# Final Report – Informe Final

## *Assessment and Plan for the Development of an ICT Innovation & Entrepreneurship Ecosystem in Bucaramanga, Santander, Colombia*

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CETICS

# Main Topics

- Project Overview
  - Objectives and Background
  - Methodology
  - Team and Sponsors
  - Related Initiatives
  - Key Definitions and Maps
- Assessment of ICT Innovation & Entrepreneurship Ecosystem
  - Santander Region – Bucaramanga Area
  - Bogota Private Sector and Government Institutions
  - See also Appendix A – Photographs of Onsite Visits
- Global Trends in Information Technologies
  - Emerging New Platforms and Economic Development Models
  - What are 'Mobile Apps' and Why are They Important?
  - See also Appendix B – Global ICT Trends
- Plan of Action and Recommendations
- Appendices

# Project Overview

# Project Objectives

- **Phase I - Part 1**
  - Assess current state of innovation ecosystem and organizations in Bucaramanga Region
  - Assess potential for support for Bucaramanga Region innovation initiatives from central government, from industry innovation and finance organizations in Bogota
  - Develop near-to medium-term innovation & entrepreneurship strategy, approach, goals, roadmap and action plan for the Santander Region
    - To be rolled out initially in Bucaramanga, and then replicated in other municipalities as appropriate
  - **Timeframe: Nov 24 - Dec 31, 2011**
    - **Part 1 was shifted to March – April 2012**

# Goals, Phases and Terms of Reference
## Long Term Roadmap

- **Phase I - Part 1 (2011)**
  - Assess current state of innovation ecosystem and organizations in Bucaramanga Region
  - Assess potential for support for Bucaramanga Region innovation initiatives from central government, from industry innovation and finance organizations in Bogota.
  - Develop near-to medium-term innovation strategy, approach, goals, roadmap and action plan for Bucaramanga Region
  - **Timeframe: Nov 24 - Dec 31 , 2011 (shifted to March – April 2012)**
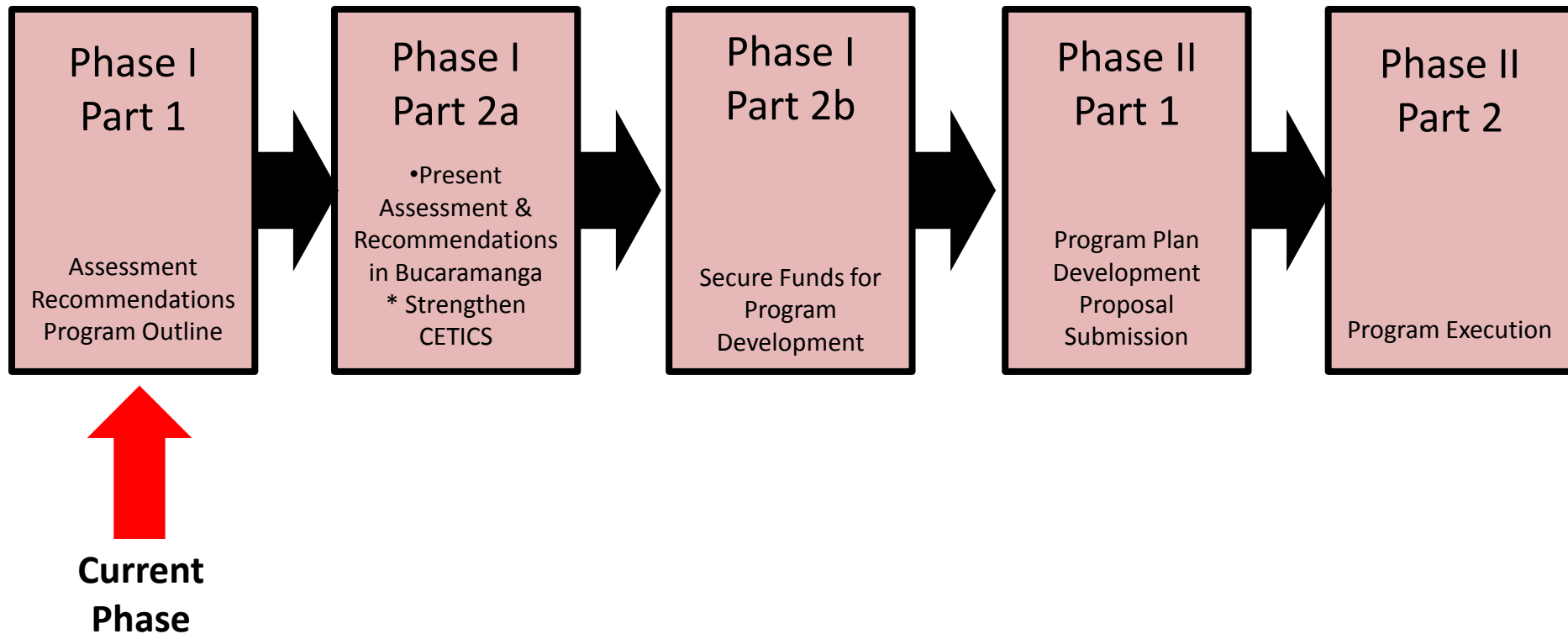
- **Phase I - Part 2 (2012)**
  - Secure support and inputs for recommended action plan from key stakeholders in Bucaramanga and Bogota
  - Secure funding for development of Program Plan, Operations, Team & Budget
  - Lay groundwork for successful execution of Phase II
  - **Timeframe: Jan 1 – May 2012 (w/in 4 month window) (shifted to H2 2012)**

- **Phase II (2012 -2013)**
  - Develop program plan, operations, team and budget; submit proposals for funding
  - Execute Phase I strategy, roadmap and action plan
  - **Timeframe:  June 2012 – December 2013**

# Project Phases and Roadmap

**Phase I Part 1**

Assessment
Recommendations
Program Outline

**Phase I Part 2a**

•Present Assessment & Recommendations in Bucaramanga
* Strengthen CETICS

**Phase I Part 2b**

Secure Funds for Program Development

**Phase II Part 1**

Program Plan Development Proposal Submission

**Phase II Part 2**

Program Execution

**Current Phase**

# Methodology – Phase I, Part 1

- Onsite visits, interviews and meetings (see also Appendix C)
  - Companies and factories
  - Investor groups, banks and accelerators
  - Hospitals and other medical facilities
  - Universities and secondary schools
  - National, regional & municipal government agencies
  - International development banks
- Data collection and Information gathering and analysis
  - Official documents from companies, govts, other organizations
  - Photographic documentation of relevant observations from onsite visits (see Appendix A)
- Assess recent trends in ICT-related technology, innovation and entrepreneurship ecosystems development around the globe; apply lessons to Colombian context (see Appendix B)
  - Silicon Valley, Europe and elsewhere

# Project Team

- **Dr. Burton H. Lee PhD MBA**
  - Managing Director, Innovarium Ventures, Silicon Valley
  - Lecturer, Stanford School of Engineering
  - Primary author of this assessment report & methodology

- **Constanza Nieto**
  - CEO, Globaltech Bridge, Silicon Valley

- See Appendix for additional information on team members

# Project Funding Sponsors

- PARQUEARSE
- MULTIUSOSPASS
- ELECTROSOFTWARE
- TELEBUCARAMANGA
- ZONA FRANCA SANTANDER
- CAMARA DE COMERCIO
- FINANCIERA COMULTRASAN
- CAJASAN
- PENSEMOS
- PROMISIÓN
- EMPAS
- FITEC (Institución de Educación Superior de carácter tecnológico )
- SENA
- USTA
- CDMB (Corporación Autónoma Regional para la Defensa de la Meseta de Bucaramanga)
- ESSA (Electrificador de Santander)
- UNAB
- UIS
- UTS

- TYT
- SYC

# Key Definitions of Important Terms

# Maps of the Region

# Definition of "Innovation" - I

- "Innovation" in an **industry** context includes:
  - Research and research strategy
    - Industry-led research: applied and fundamental
  - New product and services design and development
  - Manufacturing Process Innovation
  - Business Model Innovation
    - Applying new business models to delivery of 'old' products/services
    - Development of new business models
  - Business Process Innovation
    - Introduction/improvements of new business processes into the firm
    - Introduction of ICT to organize and bring efficiency to existing business processes
    - 'Open Innovation' practices
  - Management of innovation
    - Development of pro-innovation strategies, cultures, processes and organizations

# Definition of "Innovation" - 2

- "Innovation" in a **university** context includes:
  - Research and research strategy
    - Basic research, industry-driven research
  - Innovations in undergrad/grad teaching and education
    - Course content, course formats, content delivery, project-based teaching and learning
  - Innovations in inter-disciplinary teaching and research across
    - Engineering – Business – Medicine - Humanities
  - Commercialization activities
    - Spin-outs of traditional or scalable technology startups by students and faculty
    - Licensing and patenting of intellectual property developed at universities
    - Incubation/acceleration of startups from univs – Technology Transfer Office
  - Industry relations and collaborations in all forms, that support the above innovation-related activities
  - New approaches to university stakeholder relations and models
    - University-industry, university-government, university-alumni
  - New approaches to university administration and governance
    - Business process innovation
  - New university institutional models and business models

# Definition of "Innovation" - 3

- "Innovation" in an **economic** & **social** context includes:
  - Infrastructure Innovation
    - Transportation, telecommunications, healthcare, etc
  - Public Sector Innovation
    - Innovation in administration of government institutions
    - New institutional models in public organizations
    - Government-driven research and innovation strategies & policies
    - Policy and regulatory innovation
  - Institutional Innovation
    - Invention of new types of institutions
    - New models for traditional institutions
  - Social and public-interest innovation
    - Not-for-profit activities and organizations

# Definition of "Entrepreneurship"

- "Entrepreneurship" here is taken to mean:
  - Highly scalable technology entrepreneurship
    - **First priority**: for its ability to generate large numbers of new jobs and investment returns, with high multipliers, relatively quickly (over short- to medium-term); rapid growth and marketplace adoption; and global exports
    - Often has a strong ICT component, but may also include other technologies
  - Traditional entrepreneurship
    - **Second priority**: aimed at traditional SMEs/PYMEs, and at traditional economic sectors such as tourism, food and beverage, agriculture, transportation, construction/real estate, and consulting services
    - Job creation and investment return potential is substantially less here, with lower multipliers (than above), and growth and export potential is typically much slower as well
  - Social entrepreneurship
    - Entrepreneurship and entrepreneurial models aimed at the public interest, and at improving society
    - May be not-for-profit or for-profit
  - Entrepreneurial activities within existing enterprises
    - New products/projects launched, skunkworks, etc
  - Entrepreneurial activities within the university or government
    - Students, professors, staff, administrators

