CALIFORNIA STATE UNIVERSITY SAN MARCOS

PROJECT SIGNATURE PAGE

PROJECT SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE

MASTER OF SCIENCE IN

BIOTECHNOLOGY

PROJECT TITLE: DEVELOPING SCIENTIFIC INSTITUTIONS IN MEXICO- THE NON-PROFIT ORGANIZATION FEASIBILITY REPORT

AUTHOR: Rameez H. Zaidi

DATE OF SUCCESSFUL DEFENSE: May 7, 2019

THE PROJECT HAS BEEN ACCEPTED BY THE PROJECT COMMITTEE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN BIOTECHNOLOGY

Betsy Read PROJECT COMMITTEE CHAIR	Betsy Read SIGNATURE	8/5/19 DATE
Glen Brodowsky PROJECT COMMITTEE MEMBER	 SIGNATURE	8/2/19 DATE
Al Kern PROJECT COMMITTEE MEMBER	 SIGNATURE	8/5/19 DATE

Executive Summary

Developing Scientific Institutions in Mexico by Starting a NPO Donation Program
The Business Model and Market Research

California State University, San Marcos
Rameez H. Zaidi
March 27, 2019

The goal of this Semester-In-Residence Project was to continue the business plan presented by Mahva Naghipor and Robert Iddings. Market research was to be conducted by surveying the San Diego life science community to determine the availability of donations. Market research was also to be conducted by surveying research institution and university labs in Mexico to determine the need. Partnerships were to be fostered in San Diego and Mexico, and finally donations were to be procured from a donor partner in San Diego and shipped to the partner lab in Mexico. A survey was prepared and an outreach plan was developed and implemented. However, the project ran into issues from the initial stages no one from San Diego or Mexico responded.

Through interviews with CSUSM Business faculty and administrators including Dr. Glen Brodowsky, Dr. Samuel Clarke, Jocelyn Wyndham, and Virginia Berman, a new market research strategy was developed. It was decided that the new objective was to determine what happens to old lab equipment. Interviews were to be conducted in phase I to better understand what happens to old lab equipment, elucidate trends and metrics to be measured in phase II, and allow for an opportunity to start partnerships. The quantitative phase II would validate assumptions and track trends and metrics elucidated in phase I. Facilities and EH&S Departments were to be targeted for interviews and personal and professional networks were analyzed, to find personnel to interview.

The new outreach strategy has resulted in the interviews of two research institutions and one biotechnology companies which were willing to be interviewed. This project established a methodology for determining the availability and use of old lab equipment in biotechnology companies, research institutions, hospitals, and universities. An approach was put forth for starting partnerships with the life science community. The biotechnology industry is growing along with the e-waste problem, and there is a need to promote research in developing countries with resource restrictions like Mexico. It is worthwhile to determine how much old lab equipment is available in San Diego and whether this availability meets a need for lab equipment in Mexico.

Developing Scientific Institutions in Mexico
The Non-Profit Organization Feasibility Report

California State University, San Marcos

Rameez H. Zaidi

March 27, 2019

Faculty Advisors

Project Chair: Dr. Betsy Read

Dr. Glen Brodowsky

Dr. Al Kern

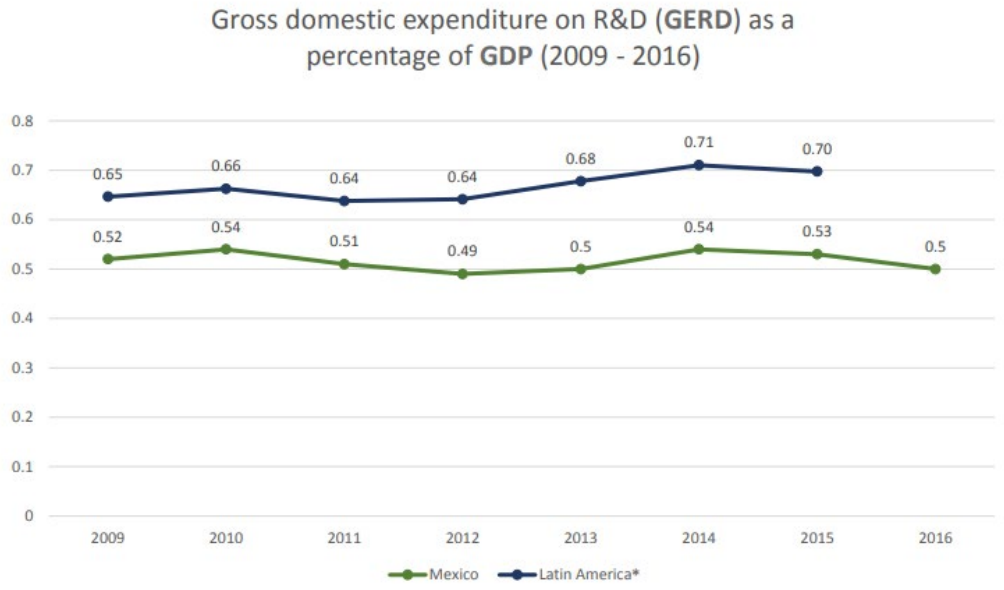
Topics To Be Covered

- Background
  - Building scientific capacity in Mexico- need
  - Growth of biotech industry in United States- availability
  - What happens to old lab equipment
- Project
  - Initial strategy
  - Critiquing strategy
  - New strategy
- Conclusions
  - What was learned
  - What still needs to be done
  - Significance of this research

