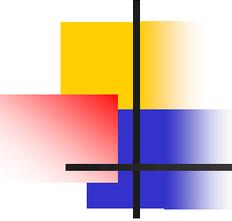
Monterrey as a City of Knowledge

- Lic. José Natividad González Parás elected governor of Nuevo León for the 2003 - 2009 period
- Identified six strategic initiatives including
 - *Ciudad Internacional de Conocimiento* (www.mtycic.com.mx)
 - Triple Helix fundamental concept of the MTYCIC
- In 2003 state government, Monterrey Tec, UANL, UDEM, private sector identified five priority industries; nanotechnology, biotechnology, mechatronics, information technology, and health
- State government formed *Instituto de Innovación y Transferencia de Tecnología* to coordinate CIC initiative
- Current director is Jaime Parada (former director of CONACYT)
 - Key focus of MTYCIC is to facilitate the emergence and rapid growth of technology based companies
- Program funding has continued with current governor



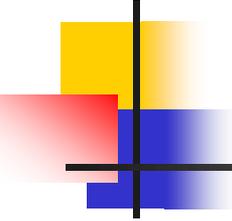
Monterrey as a City of Knowledge

- Major parts of this presentation modeled after information provided compiled and presented by Carlos Ross
 - Executive Director of the UT Austin's Center for Global Innovation and Entrepreneurship in Monterrey
- Mexico's national system of innovation
- Where does basic knowledge useful for technology commercialization come from?
 - Mexican R&D spending increased from roughly \$3.3 billion in 2000 to \$4.4 billion in 2012 (Source: CONACYT)
 - SNI: National system of researchers has gone from 7,466 in 2000 to 18,554 in 2012



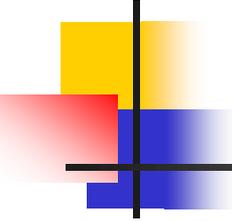
Monterrey as a City of Knowledge

- There are a variety of federal financial instruments designed to promote innovation
- Number of R&D employees in Mexico's private sector increased to 41.1 percent of total
- Federal effort to create technology transfer offices at universities and public research enters
 - Funding of up to \$100,000 per institution
 - 66 entities participated
 - 19 certified entities
 - Similar to AUTM in the US and FORTEC in Brazil, a national system of TTOs has been created
 - Second annual meeting held in Monterrey last week



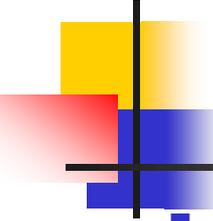
Monterrey as a City of Knowledge

- 27 science and technology parks have been created in Mexico
 - 17 major parks have received federal and state funds of aprox. \$300 million
- Monterrey Tec entrepreneurial ecosystem
 - 11,000 students per year in an entrepreneurship program
 - 2085 businesses graduated from incubation programs
 - More than 900 mentors/experts supporting companies in the ecosystem
 - More than \$75 million in public resources spent to support ecosystem since 2003



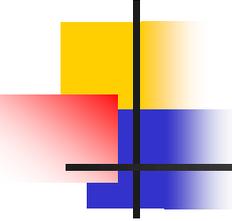
Monterrey as a City of Knowledge

- The Research and Technological Innovation Park in Monterrey
- Includes 10 university, 10 public, 14 private research centers and four business incubators in operation, under construction, or in the advanced planning stage
- UT Austin offers their Maestría en Ciencias de Comercialización de la Ciencia y la Tecnología at facility in the PIIT
 - Same masters program initially develop by George Kosmetsky and currently taught in Austin
 - Taught in English by UT Austin faculty
 - Intensive one year program
 - 158 graduates, 26 current students
 - Less than half of the students from Nuevo León, average age 36, more than half have advanced degrees



Monterrey as a City of Knowledge

- Students in program are creating real companies
 - Recárgate!!
 - Uses traditional public phone plus software and hardware for wireless technology to produce an easy, safe, and fast ecommerce service for the Mexican low-income market
 - Alliances with four main wireless carriers
 - Estimated sales in 2012 of \$25.8 million
 - BioSolutions
 - Developed manufacturing process to use natural fibers such as agave to be mixed with plastics in pellet form to produce a variety of bioplastic products
 - Incubated in Monterrey Tec system, funded by FONLIN, a state seed capital fund, installing first production line



Maquilas and Monterrey

- Interested in learning more?
 - Invite Carlos Ross next year

■ Questions????