**Maps of Santander Region/Bucaramanga Colombia**
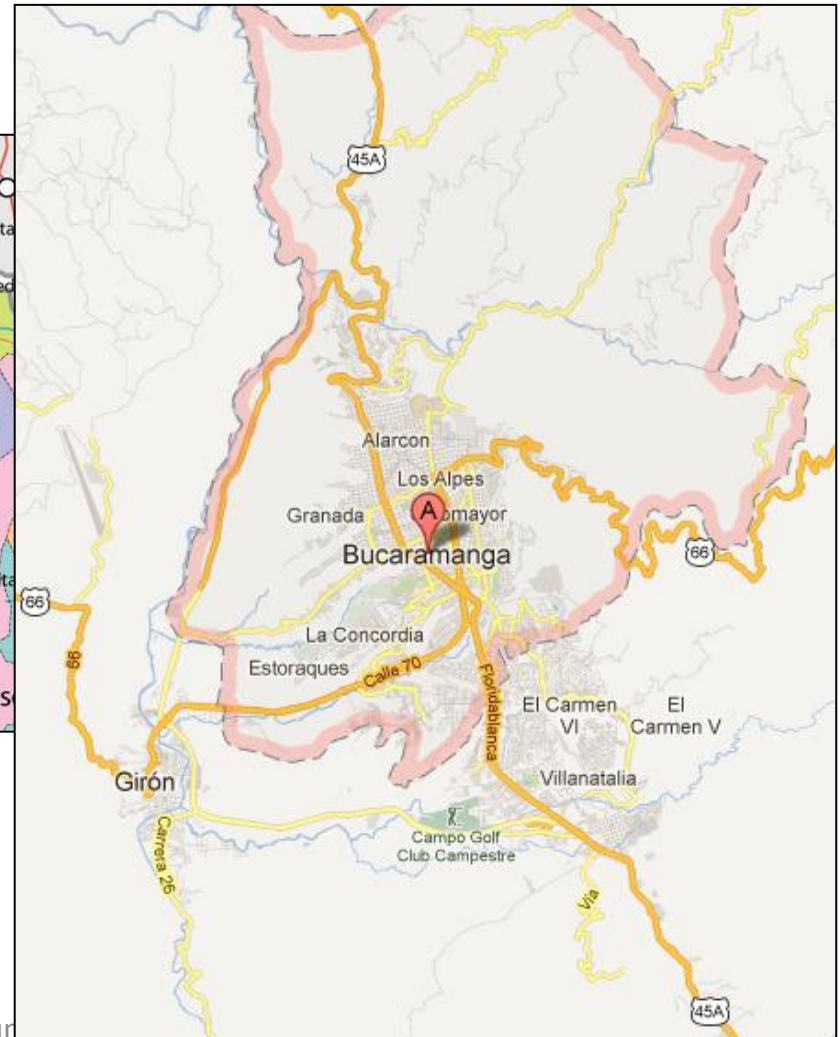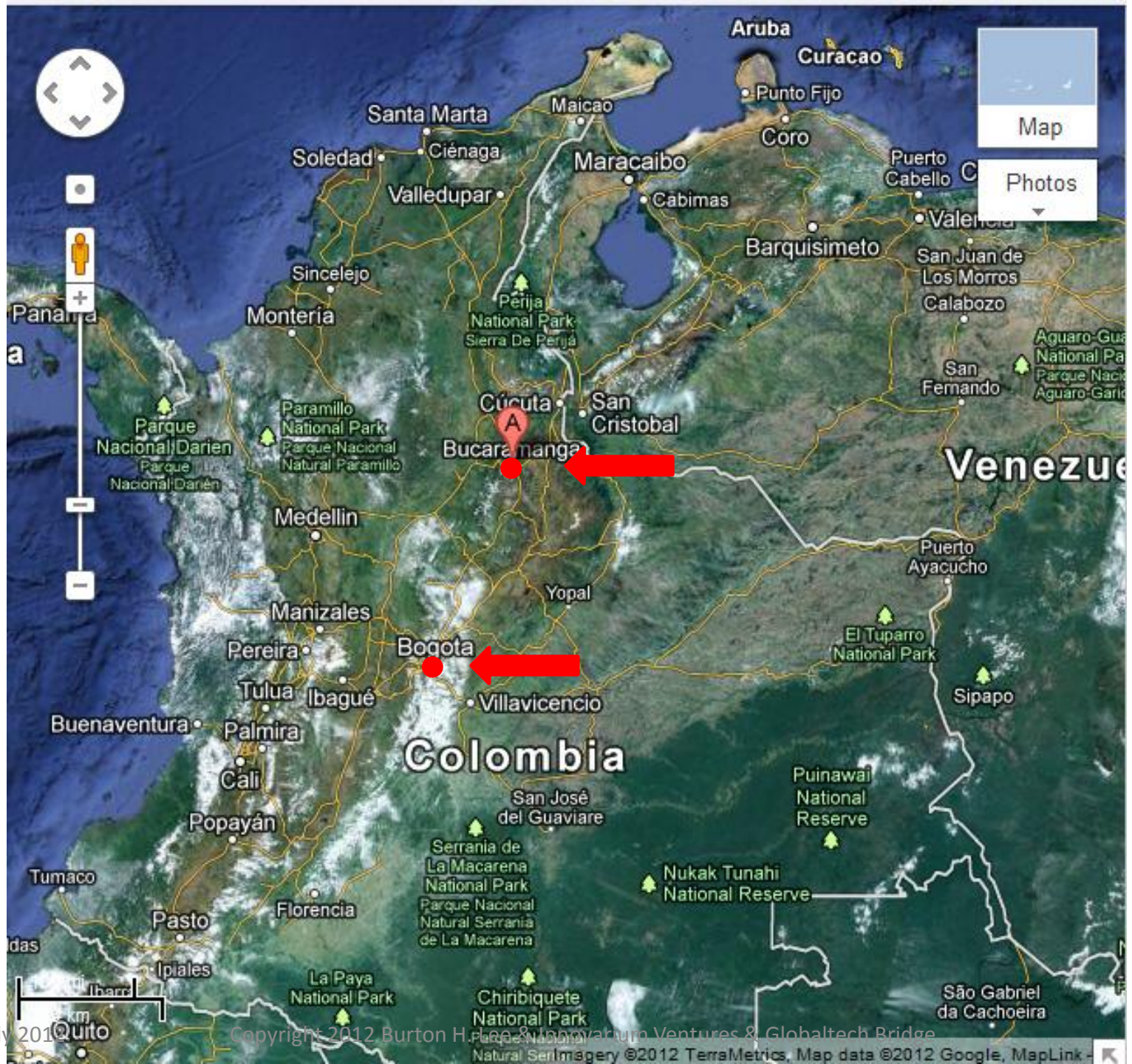
# Diagnostic and Assessment

# ICT Innovation & Entrepreneurship Ecosystem

# Bucaramanga/Santander Region & Bogota Institutions

# Topics

- Santander Region
  - SWOT Analysis
    - Strengths, Weaknesses
    - Opportunities and Threats
  - Sectoral Analysis
    - Private Sector – Companies, Investors
    - Universities/Education Sector
    - Civil Sector
    - Local Government Sector

- Bogota Institutions
  - SWOT Analysis
    - Strengths, Weaknesses
    - Opportunities and Threats
  - Sectoral Analysis
    - Private Sector – Companies, Investors
    - National Government Sector (selected institutions)

**Santander Region/Bucaramanga**

**ICT Innovation and Entrepreneurship Ecosystem**

# Santander Region/Bucaramanga
# SWOT Diagram – Summary of Major Findings

**Strengths**
• Strong economy showing sustained growth, based largely on services, the petroleum sector and agro-industry
• Numerous excellent role models for world-class innovation & product design in small and large enterprises in the region
• Strong history and tradition of entrepreneurship, design/fabrication, automotive electronics, metal working in region; emerging interest in mobile robotics/smart products
• Strong crafts and artisan sector (wood, ceramics, leather)
• Universities: 17 universities + research centers
• Strong secondary school system (2nd place in Colombia on ICFES)
• Local govt competencies have been upgraded with the addition of new offices/advisors in internl affairs, competitiveness and ICT
• CETICS is one of the few organizations in Santander that is building bridges to Silicon Valley and the global innovation sector
• Bucaramanga has adopted a sustainable cities strategy and roadmap, and has been designated a 'sustainable' city by the IADB

**Opportunities**
• Major need for application of ICT to industry, healthcare, social, govt sectors (enterprise software, mobile & cloud applications)
• Accelerated introduction & utilization of latest mobile platforms in mobiles and tablets
• Telemedicine and medical tourism have major potential
• Distance education employing digital technologies also is a significant area of opportunity
• Promising technology and skills base for medical devices & equipment, 'smart products' and 'small robotics'
• No co-working spaces are today present in Santander
• A MakerFaire-type event/activity would resonate well in the region, and bring together many traditional industry sectors with emerging technology-focused companies and universities
• Ecopetrol can expand its support for innovation & tech-based entrepreneurship outside the immediate petroleum sector

**Weaknesses**
• Region is isolated from global innovation networks
• Many companies focus on local markets only, do not follow a larger vision of expanding into national or global markets
• Lack of risk capital: angel and venture capital
• Highly fragmented higher education market in region
• ICT skills and mobile infrastructure in companies and other sectors are not strong; specific areas for improvement include late adoption and under-utilization of social media and enterprise software, and the absence of a 'hacker' community
• English language competencies are generally weak

**Threats**
•Other regions/cities in Colombia with strong universities, industry and innovation sectors (Bogota, Cali, Medellin); other LatAm countries
• Other regions with stronger ties to Bogota govt and industry
• Other regions with stronger tradition of industry, university and govt collaboration and cooperation
• Other regions with stronger ICT and English language skills base
• Violence and corruption can undermine the building of high-trust and open innovation culture in Bucaramanga/Santander

# Santander Region/Bucaramanga
# **Strengths**

- Many good examples of "innovation" in its various forms can be found today in the Santander Region and elsewhere in Colombia. A few we found are:
  - Business model innovation
    - Fundacion CardioVascular (FCV), Mediimplantes S.A. (medical devices), FOSUNAB
  - Manufacturing process innovation
    - Promitec (yucca processing), Mediimplantes S.A. (medical devices)
  - Business process innovation
    - Fundacion CardioVascular (FCV), Sistemas y Computadores S.A. (SYC), Comertex S.A.
  - Design & development of new products and services
    - Mediimplantes S.A., Sistemas y Computadores S.A. (SYC), ElectroSoftware S.A., Proditexco S.A.
  - Institutional innovation
    - Fundacion CardioVascular (FCV), Promision (angel/VC investor group), FOSUNAB
  - Teaching innovation in universities, government and secondary schools
    - Universidad San Tomas (mechatronics & robotics)
    - SENA
    - Colegio San Pedro Claver, Colegio Salesiano (robotics)
  - Research and development in universities and companies
    - Universidad Industrial de Santander (UIS), Universidad Autonoma de Bucaramanga (UNAB)
    - Ecopetrol (ICP), ElectroSoftware S.A., SYC S.A.
  - Infrastructure Innovation
    - Bogota TransMilenio public transportation system

# Santander Region/Bucaramanga
# **Strengths**

- Metalworking skills are quite strong in the region
  - Strong automotive and basic factory processing equipment rework/design/fabrication in Bucaramanga

- Core electronics skills in region are also strong
  - Ample evidence of strong skills in factory systems and automotive-related electronics design, prototyping and fabrication
  - Electronics stores in Bucaramanga can provide – or order – most electronic components desired
    - Prices can be high, however

# Santander Region/Bucaramanga
# **Strengths**

- Strong competency and tradition in the region for design in many forms
  - In fashion
    - Observed in clothing, shoes and textiles manufacturing sectors
  - In new product/services design & fabrication
    - Automobile rework, factory equipment
    - Some good user interface designers can be found in the region, but many firms do not appreciate the importance of good UI design
  - In traditional arts and crafts

- Product design, however, is currently not taught in local engineering schools as part of undergrad or graduate programs
  - Not understood as a core competency in most local enterprises

# Santander Region/Bucaramanga
# **Strengths**

- Strong interest in Bucaramanga to become a 'sustainable city' in the medium- to long-term

  - Current project 'Bucaramanga - Una Ciudad Sostenible', led by the CDMB, provides a foundation for sustainable and planned growth, optimization of the use of renewable resources, and finding alternative sources of energy, food and water.