Is it feasible to start a NPO that ships donated equipment to labs in Mexico

Does Mexico have a need for lab equipment- worth finding out

Expenditure on R&D in Mexico



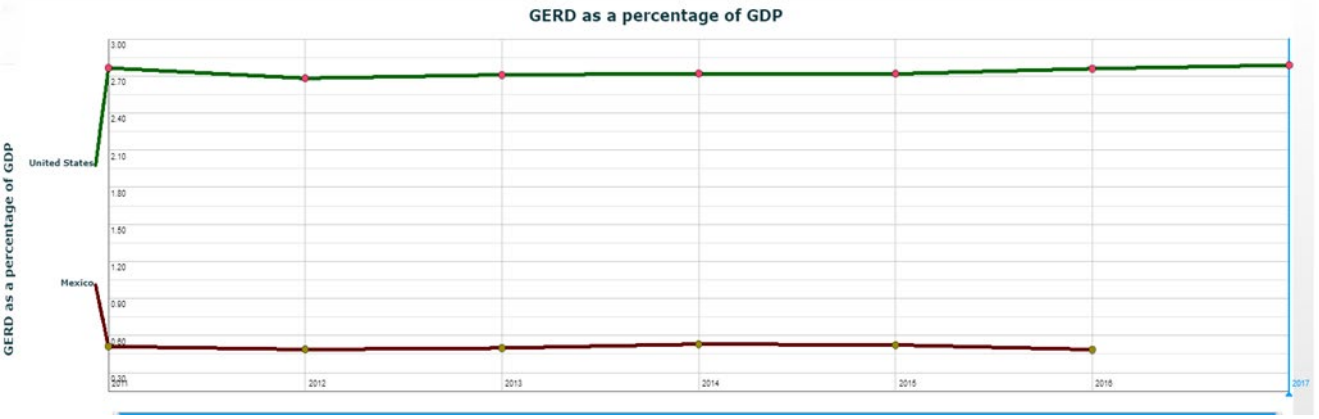
- GERD as % of GDP
- Mexico is green
- Latin America is Blue

BUDGET restrictions = RESOURCE restrictions

What is needed?
Who needs it?

* There is no data available for Latin America.
Sources: UNESCO, How much does your country invest in R&D. CONACYT, *Informe General del estado de la Ciencia, la Tecnología y la Innovación.* 2016.

Does Mexico have a need for lab equipment- worth finding out (2)



- GERD as % of GDP
- US is green
- Mexico is red
- 2011 to 2017

- Mexico spends 0.5% of GDP

BUDGET restrictions = RESOURCE restrictions

What is needed?
Who needs it?