  - The "Sustainable City" initiative also provides a policy and funding basis for strengthening ICT in Bucaramanga and the region

# Santander Region/Bucaramanga
# **Weaknesses**

- Many people in the region lack a good understanding of what is meant by 'innovation' and 'entrepreneurship' in a technology context
  - Often leads to confusion over types of innovation and entrepreneurship that we are aiming to promote and accelerate
  - See definitions of 'innovation' and 'entrepreneurship' above

# Santander Region/Bucaramanga
# **Weaknesses**

- Key entrepreneurship skills and concepts generally seem at a low level in the region
  - Many PyMES interviewed were unable to calculate the size of their market
    - "25,000 chickens" or "5 Million pigs" vs 'Pesos' or '$$ Dollars'
  - Lack proper understanding of what 'market size' is
  - Use of social media for marketing, sales and customer support is not well understood or employed
  - Role of attorneys seems much less critical than in Silicon Valley
  - Use of ICT for business processes is very limited, since ICT expenditures are seen as an expense/cost vs an investment
  - Software packages used for accounting, sales, marketing, etc are obsolete and used by only a few staff, because there is inadequate training and lack of interest by organization leaders

# Santander Region/Bucaramanga
# **Weaknesses**

- The region is very isolated from global innovation networks and organizations
  - Few organizations or senior leaders have strong connections to, or understanding of, the global innovation ecosystem and innovation and technology trends

# Santander Region/Bucaramanga
# **Weaknesses**

- ICT skills and utilization are quite weak in most organizations in the region (firms, universities and govt)
  - Web site quality is often poor, many orgs still do not have homepages
  - Social media utilization by firms and other organizations is quite sketchy, with large gaps, and is generally not approached from a strategic communications perspective
    - Social media do not seem to be taken seriously by most organization leaders today
  - Design of hardcopy marketing collateral also shows lack of connection with online media
  - Public hospitals show major absence of IT skills, utilization and resources
  - Government institutions have no 'Open Data' policies or resources in place today
  - Broad lack of understanding of what 'mobile apps' are today
  - Exceptions here:
    - Top managers at leading organizations were observed to use iPads on a regular basis for note taking, giving speeches, accessing press/media and other info
    - Major companies and foundations with a strong focus on process efficiency and global markets (Comertex, FCV)

# Santander Region/Bucaramanga
# **Weaknesses**

- Lack of good English language skills is common at all levels in Santander
  - Prevents many managers from understanding developments in Silicon Valley, Europe and outside Colombia and Latin America
  - Prevents many organizations from effectively marketing themselves around the world outside Spanish-speaking regions
  - Level of English-language teaching in some universities is too low, and needs to be raised
  - Also does not seem to receive sufficient attention in many secondary schools
  - Few native English language instructors can be found in the Santander Region
  - Improving English language skills does not seem to be a high priority for many organizations visited, or for the region

# Santander Region/Bucaramanga
## **Weaknesses**

- The region does not seem to have a strong, organized and coordinated presence in Bogota:
  – With major government agencies and ministries
  – With major industry organizations, groups and associations
  – With universities in Bogota
  – With political and industry leaders at all levels

- The level of participation by Santander companies/teams in national competitions seems low, and below Santander's potential
  – **Fundacion Bavaria/Red de Angeles** calls/deal submissions: 20 % from Santander, none selected
  – **Wayra/Telefonica** calls for applicants: 7 % of applications from Santander, no details available on winners from Santander

# Santander Region/Bucaramanga
# **Weaknesses & Opportunities**

- Elements of the region's ICT-related infrastructure are somewhat out of date
  - Extensive use of older Blackberry platforms for mobile communications by enterprises and other orgs
    - Lower cost, less likely to be stolen vs 'SmartPhones'
    - In general, these do not support 'mobile apps' deployments
  - Limited use of iOS, Android and Windows 7 platforms in companies and by mid-level personnel in organizations
  - Limited use of tablets observed
    - Senior managers in some firms and govt organizations were seen to be using iPads on occasion
  - Substantial lack of knowledge around 'mobile apps'
- Some Data Center infrastructure exists in a few large firms (e.g. SYC), and is being expanded in the region via Zona Franca Santander project

# Santander Region/Bucaramanga
# **Weaknesses & Opportunities**

- Few policies seem to be in place today, at the regional or municipal level, that are specifically aimed at promoting/improving the region's/city's innovation and technology entrepreneurship performance
  - No tax incentives for angel investors exist in Santander today
  - Local government procurement policies are not aimed at supporting new high growth companies
  - Local government today lacks 'open data' policies, programs and data bases. Govt data bases are not open to the public.  Few or no govt resources are aimed at making public data sets available to for-profit/non-profit organizations for commercial or social use

- 'Online Government' initiatives are aimed at
  - Improving access by citizens to government services
  - Facilitating increased efficiency of central government operations and administration
  - It is not clear how effective these initiatives are at accelerating innovation in government administration

# Santander Region/Bucaramanga
# **Threats**

- Other regions and cities in Colombia with a strong history and tradition of:
  - Collaboration and openness
  - Innovation & entrepreneurship
  - Excellent universities
  - Global thinking and English language skills
- Other Latin American countries
  - Chile, Brazil, Mexico, Argentina, Costa Rica, Dominican Republic
- Southeast Asia and Africa
  - Low cost labor in manufacturing and outsourcing
  - Rapid decision-making by government and private sector

- Violence and corruption can undermine and slow down the development of an open, collaborative and trust-based innovation culture in Santander

# Sectoral Analysis - Companies

- **PyMES**
  - Tend to be very locally focused, on local markets
  - Substantial under-utilization of ICT to support internal business processes, viewed as a cost center
  - Poor document handling and processing capabilities frequently observed
  - Poor English language skills
- **Large Firms**
  - Larger firms seem to have substantially better:
    - ICT teams, resources and strategies (but small sample size here)
      - SYC, FCV, Comertex, EcoPetrol
    - ICT-based document management, handling and processing
      - FCV, Comertex and SYC are noted here for their excellence in effective document management via ICT
    - Business networks that are connected to global markets and innovation networks
  - Somewhat higher confidence than PyMES in their ability to perform and compete outside the Spanish speaking world
- **EcoPetrol**
  - Strong in basic petrochemical processing research and development (ICP)
  - Has demonstrated internal software programming competencies around exploration, data processing and visualization
  - Now developing and executing its first formal innovation strategy and programs
  - Opportunity exists to secure EcoPetrol's interest in support/engagement with broader innovation sector outside the immediate petroleum industry
- **Fundacion CardioVascular** (FCV)
  - Excellent example of effective use of ICT to create substantial competitive advantage around paperless business processes

# Sectoral Analysis - CETICS & Member Companies

- **CETICS**
  - Leadership team has demonstrated great vision, progress and dedication, but is thin and over-stretched
  - Resources today are quite limited
  - Junta Directiva does not seem actively involved today in leading CETICS cluster forward, or in working closely together, but this seems to be improving
  - Web site needs to be upgraded, with English language version
  - Generally limited/poor English language skills among leadership

- **CETICS Member companies**
  - Wide differences in level of development of member companies
  - Wide differences in management training and experience
  - A few companies have demonstrated strong initiative and management and engineering skills that should be encouraged and built upon (SYC, Electrosoftware, Inkco)
  - Most companies focused on local or domestic market only, with little concrete interest in expanding sales to USA
  - Very little progress by most individual member companies is evident following visit to Silicon Valley in 2010
  - Generally poor English language skills

# Sectoral Analysis - Investors & Lenders

- **Promision**
  - The Promision is the only active group of private angel/venture investors in Bucaramanga/Santander
  - Limited technology experience, and limited investment capacity today, but interested in moving in this direction
  - Primary focus seems to be on local markets today, but interested in global expansion where feasible
  - Willing to invest in manufacturing process innovations
  - Good English-language skills

- **FGS** (Fondo Regional de Garantias)
  - Promotes, facilitates and accelerates socio-economic development in the region via credit guarantees
  - Interested in becoming an investor institution - Able to fund industry investment projects in the health care and information technology (TICS) sectors, with approx. $250,000 available at present
  - Unlikely to be a major source of risk equity finance to new technology companies, preference for low risk projects/ventures

- **Comultrasan**
  - Strong social mission; provides credit services to PyMES in the following sectors: industrial, commercial, mining, and services
  - A possible source of debt finance to new tech companies, but with limited impact and capacity

- **Bucaramanga Sustainable City Project**
  - A possible source of grant funding for projects in the sustainability area

# Santander Region/Bucaramanga
# Technology Parks & Free Trade Zones

- **Parque Tecnológico de Guatiguará** (UIS S&T Park)
  - Research focus on energy, health, software, agro-industry and biotechnology
  - Installation of advanced new scientific research equipment is now underway, as is build-out of facilities & infrastructure
  - Excellent network connectivity
  - Not clear if social media is actively used to promote Park's activities
- **SENA**
  - TecnoParque
    - Advanced facilities for 3D printing and video motion capture
    - Excellent teaching team with highly motivated students
    - Focus on technology entrepreneurship, interest in mobile robotics and mobile applications
  - CIMI (Centro Industrial de Mantenimiento Integral)
    - Training facilities for software, communication networks, computer equipment maintenance, telecommunications, factory systems, industrial electronics, biomedicine, automation and mechatronics
- **Zona Franca Santander (ZFS)**
  - Privately owned and operated with investments from Promision, Camara de Comercio, Araújo Ibarra & Asociados, and other companies from the region
  - Excellent network connectivity; new Data Center is planned
  - Major new construction is now underway: buildings, infrastructure
  - Strong interest in being connected to new technology-oriented activities around entrepreneurship, co-working spaces
  - Not clear if social media is actively used to promote ZFS activities
- **NEOMUNDO**
  - Non-profit interactive science & technology center; looking for new business model and markets
- Not clear how closely these various initiatives and projects are tied to parallel 'Invest in Santander' initiatives

# Sectoral Analysis - Universities

- Research
  - UIS installing advanced new scientific equipment at Parque Tecnologico de Guatiguará
  - Has spun out some research-based IP in earlier days, but now is seeking to formalize this process in a faulty/partial policy/regulatory environment
  - UTS – several interesting research projects presented
- Teaching
  - Mobile Robotics – Santo Tomas
  - UNAB and UIS also teach robotics
  - Entrepreneurship programs seem aimed largely at teaching traditional entrepreneurship concepts, and do not specifically address technology or ICT entrepreneurship/startups
- Tech Transfer Offices
  - Only UIS has a formal TTO, but it is not really functioning at present
- English language preparation
  - Does not seem like it is a high priority for universities in the region
  - Level of English language training received by most students does not appear adequate for most enterprise needs today (marketing, sales, social media, etc)
  - Teaching done almost entirely by non-native speakers
- Student groups and engagement
  - Relatively little organized student activities across universities, seem confined mostly to faculties or research groups
  - Student career preparation and assistance provided by university seems to be minimal
  - Robotics – ERA group at UIS
  - Student Entrepreneurship Societies – didn't find any
  - Don't have financial support, receive facilities from university

# Santander Region/Bucaramanga
# **Sectoral Analysis - SENA**

- Teaching
  - Mobile Apps
    - Platforms: Android
    - Programming languages: C, C#
    - New course for 30 students, to be expanded to 60 students/year
  - Programming
    - Microsoft IT Academy Program member
  - Mobile Robotics
    - Small teams at two locations
  - Computer Networking
    - A 'Cisco Academy' recognized institution
  - Automotive
    - Winner of international prize
- Tech Transfer Offices
  - None
- Technology Park (TecnoParque)
  - 3D printer, 3D video motion capture, video production, mobile robotics
- Use of Social Media
  - Needs improvement

# Sectoral Analysis - Secondary Schools

- Teaching
  - Mobile Robotics
    - Colegio San Pedro Claver, Colegio Salesiano
    - Co-educational team of 9 students, 2 instructors
    - Part of physics course curriculum, introduced during past year
    - Course instructors trained by Spanish company (Mondragon Cooperative)
    - Very impressive initiative and ongoing effort, with strong backing of Colegio leadership
- Competitions
  - Three Bucaramanga Colegios won in national robotics competitions
  - SPC team invited to international VEX competition in Los Angeles
- Entrepreneurship
  - Colegio San Pedro Claver interested in introducing entrepreneurship content into curriculum
- Student groups and engagement
  - Very strong student enthusiasm in mobile robotics team
  - Student Entrepreneurship Societies – none in place yet
  - Could be candidates for participation as individuals or teams in new CETICS 'mobile apps' program

# Sectoral Analysis - Healthcare Institutions

- **Public Hospitals**
  - Hospital @ UIS (teaching hospital)
    - Deficient in ICT capabilities and resources, including patient records digitization
  - Hospital Local del Norte
    - Major problems with processing of patient information and other ICT areas
    - Highly deficient in ICT capabilities and resources, including patient records digitization
  - Rural and lower income populations today are highly underserved
- **Fundacion CardioVascular** (FCV)
  - Very impressive business model and management team, far ahead of public institutions visited
  - Thinking of expanding outside Colombia to other parts of Latin America, and into US medical tourism market
  - Strong emphasis on use of advanced ICT in management, document handling and services delivery; paperless organization is the goal
  - Now building new campus outside Bucaramanga for telemedicine services
- **FOSUNAB**
  - No visit arranged

# Sectoral Analysis - Local Governments

- Regional Government
  - No ICT roadmap or strategy for the regional govt or the region has existed until recently; there is a strategy for strengthening ICT in the current plan of local development
  - Do not have an "Open Data" plan of implementation today, or data sets available to the public
  - Dependent largely on MinTICS in Bogota for direction in major programs and policy
  - Small ICT Department, no Chief Information Officer (CIO) today
  - Many senior leaders are iPad users; Mid-level staff still largely reliant on Blackberries

- Municipal Governments
  - No Chief Information Officers (CIOs) today, no ICT roadmap or strategy for municipal govts
  - Do not have an "Open Data" policy, plan or program today, or data sets available to the public
  - Dependent largely on MinTICS in Bogota for direction in major programs and policy, and on regional govt initiatives
  - Small ICT Departments
  - Many senior leaders are iPad users; Mid-level staff still largely reliant on Blackberries

# Government & Private Sector Organizations @ Bogota

# Innovation and Entrepreneurship Ecosystem

# Bogota & Colombia
# SWOT Diagram – Summary of Major Findings

**Strengths**
• Several US technology MNCs are present in Colombia (Intel, HP, Oracle, IBM), mostly with sales offices
• Ecopetrol is playing a key role in supporting research and innovation in key areas
• Universities in Cali, Medellin and Bogota are moving to improve their engineering/science programs and infrastructure
• Strong Colombia connection in Silicon Valley and San Diego
• Political leadership has moved quickly in past 2 years to embrace innovation and technology as core elements of Colombia national growth and development strategy
• MinTICS app.co and interconnection programs are well-aligned with latest ICT trends and provide new funding sources
• Ministry of Commerce & Development and INNpulsa are also new sources of innovation & entrepreneurship project funding
• Colciencias also supports innovation projects

**Opportunities**
• Substantial Colombian diaspora in USA offers important opportunities for universities to secure private donations, and for Colombian companies to raise investment capital
• Engineering Schools in Colombia need to move more aggressively to computer science, electrical engineering, mechanical engineering & biomedical engineering disciplines
• Ecopetrol can expand its support for innovation & tech-based entrepreneurship outside the immediate petroleum sector

**Weaknesses**
• Angel and venture capital sectors are not strong
• Quality of startup mentoring needs substantial improvement
• Accelerator, incubator and co-working space organizations and infrastructure require significant buildout across Colombia
• Certain central government agencies working in the science, technology and innovation sector need substantial strengthening
• Dependence on Spanish industry and major companies may prove to be a structural weakness for Colombia at a time when the Spanish economy is weak
• English language skills need substantial improvement across the country, at all levels, particularly in the universities
• Govt programs must be less bureaucratic and restrictive, so that entrepreneurs have timely and easy access to resources

**Threats**
• Mexico, Chile, Brazil, Argentina – all of these are serious competitors to Colombia, and several have strong advantages in technology, innovation, universities, and global innovation networks
• Resurgence of violence, and persistent corruption, pose an ongoing threat to the development of a high trust, open innovation culture in Colombia
• Increasing focus on petroleum sector, and related petroleum, chemical and civil engineering disciplines, have the potential to distract universities and govt from focus on core high tech areas: information technologies (mobile, cloud, data), mechatronics, medical devices/equipment, etc

# Bogota Institutions
## Private Sector and Firms – Startups & Investors

- **Red de Angeles Inversionistas/Fundacion Bavaria**
  - Poor track record of technology investing over past 4 years
  - Of 400 deals reviewed, only 1 deal done as of March 2012
  - Only 20 % of company applicants come from Santander Region; no deals done to date with Santander firms

- **Venture Capital Funds**
  - VC funds are almost non-existent today in Colombia; the business community does not have a risk capital culture (i.e. is risk-averse), and it is difficult to raise money from potential Limited Partners

- **Accelerators**
  - Wayra Colombia (Telefonica)
    - Quality of first round of portfolio companies is not impressive
    - Quality of mentoring that companies are receiving needs substantial improvement
    - 7 % of first-round applicants came from Santander Region; none accepted
  - Founder Institute
    - Only one class of companies done in first year, as of March 2012 (seems low)
    - Two new classes are planned for later in 2012

# Bogota Institutions
## Private Sector and Firms – Traditional Sectors

- **Banks and Pension Funds**
  - Banks are not allowed by law to invest in risk capital
  - Pension funds may invest in risk capital, but need big deals to invest
  - Senior banking executives are unlikely to be angel investors in tech firms

- **Multi-national Technology Companies** (MNCs)
  - MNCs are present in Colombia mostly in the form of sales offices in Bogota
  - Sales personnel are generally not well-connected with engineering, research or other technology groups back in USA headquarters; often do not have interest or connections to develop broader technology relationships for Colombian institutions (IBM is one exception here)
  - Intel has a person in charge of entrepreneurship support, but the senior management does not seem in close touch with local universities and engineering schools (was unaware that UniAndes has established a chip fab)

- **Software Outsourcing Sector**
  - Small, but sector is growing in strength, as Indian and other firms establish operations in Colombia
  - Heinsohn is an example of an excellent Colombian software outsourcing firm that has bootstrapped itself over many years to become an industry leader

- **EcoPetrol**
  - Currently assessing new innovation strategy and program focus
  - Very narrowly focused on direct petroleum-related research and innovation

# Bogota Institutions
## **Central Government**

- **Colciencias**
  - Does not seem very focused on ICT for potential role in ecosystem development
  - Little heritage of projects in product/services design, generally unfamiliar with this area
  - Possible source of CETICS project funding via Calls (convocatorias)

- **MinTICS**
  - Minister is strongly focused on mobile opportunities in MinTICS strategy
  - Staff advising the Minister seem very good, enthusiastic and interested in supporting the Bucaramanga initiative
  - ViveDigital is a core initiative of MinTICS that CETICS should track
  - MinTICS has cancelled their venture fund initiative
  - May be able to provide political support  inside Colombian govt, and to BID

- **Ministerio de Comercio, Industria y Turismo**
  - Key Programs/groups: ProExport, INNpulsa
  - Other Programs: Programa de Transformacion Productiva (PTP), Programa de Fortalecimiento de la Industria de las TI (FITI)
  - Follow-up with INNpulsa is recommended, as INNpulsa has funding for startups

# Bogota Institutions
# **International Development Banks**

- **Inter-American Development Bank** (BID/IADB)

  – IADB funding is accessible only through national government agencies and programs

  – Interested in new program ideas that take innovative approaches to bringing 'innovation' and 'entrepreneurship' to Latin America

# Global Trends in Information Technologies (ICT)

## Emerging New Platforms
## & Economic Development Models

*(abbreviated section – See Appendix B document for complete slideset here)*

# Global Trends in Information Technologies

- ## Major ICT Platform Trends Today
  - Shift from Desktop to Mobile
  - Shift from 'Dumb Phones' to Smart Phones & Tablets
  - The 'Dumb Phone Conversion Cycle'

- ## What are 'Mobile Apps' ??
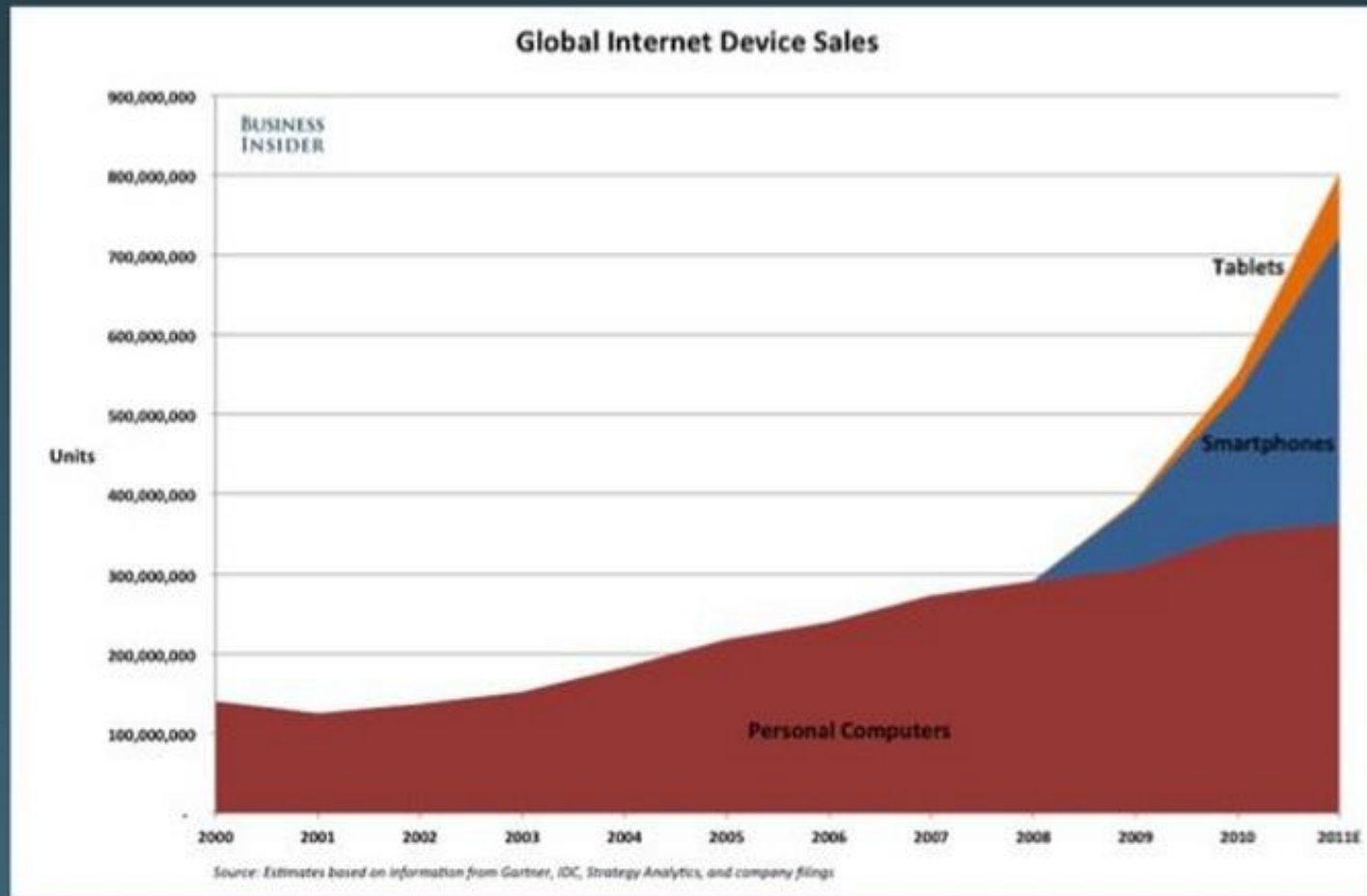  - Why are 'Mobile Apps' Important for Santander ??