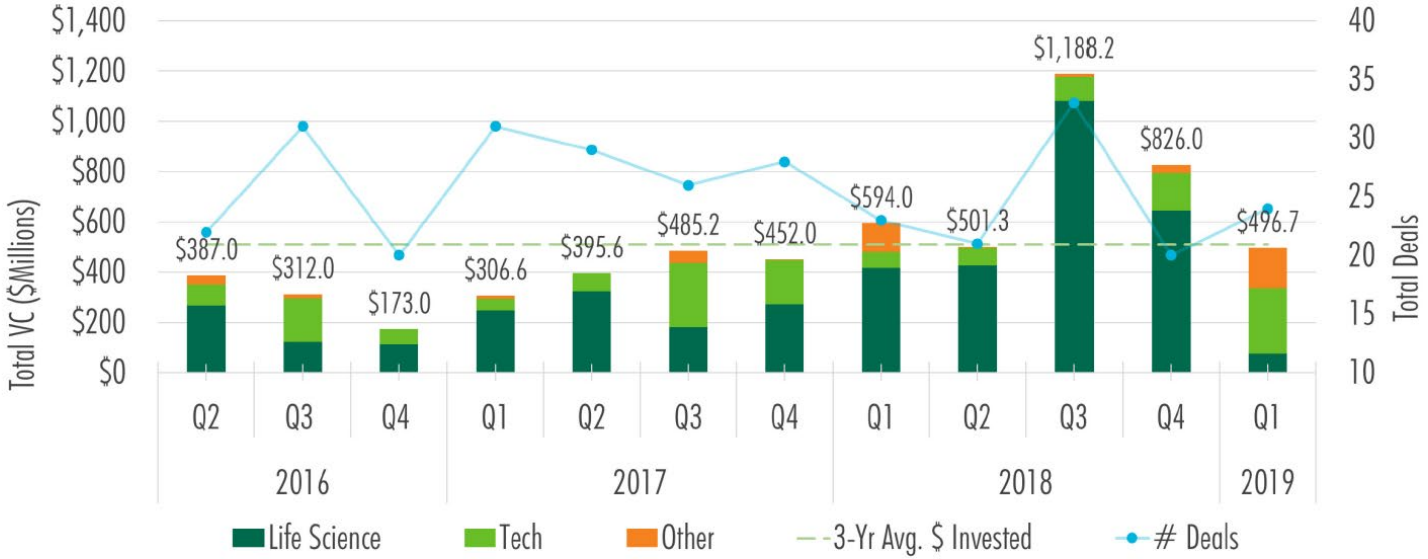
Import lab equipment

BRAIN- DRAIN

Size of the biotech industry increasing- worth evaluating the fate of old lab equipment

Figure 1: Venture Capital Investment in San Diego County

Dollar and Deal Volume, by Industry Group, Three Years, Q2 2016 to Q1 2019



Source: CBRE Research, with partial data from PwC/CB Insights MoneyTree Report, Pitchbook and Mattermark

Is there old or unused lab equipment?

How much is available?

With increasing amount of e-waste, its worth finding out how much is usable

28% of disposed electronics are recycled. the rest ends up in landfill...

How much of it is lab equipment?

There is a growing need to fi ways to reuse and repurpose usable equipment

"Labconscious" scientists can divert high volumes of laboratory waste to local recycling markets or vendor recycling programs

Not clear how to determine availability of donations of old lab equipment

A lot of research on End of Life Management-

Optimizing the Supply chain in Reverse Logistics

Supply chain planning systems in reverse logistics present the industry with new problems that demand new approaches. The specivic problem of the reverse logistics for the end-of-life (EOL) products addressed in this study is to determine the number of products to disassemble in a given time period to fulfill the demand of various components during that and subsequent time periods.

Worth developing a methodology to determine availability in life science hubs

Most research on donation surveys deals with recipients

A Study of Medical Equipment Donations: Recipient Experiences (2016 CMBEC39 Conference)

Medical Imaging in Global Public Health: Donation, Procurement, Installation, and Maintenance

Initial Market Research Strategy developed

Continued work of Mahva Naghipor and Robert Idding…

Focus on San Diego Life Science Community

SAN DIEGO'S LIFE SCIENCE CLUSTER

The life sciences cluster is a major driver of San Diego's innovation ecomomy. The region is home to more than 1,225 life sciences companies and more than 80 independent and university-affiliated research institutions.

These research institutions provide the region's life-changing technologies that fuel company growth and product development

Highlights

-economic impact: life sciences activity accounts for $33.6 billion in total economic impact in San Diego
-lab space: San Diego nas hearly 17 million square feelt of lab space
-increased demand: there was more than 2.4 million square feet added since 2016, with 500,000 square feet under construction
-jobs: life sciences employees on average earn more than $117,000 annually
-research funds: NIH funding in life sciences in San Diego county totaled more than $830 million in 2016
-STEM graduates: San Diego County higher education institutions produce over 7,000 STEM graduates annually.

Initial Market Research Strategy developed (2)

Continued work of Mahva Naghipor and Robert Idding…

Focused on Tijuana

Comparative Advantages

- Differentiated wage, cost of living, and land cost structure
- Geographich proximity to San Diego's R&D hubs to manufacturing centers in Baja and larger imperial valley
- Diverse, advanced manufacturing clusters
- Significant renewable energy resources
- CaliBja has over 90 colleges and universities and over 80 research institutions
- Robust internal infrastructure connections including 6 border crossings
- Part of NAFTA corridor for seamless movement of goods and products

Market Research on donation availability and need in Mexico was a failure

Reached out to San Diego life science community and research labs in Tijuana...