# Major ICT Platform Trends Today

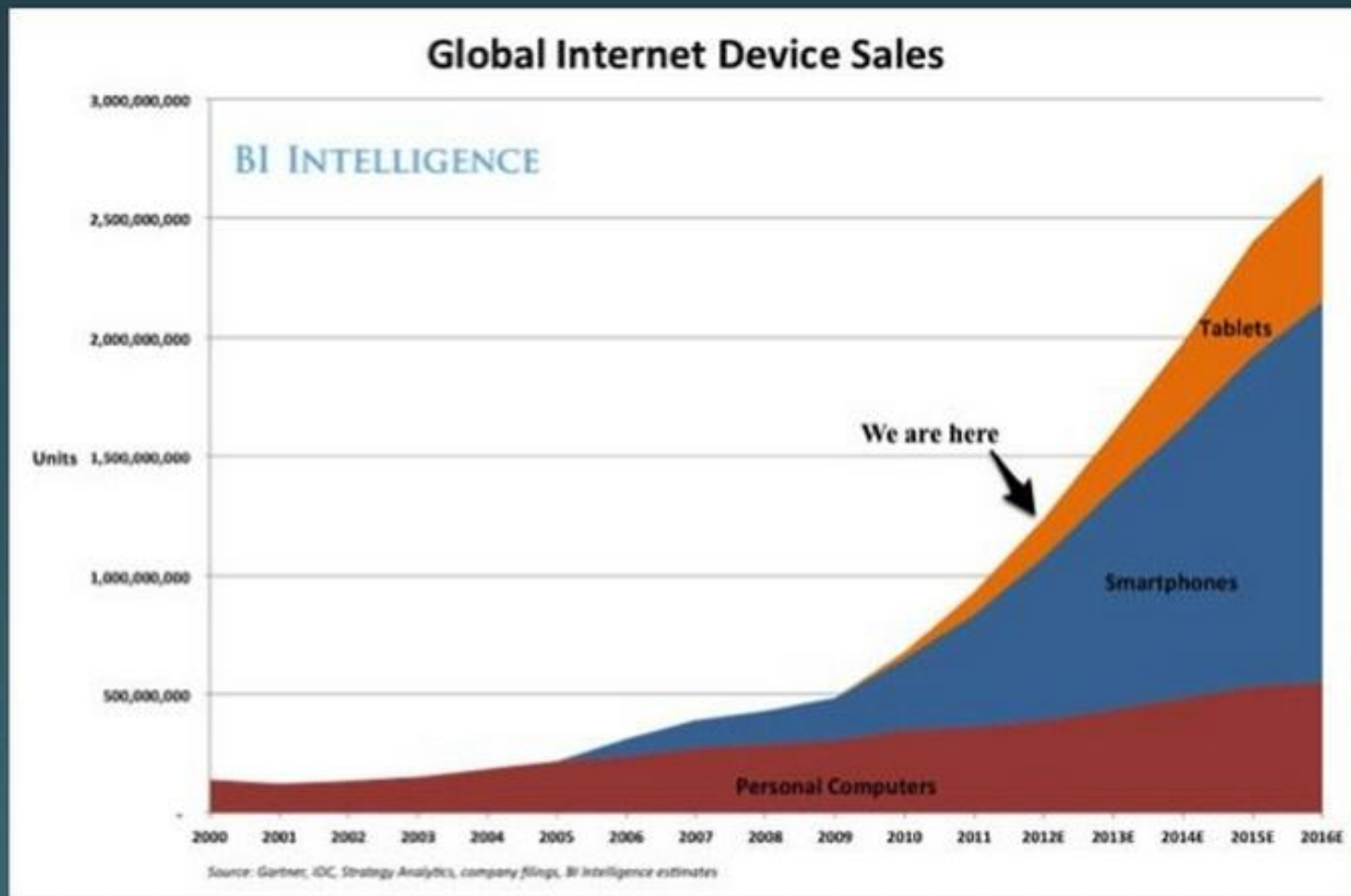## United States, Europe, Asia, Latin America

# Mobile

- Major disruption of traditional mobile models
  - New "Smart Phone" software platforms have emerged in last 3-4 years
    - Android, Apple iOS
  - New hardware platforms and user interfaces
    - Smartphones, tablets, e-book readers
- "Apps" market growing very quickly
  - Number of "apps" exceeds 950,000 (April 2012)
  - App startups is major area of investing interest by SV angels and VCs
- "Apps Economy" credited with creating/keeping 500,000 jobs in USA over past 4 years (TechNet study, Feb 2012 – see below)
- eBooks also rapidly growing as a new category of digital content
  - Amazon's *Kindle*, Sony *Reader*
- Major players
  - Google – Android
  - Apple – iPhone
  - Microsoft – Windows - Nokia
    - Nokia – now collaborating with MSFT, has abandoned Symbian
    - Major shift in momentum, technology, jobs and profits from Finland to Silicon Valley during 2008-2012
  - Amazon – Kindle and eBooks

# The number of smartphones sold exceeded the number of PCs sold.



**Global Internet Device Sales**

BUSINESS INSIDER

Tablets

Smartphones

Personal Computers

Units

Source: Estimates based on information from Gartner, IDC, Strategy Analytics, and company filings

900,000,000 · 800,000,000 · 700,000,000 · 600,000,000 · 500,000,000 · 400,000,000 · 300,000,000 · 200,000,000 · 100,000,000

2000 · 2001 · 2002 · 2003 · 2004 · 2005 · 2006 · 2007 · 2008 · 2009 · 2010 · 2011E

BUSINESS INSIDER

# In a few years, the number of mobile devices will DWARF the number of PCs



**Global Internet Device Sales**

BI INTELLIGENCE

Tablets

We are here

Smartphones

Units

Personal Computers

3,000,000,000
2,500,000,000
2,000,000,000
1,500,000,000
1,000,000,000
500,000,000

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012E 2013E 2014E 2015E 2016E

Source: Gartner, IDC, Strategy Analytics, company filings, BI Intelligence estimates
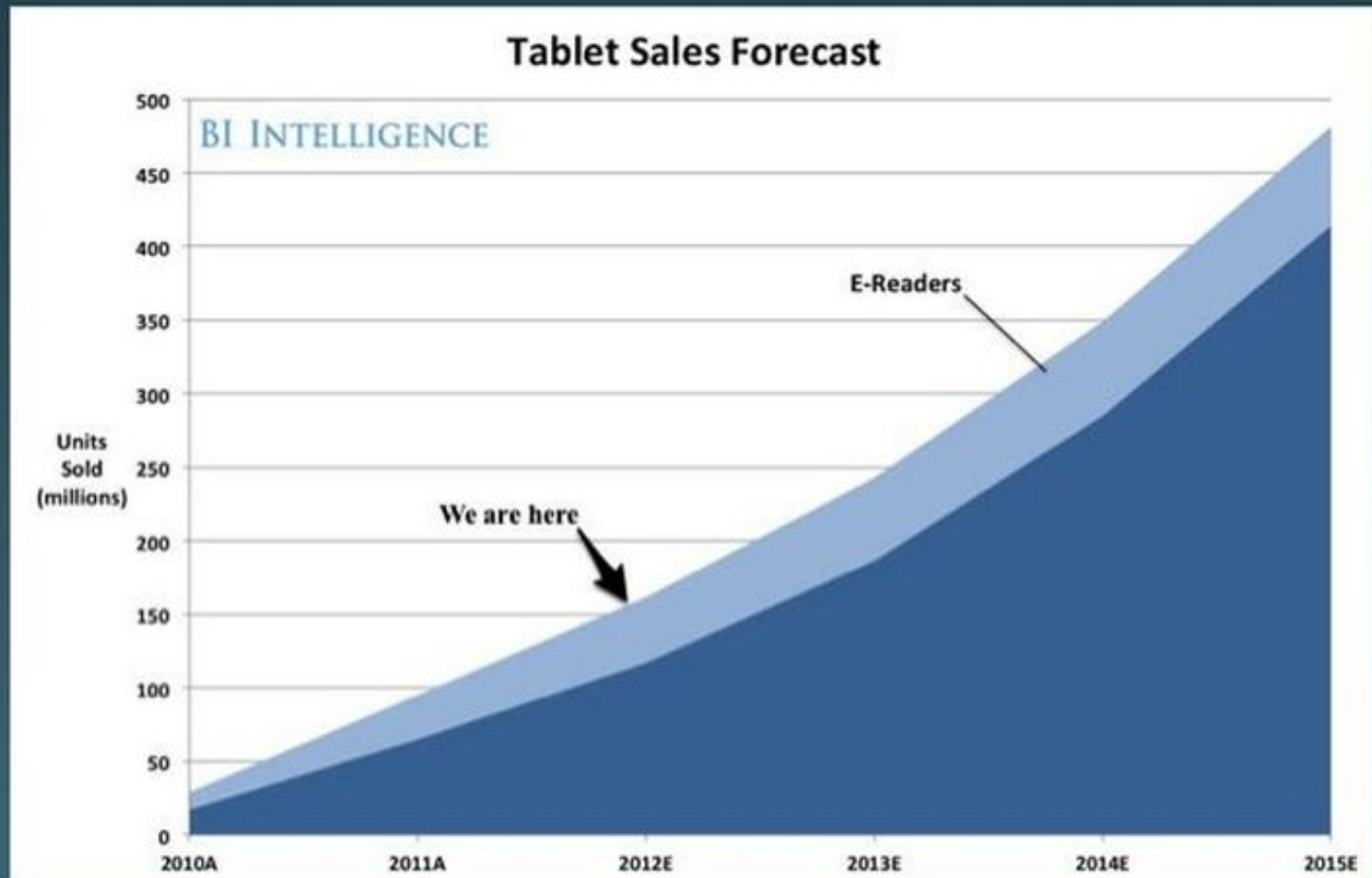
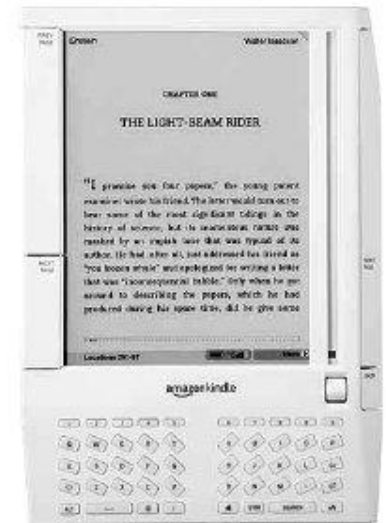BUSINESS INSIDER

# Android (Google) and iPhone (Apple)



**"Disruptive Innovation" via New Business Models + Advanced Product Design**

# And then there are tablets. Tablets alone should pass PC sales in 2-3 years.



Tablet Sales Forecast

Copyright 2012 Burton H. Lee & Innovarium Ventures

# Tablets v eReaders

# What are 'Mobile Apps' ??

# Why are 'Mobile Apps' Important for Santander ??

# What are 'Mobile Apps' ??

## *The Growing Importance of 'Mobile Applications' in Building Innovation and Entrepreneurship Ecosystems*

WHERE THE JOBS ARE:
**THE APP ECONOMY**

TechNet

*Research by*
Dr. Michael Mandel
South Mountain Economics, LLC

**February 7, 2012**

The key platforms in the App Economy today are

- Android, anchored by Google;
- Apple iOS, anchored by Apple;
- Blackberry, anchored by RIM;
- Facebook, anchored by Facebook;
- Windows Phone and Windows Mobile, anchored by Microsoft

# Example 'Mobile Apps'

- Instagram

- Angry Birds (Rovio)

Copyright 2012 Burton H. Lee & Innovarium Ventures

An Example of One Very Popular Photo Sharing 'Mobile App' Recently Acquired by Facebook
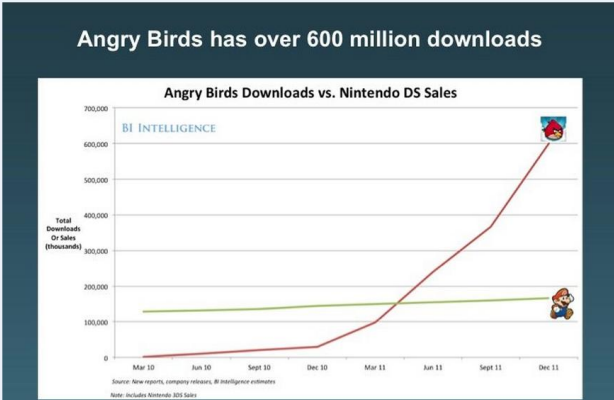
**Extremely rapid growth at Instagram + very small cost base ….**

**Instagram launched 1.5 years ago. When it was acquired by Facebook in April 2012, it counted 15 employees and 40+ Mn users.**



Instagram Estimated Users And Employees
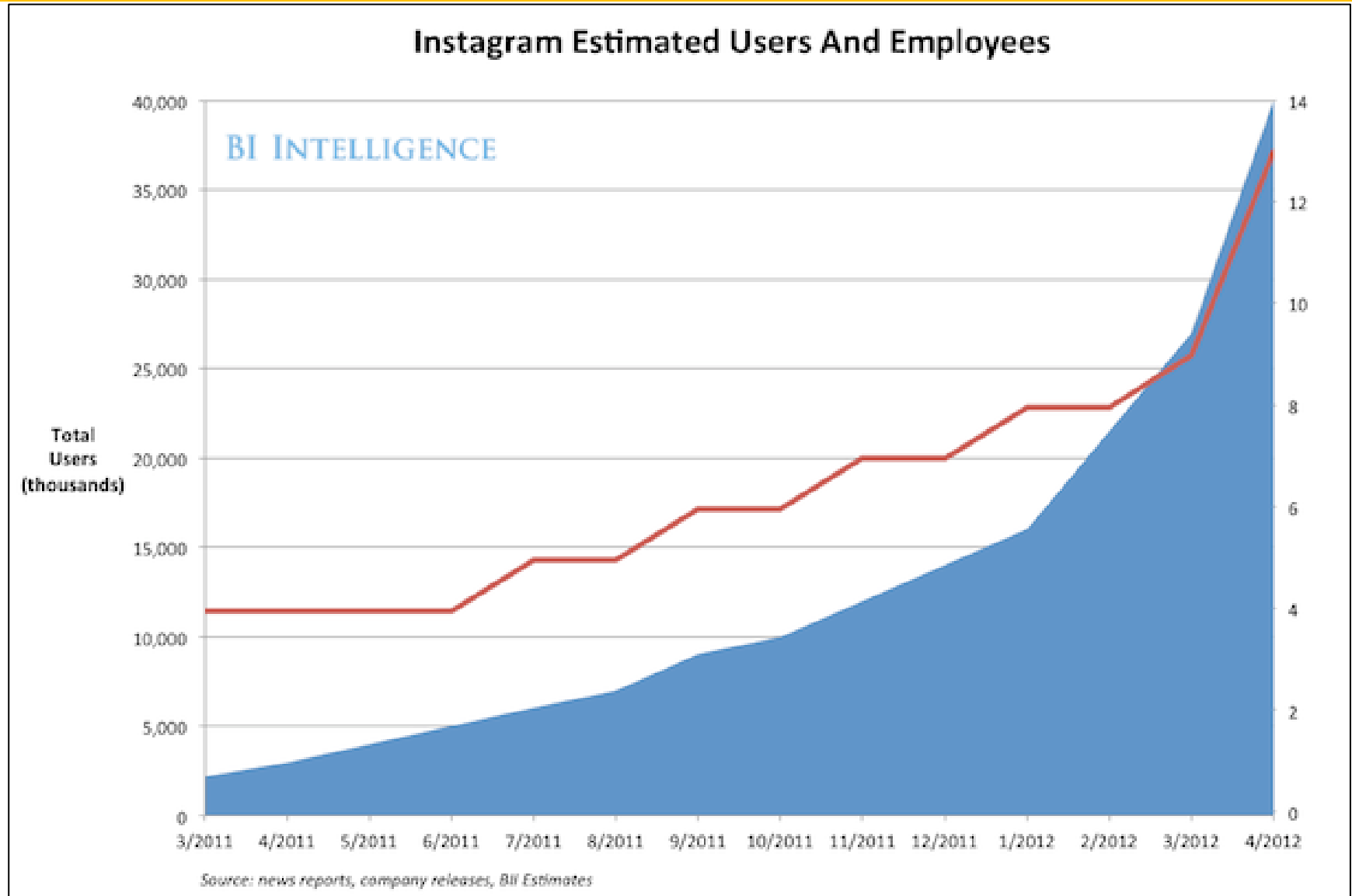
Source: news reports, company releases, BII Estimates

**Total Angry Birds 'App' Downloads May 9 2012**

ONE BILLION ANGRY BIRDS DOWNLOADED

**Angry Birds has over 600 million downloads**

Angry Birds Downloads vs. Nintendo DS Sales

BI INTELLIGENCE

Total Downloads Or Sales (thousands)

Source: News reports, company releases, BI Intelligence estimates
Note: Includes Nintendo 3DS Sales

BUSINESS INSIDER

Apps are now a ~$10 billion market, growing at ~100% per year

Mobile App Revenue

BI INTELLIGENCE

Source: Mary Meeker, Kleiner Perkins, and BI Intelligence estimates
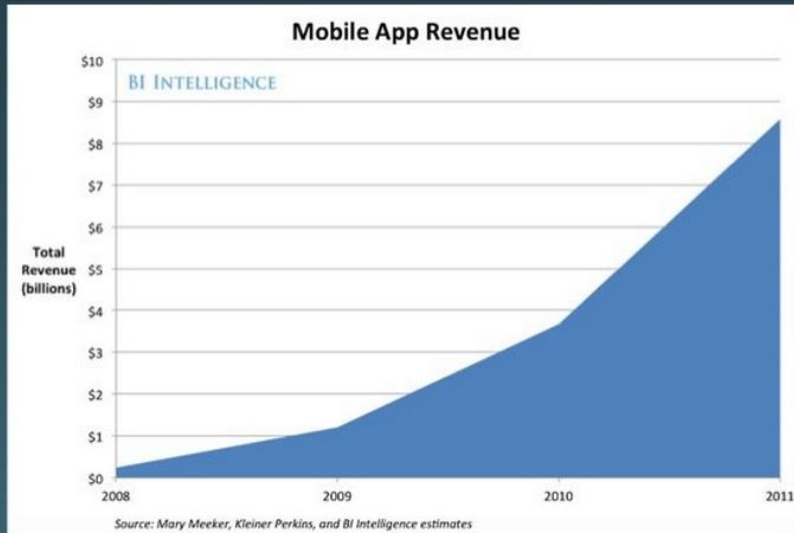
BUSINESS INSIDER



Apple vs. Android: **Number of Apps**
2008 - 2013

August 2012
Both: **680.000 apps**

August 2011
Apple: **465.729**
Android: **289.305**

XYOLOGIC
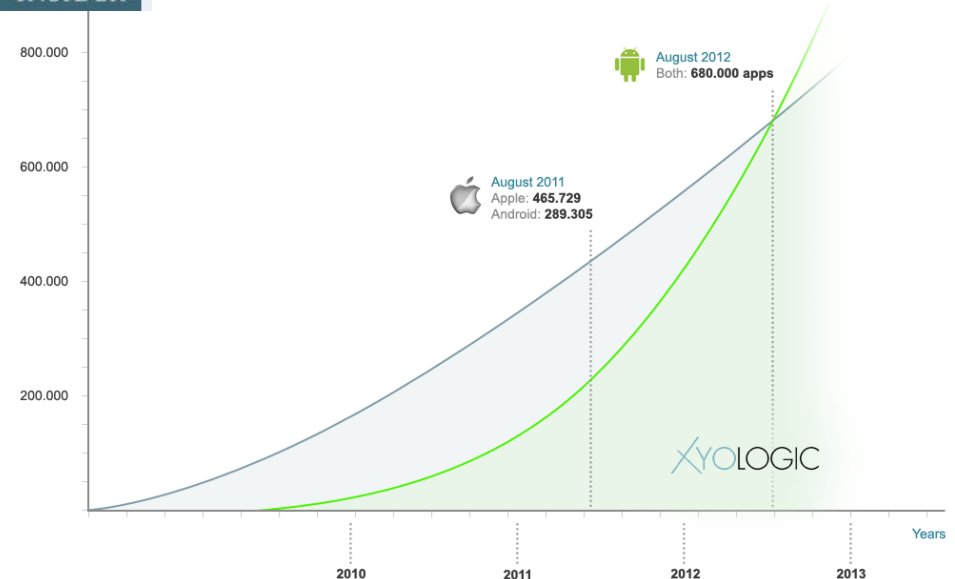
# Why are 'Mobile Apps' So Special?

- Successful 'mobile apps' have extremely fast growth and consumer adoptions
  - Can grow to more than 1 Mn users in less than 10 days
- **Fastest growing tech sector today in USA and globally**

- Relatively inexpensive to design, develop, code and test (a few weeks, a couple of months)
- **Risk capital requirements for mobile app startups are usually much lower than for other tech startups**

- Rapid development and market feedback
- **Entirely new disruptive class of low risk tech startup and business model**

CNET › News › Digital Media

# Study credits 'app economy' with 500,000 U.S. jobs

by Lance Whitney | February 7, 2012 10:15 AM PST

Follow

**... four years ago the "app economy" did not exist ...**

The surge in mobile software and other apps has also led to a surge in jobs, almost half a million just in the U.S., estimates a study out today from CEO network TechNet.

Dubbed the "app economy," the million or so apps created just for iOS and Android devices represent jobs for programmers, designers, marketers, managers, support staff, and other professionals, according to TechNet's report "Where the Jobs Are: The App Economy."

But how just many jobs? Analysis conducted for TechNet by Michael Mandel, president of South Mountain Economics and former chief economist for BusinessWeek, found that the app economy has been responsible for adding an estimated 466,000 jobs in the U.S., up from zero in 2007 when the iPhone was first unveiled.

However, it's important to point out, as the study notes in its executive summary, that these are estimates and "may represent 'jobs not lost' rather than net jobs gained."

**Feb 7 2012 Study on US 'App Economy' – Lessons for Colombia:**

*Companies, universities & government in Santander/Bucaramanga can play a central role in supporting the development of a strong "App innovation & startup ecosystem" in Colombia*

**Figure 1: Sizing the App Economy (jobs, thousands)**
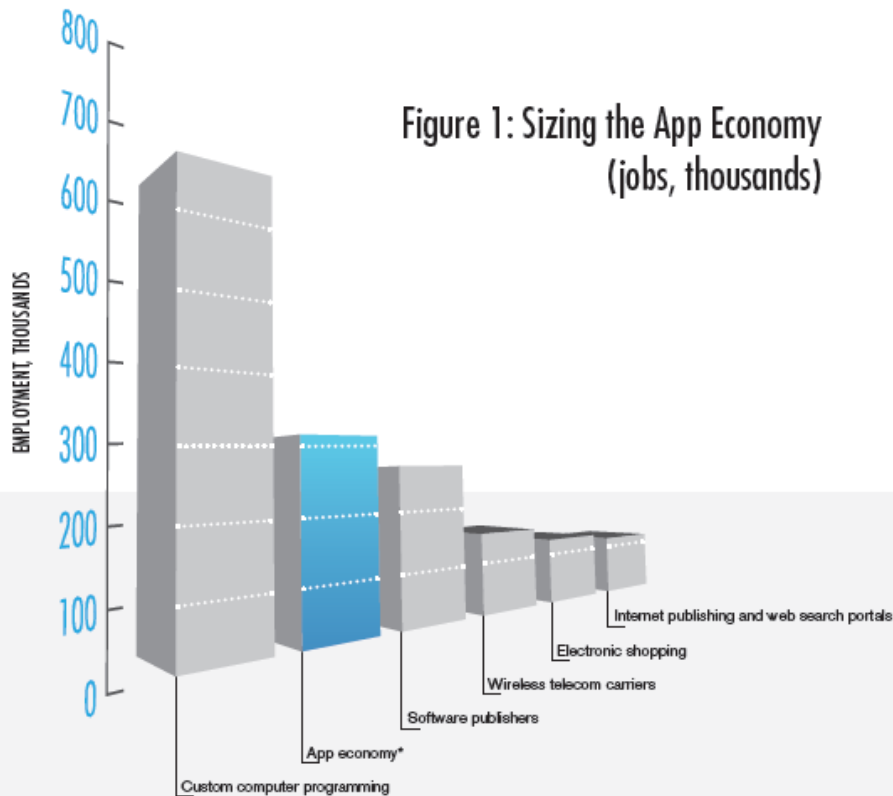
*App economy employment, not including spillovers. Based on 90 days ending December 31, 2011. Industry employment as of November 2011. App economy jobs are distributed across all industries. Data: The Conference Board, BLS