Contact	Company	Contact Method	Response
Mickie Henshall	Agena Bioscience	Email	No
Jonathan Day	Agena Bioscience	Email, LinkedIn message	No
customer service	AltheaDx	Phone call	No
Gwen Gordon	BD	Email	No
Troy Kirkpatrick	BD	Email, phone call	No
omead ostadan	Edico Genome	LinedIn Message	No
Aimee Hoyt	Edico Genome	LinkedIn Message	No
Amy Israel	Eli Lilly	Email	No
David Marbaugh	Eli Lilly	Email	No
Gary Marchetti	Genentech	LinkedIn message	No
Community Partnerships	GSK	Email	No
Client Services- Health Nucleus	Human Longevity, Inc.	Email	No
Client Services-Human Longevity	Human Longevity, Inc.	Email	No
Business Development	Illumina	Email	No
Propel Team	Illumina	Email	No
Customer Service	Illumina	Phone call	No
Anne Erickson	Pfizer	LinkedIn message	No
Non Profit Management Solutions	Affiliated partner with Pfizer	Email	No

NO RESPONSE

University	Location	Department	Name	Position Title	Contacted	Response
UBAC-School of Engineering & Technology	Tijuana-Valle					
		Renewable Energy	Eric Villanueva Vega	Coordinator		
		Bioengineering	Juan Miguel Colores Vargas	Coordinator	Yes	No
		Planing Commitee	Yuridia Vega	Aid		
		Scientific Outreach	Alberto Hernandez Maldonado	Appointee	Yes	No
		Laboratory of General Sciences	Claudia Vargas Muñiz	Appointee	Yes	No
		Appointee of Didactic Material	Eduardo Montoya Reyes	Appointee		
UBAC-School of Health Sciences	Tijuana-Valle					
		Medicine	Dr. Jorge Alvelais Palacio	Coordinator		
		Nursing	Prof. Anzony Cruz Gonzalez	Coordinator		
		Laboratories	Dra. Veronica Gonzalez		Yes	No
		Clinics	Dra. Karina Rodriguez Fuentes	Coordinator		
UBAC-School of Science: Chemistry & Engineering	Tijuana-Otay					
			Dr. Enrique Palafox Maestre	Director	Yes	No
		Chemical Enginnering	Dr. Miguel Angel Pastrana Corral	Coordinator	Yes	No
		Pharmaceutical Biological Chemist	Dr. Samuel Melendez Lopez	Coordinator	Yes	No
		Industrial Chemistry	Dr. Ruben Sepúlveda Marques	Coordinator		
		Pharmaceutical Area	Dr. Jose manuel Cornejo Bravo			
		Clinical Analisis Laboratory	Q.F.B Elda Maria Leal Orozco	Coordinator		
		Water Analysis Laboratory	Dra. GabrielaCarrillo	Coordinator		
		Microbiological Analysis Laboratory	M.S.P Lilia A. Hurtado Ayala	Coordinator		
		Storage Chemistry Laboratory	C. Eduardo Sanchez Rangel	Coordinator	Yes	No

Evaluation of Market Research Strategy revealed it needed to be redeveloped

CSUSM employees from Development and Procurement Departmentsfaculty, and members from the College of Business Administration consulted

A general theme emerged…

Who handles donations

Evaluation of Market Research Strategy revealed it needed to be redeveloped (2)

Larry Adelman, Director of EH&S at SBPMRI, was consulted…

EH&S and Facilities departments deal with old and obsolete lab equipment

A New Market Research Strategy Emerges

Target: **EH&S and Facilities Department, and personal contacts**

Phase I: **what happens to old lab equipment**

Phase II: **what is the availability**

New Market Research Strategy showing promise

Results:

SBPMRI, Scripps Research Institute, and GSK have participated in phase I, and are willing to participate in phase II

SBPMRI and Scripps are willing to start partnership to get equipment to labs in Mexico

Address issues with the Mexico Market Research Strategy

This project is worth completing

Whats still left

SD: finish Phase I&II

MEX: critique and reasess Mexico outreach strategy and finish Phase I&II

Develop business model, and accepting donations and shipping equipment

This project is worth completing (2)

New methodology established

Promote regional partnerships

This project is worth completing (3)

Cut down on storage space,

Put unused lab equipment to good use,

Cut down on e-waste...

All while promoting science in Mexico

References

- *LabConscious, www.labconscious.com/laboratory-recycling*
- *REDUCE, REUSE, RECYCLE YOUR OLD LAB EQUIPMENT*, www.thelabworldgroup.com/recycling-lab-equipment.
- OECD (2019), "Main Science and Technology Indicators", OECD Science, Technology and R&D Statistics (database), www.doi.org/10.1787/data-00182-en (accessed on 04 May 2019).
- Isaacson, Greg. “Coworking Grows in San Diego as Biotech VC Stumbles.” CRETECH, Commercial Property Executive, 30 Apr. 2019, www.cretech.com/news/coworking-grows-in-san-diego-as-biotech-vc-stumbles/.
- Veerakamolmal, Pitipong, and Surendra M. Gupta. “Optimizing the Supply Chain in Reverse Logistics.” Environmentally Conscious Manufacturing, 2001, doi:10.1117/12.417259.
- “Invest. Innovate. Grow.” Cali Baja, CaliBaja BiNational MegaRegion, calibaja.net/.