**Accelerating New Job Creation in the App Economy**

**Figure 2: Growth of the App Economy (December 2008=1)**
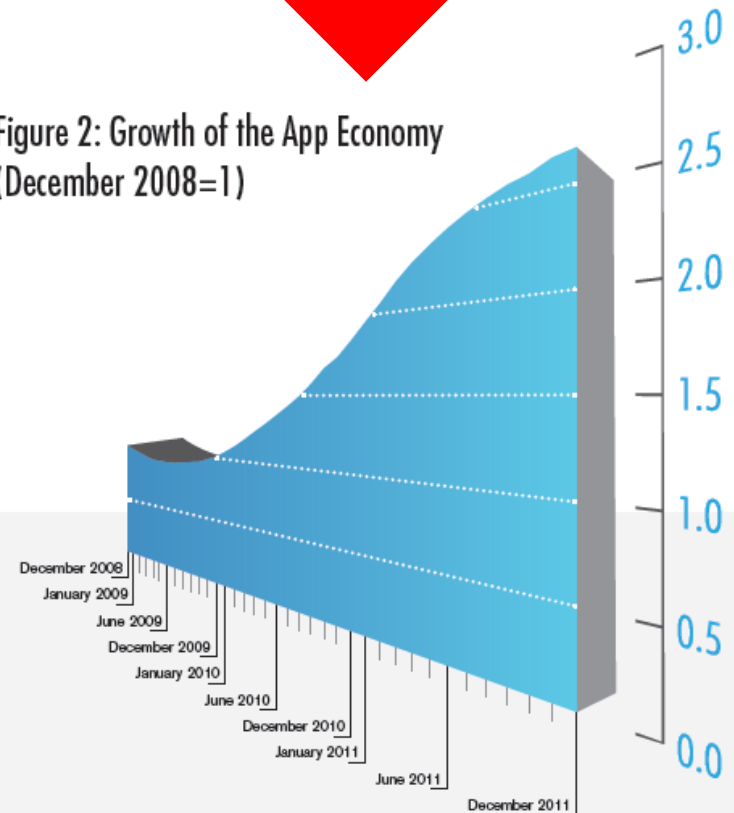
Help-wanted ads for computer and mathematical occupations that contain the word 'app'; 12-month moving average
Data: The Conference Board

**... the "App Economy" emerged just 4 years ago ....**

*Source*: Mandel, M., 'Where the Jobs Are: The App Economy', study undertaken for TechNet, February 2012, by South Mountain Economics LLC.

# "Mobile Apps" – Why So Successful?

- **Innovation**
  - Innovation in business models underlies many "apps" successes
  - Can be applied across many industry verticals – mobile healthcare as well
  - "Apps" integrate several existing technologies into a single platform

- **Entrepreneurship**
  - "Apps" industry is led by startups and established tech firms
  - Dealflow and investment in apps-startups has surged in Silicon Valley over the past three years – emergence as a separate, much more dynamic innovation ecosystem with dedicated investor community
  - Most "apps" are based on highly scalable business models

- **Design**
  - Great mobile user interface design (UIX) is core to the success of many app-based services and products
  - Supports viral uptake by consumers
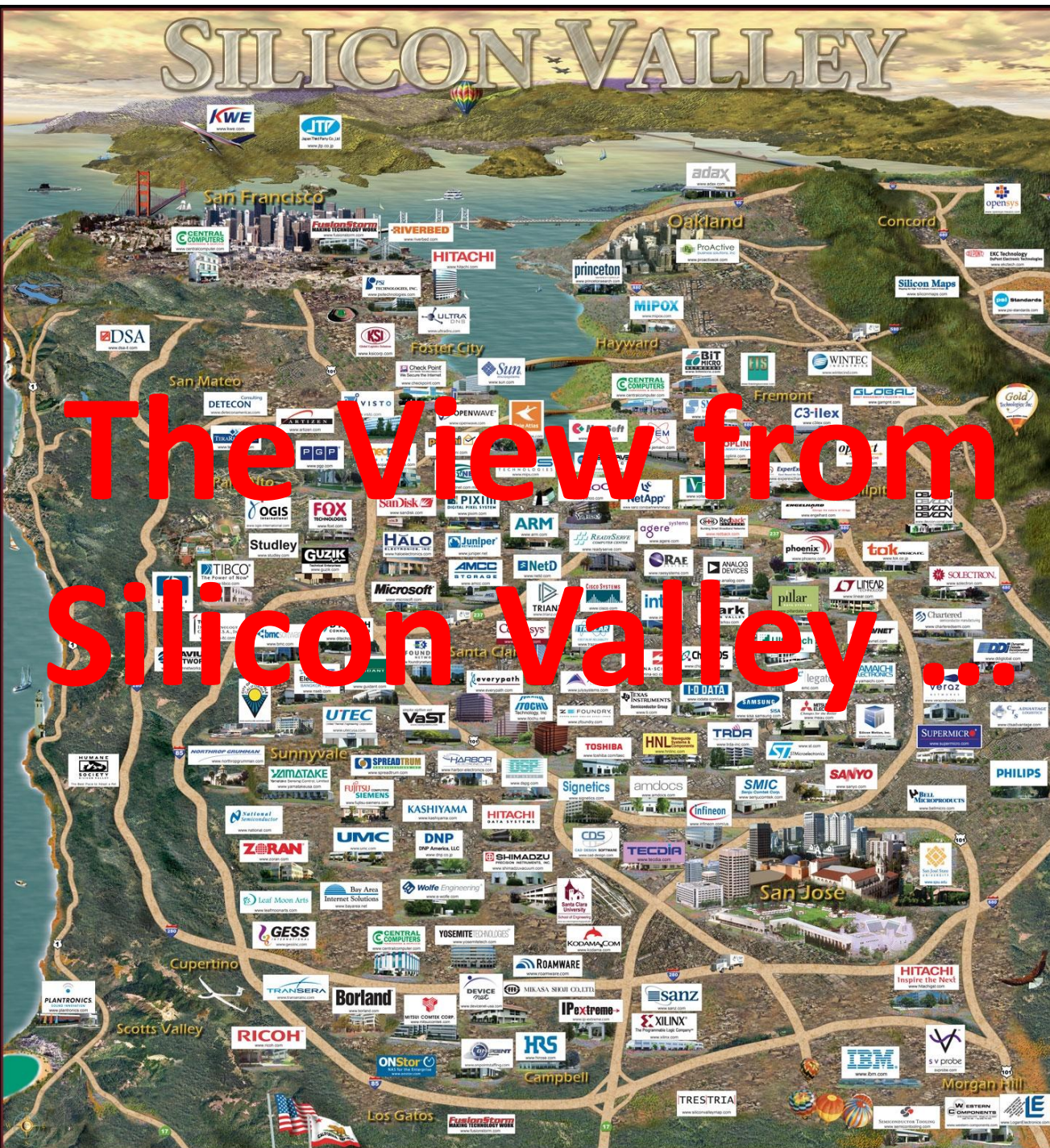
**mobile + cloud**

*Explosive growth !!*

# 'Mobile Apps'
# **Why Important for Santander Region ??**

- Information technologies are generally a weak competency among Santander organizations
- Many companies – small, medium and large – are not strong in the use of ICT for business-related activities
  - Sales, marketing, customer support, supply chain management
- The public sector is also extremely weak in ICT
  - Hospitals, higher education institutions, public companies
- Demonstrated need in many sectors for improved use of ICT
  - Healthcare, manufacturing, commerce, tourism, agriculture
- Better use of ICT is important for connecting industry and universities to the world outside Latin America
- Improving ICT competencies offers broad benefits and job creation multipliers across all industry sectors, with relatively low cost and risk, with near-term impact in next 2 years

# Recommendations

# Proposed Plan of Action
# Next Steps

# Topics

- Proposed Plan of Action
  - Recommendation 1: *SantandApps* Program
  - Recommendation 2: Strengthen CETICS status

- Next Steps

- Acknowledgements

# Proposed Plan of Action
## **Recommendation 1**

- **Primary Recommendation**
  - Focus on New Generation Mobile Technologies
    - SmartPhones and Tablets
  - Create a New and Dedicated 'Mobile Apps' Programming, Design & Entrepreneurship Program ('*SantandApps*' Program) in Bucaramanga/Santander Region
    - Supported with new central, regional and municipal government 'Open Data' policies and programs

# *SantandApps* Program Goals

- Develop a sustainable "engine" of new projects in and around Bucaramanga that can form the basis for:

  - A sustainable and growing innovation and entrepreneurship ecosystem in Bucaramanga and the Santander Region
  - Advanced employee training in leading information technology applications programming, product/services design and entrepreneurship, for the benefit of small, medium and large companies in the region
  - Identifying unmet needs and market demand of companies, hospitals and clinics, social services and the broad population in the region
  - Discovering and prototyping new mobile products and services that are tested in the local marketplace
  - Increasing the size and ICT programming and design skills level of established local companies in the region
  - Creating new companies in the technology product and (mobile) services sector
  - Creating new social ventures that employ mobile-based technologies to deliver new services to the population of Bucaramanga and the Santander Region
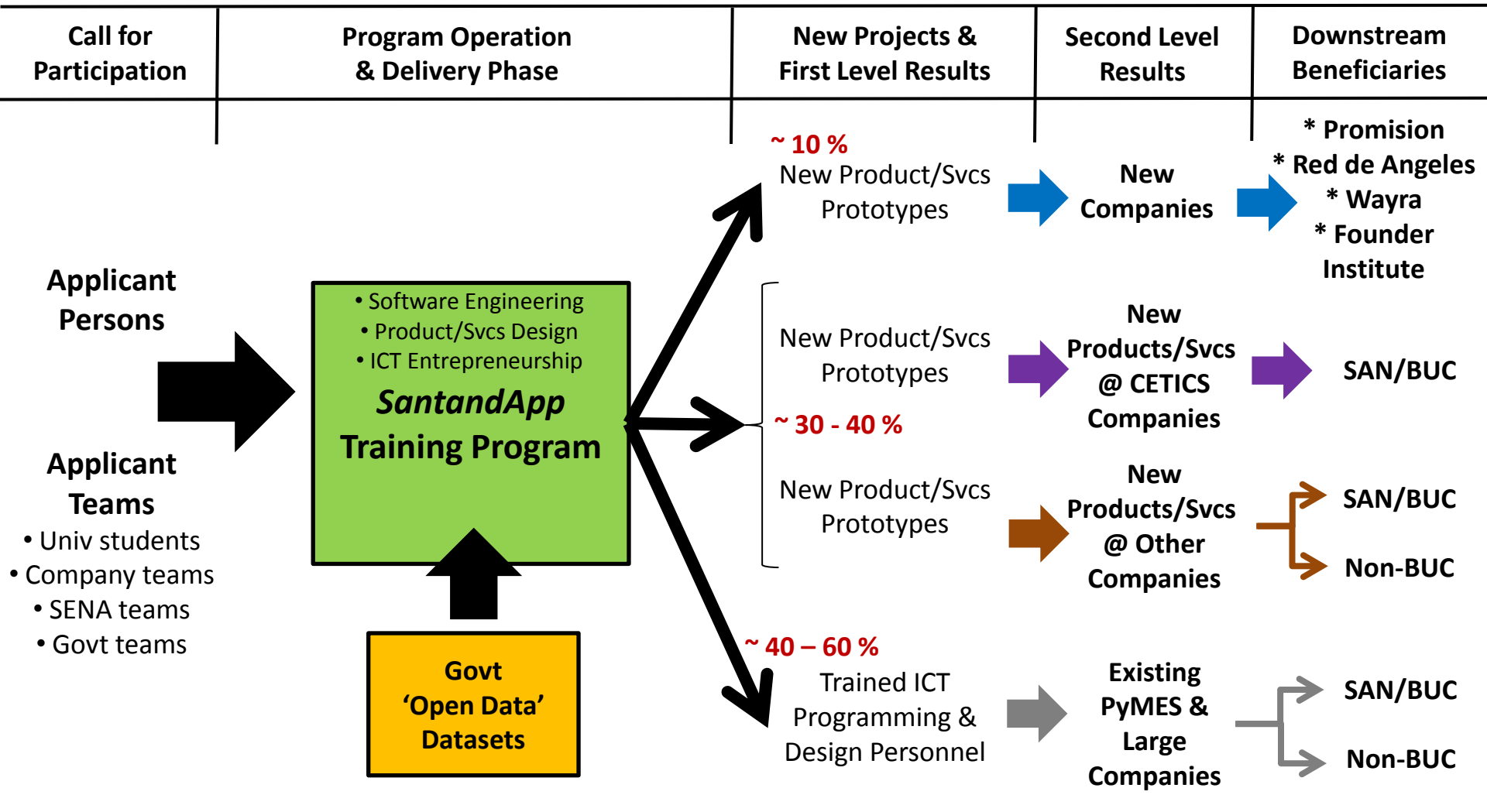
# *SantandApps* Program Outline

- A modular intensive program of 3 months duration
  - Designed to scale up to 4x per year
- A dedicated and custom-designed program of classroom instruction and practical in-field training covering 3 critical overlapping areas
  - 'Mobile apps' programming (iOs, Android, Windows 7)
  - Product/services and User Interface design
  - "Lean" ICT Entrepreneurship
  - (and English)
- Participants
  - Teams of 3-5 persons each, composed of individuals from different institutions
    - University students, secondary school students, company employees, government agency employees
  - Goal is to ramp up the program to 8-10 teams per 3 month module
- Teaching & Mentoring Team
  - Instructors and mentors from industry/universities/Silicon Valley
  - Recruited (hand-picked) from Bucaramanga, Bogota, Cali, Medellin, Cartagena, other cities
  - Trained in Silicon Valley and Bucaramanga
- Primary Customer
  - Local industry and investors
- Location
  - To be based in a new, dedicated Co-Working Space in Bucaramanga
  - Some teams, instructors and mentors to be sent to Silicon Valley for several weeks

# Key *SantandApps* Program Design Goals

- Clear and Focused Mission and Stakeholders
  - Private sector in Santander Region is the primary customer, stakeholder and driver
  - Universities and SENA are also potential key partners here
  - Governments have important role to play in providing key regulatory, policy, data and financial support, particularly in the area of making 'Open Data' datasets available to developers
- Focus on 'Mobile Apps' (Mobile Applications for iOS, Android, Windows)
  - Software languages, user interface design, services design, mobile + cloud computing
- Core Outcomes and Goals
  - Improved ICT programming, product design and collaboration/teamwork skills for current and future employees of Santander companies and social organizations
  - New product and services ideas and prototypes for existing enterprises
  - New product and services ideas and prototypes for social ventures, civic orgs and govt
  - New ICT products and services companies
  - Co-working space provides a testbed and platform for growing and demonstrating new innovation-centric culture and work practices in the Region
- Measurable Impact on the Region
  - Quantitative and Qualitative Success Metrics should be identified and tracked
- Scalable Modular Design of the 3 Month Program Permits Expansion
  - Permits expanding of program module to multiple times per year in Bucaramanga, in order to increase the impact in the region
  - Designed to be scalable outside Santander Region to other regions and cities of Colombia and Latin America

# Proposed *SantandApps* Program



| Call for Participation | Program Operation & Delivery Phase | New Projects & First Level Results | Second Level Results | Downstream Beneficiaries |
|---|---|---|---|---|

**Applicant Persons**

**Applicant Teams**
- Univ students
- Company teams
- SENA teams
- Govt teams

• Software Engineering
• Product/Svcs Design
• ICT Entrepreneurship
**SantandApp Training Program**

**Govt 'Open Data' Datasets**

**~ 10 %**
New Product/Svcs Prototypes

**New Companies**

**\* Promision**
**\* Red de Angeles**
**\* Wayra**
**\* Founder Institute**

New Product/Svcs Prototypes

**New Products/Svcs @ CETICS Companies**

**SAN/BUC**

**~ 30 - 40 %**

New Product/Svcs Prototypes

**New Products/Svcs @ Other Companies**

**SAN/BUC**
**Non-BUC**

**~ 40 – 60 %**
Trained ICT Programming & Design Personnel

**Existing PyMES & Large Companies**

**SAN/BUC**
**Non-BUC**

## *SantandApps* Program
# Modular Program Design Permits Expansion Across Full Year

| Winter Course 3 Months | → | Spring Course 3 Months | Summer Course 3 Months | Autumn Course 3 Months |
|---|---|---|---|---|

8 – 10 teams
25-50 persons total
8 – 10 projects w prototypes
# instructors TBD
At least 1 mentor/team
• Programming
• Product/Services/UI Design
• 'Lean' ICT Entrepreneurship
• English-language Training

**Total Est'd Throughput per Year (@ 4 training modules)**

• 30 - 40 teams/projects/prototypes generated/year
• 100 – 200 successful participants per year

# *SantandApps* Program
## Leveraging Current Strengths and Needs in the Region

- ## Strengths
  - Design
  - Software design
  - Development of video games
  - Traceability of products

- ## Regional Needs
  - Healthcare for rural and lower income populations
  - Mobile education
  - Improved use of ICT by local companies & hospitals

# Key Program Variables and Decisions
# **Program Design and Operation**

- Training of Teams vs Individuals ??
- Full-time vs Part-time Commitment from participants ??
- Numbers of participants per round
  - First round - reduced number of teams?
  - Second and later rounds
- Recruiting of instructors and mentors
- Training of instructors and mentors
- Development of curriculum and teaching materials
  - Keep programming separate?
  - Integration of product/services design with ICT entrepreneurship
  - Use of English language in program training and by teams
- Procurement of program co-working space
  - Location, interior design, security, financial terms
- Travel to, time in, Silicon Valley
  - How much time? How often? Who? Cost?
  - Instructors, mentors, participants/teams, sponsors/partners

# Key Program Variables and Decisions
## **Program Funding and Legal Form**

- Funding Level and Sources
  - Full-time vs part-time participation models
  - Stipend for participants?
  - Compensation for instructors and mentors
  - Industry vs government funding sources
    - How combine these both? Private foundations?
  - Cost of space
  - Staffing
  - Estimated Budget

- Legal Entity and Governance
  - What juridical form should this new organization have?
    - Not-for-profit foundation? For-profit?
    - Study model of Fundacion CardioVascular for lessons and model
  - How shall this new entity be governed?
    - Size of board, officers, powers of board members/officers, etc

# Why Focus on 'Mobile Apps' ??
## *The Growing Importance of 'Mobile Applications'*

- Well-suited for accelerated development of regional innovation and entrepreneurship ecosystems at low cost, low risk
- Growing importance of 'mobile applications'
  - For building regional skillsbase in technology, design and technology-based entrepreneurship
  - For near- to medium-term job creation
- Supports existing companies across all sectors in Santander Region
- Strong interest in mobile strategies at MinTICS
- Growing interest at SENA in mobile apps programming training and skillsets
- Extensive positive experience outside Colombia (see also Appendix)
  - USA, UK, Finland, Germany, Kenya

# Metrics of *SantandApps* Program Success

- What do we define as "success" here?
  - Numbers of teams that successfully complete the program
  - Numbers of new projects and prototypes that are generated per year in Santander
  - Numbers of persons that successfully complete the program
  - Demonstrated improvements in key skills by participants
  - Number of persons who are offered jobs in existing companies in Santander
  - Number of new products/services adopted/brought to market by existing companies in Santander, on the basis of product prototypes demonstrated during the program
  - Number of new companies formed/spun-out of the program
  - Private investment attracted to program products and spin-outs
  - New jobs generated through new products/services/spin-outs
  - Increases in media articles, TV spots about Bucaramanga in Colombia media
  - Increased visibility of Bucaramanga/Santander in Bogota, Latin America and around the world, as tracked by growth in social media 'hits' and 'likes', and through growth in use of social media by local companies, universities and government organizations
- Use of Quantitative vs Qualitative Metrics
- 'Success' means different things to different stakeholder communities

*SantandApps* Program
# Differences to Existing/Planned Programs

- How is this program different from SENA and MinTICS?
  - Focus on product/services design
  - Focus on ICT-based entrepreneurship
    - Vs generic traditional entrepreneurship
  - Needs-based approach to identifying potential mobile apps users in local area
    - Teams are sent into the region to identify user needs
  - New program curriculum integrates programming with design and entrepreneurship
    - Also will strengthen English language skills
  - New program is intended to serve as an early stage 'feeder' to angel investor groups and accelerators in region and elsewhere in Colombia
  - If scaled properly, *SantandApps* can substantially increase number of successful participants beyond current levels achieved in SENA mobile apps programs

# Industry Organizations I

- **CETICS**
  - A Key Founding Organization and Stakeholder
  - CETICS Rep is Member of the Board of Directors (Junta Directiva)
  - Plays important continuing role in establishing, designing, guiding and funding of *SantandApps*

- **CETICS Member Companies**
  - CETICS companies are important stakeholders, beneficiaries & customers of *SantandApps*
  - Employers of *SantandApps* graduates
  - New product/services concepts prototyped in *SantandApps* may be adopted by CETICS members for productization and full market entry
  - New companies created out of *SantandApps* may later join CETICS as member firm
  - May send technical/management employees to participate/receive training in *SantandApps*
  - Top employees may be invited to become instructors, mentors and/or advisory board members
  - May be invited to join *SantandApps* Advisory Board from time to time

- **Other Enterprises in Santander Region**
  - Employers of *SantandApps* graduates
  - New product/services concepts prototyped in *SantandApps* may be adopted by other firms for productization and full market entry
  - May send technical/management employees to participate/receive training in *SantandApps*
  - Top employees may be invited to become instructors, mentors, and/or advisory board members

Roles of Founding and Stakeholder Organizations
# Industry Organizations 2

- Investor Groups
  - **Promision**
    - A Key Founding Organization and Stakeholder
    - Promision Rep is Member of the Board of Directors (Junta Directiva)
    - Plays important continuing role in establishing, designing, guiding and funding of *SantandApps*
    - Portfolio companies may hire *SantandApps* graduates
    - New product/services concepts prototyped in *SantandApps* may be adopted by Promision portfolio companies for productization and full market entry
    - Portfolio companies may send technical/management employees to participate/receive training in *SantandApps*
    - Top employees at portfolio companies may be invited to become instructors and/or mentors
    - Qualified investors may be invited to become instructors, mentors and/or advisory board members
    - May invest in new companies formed out of *SantandApps*
  - **Angel Investor Groups and Venture Funds (in Santander and elsewhere)**
    - Portfolio companies may send technical/management employees to participate/receive training in *SantandApps*
    - Top employees at portfolio companies may be invited to become instructors and/or mentors
    - Qualified investors may be invited to become instructors, mentors and/or advisory board members
    - May invest in new companies formed out of *SantandApps*

# Industry Organizations 3

- **Private Accelerators and Incubators (in Santander and elsewhere)**
  - Portfolio companies may send technical/management employees to participate/receive training in *SantandApps*
  - Top employees at portfolio companies may be invited to become *SantandApps* instructors and/or mentors
  - Accelerator staff may be invited to become instructors, mentors or advisory board members
  - *SantandApps* may become 'feeder' of new companies to accelerators/incubators

- **Private Science & Technology Parks and Free Trade Zones**

  - Tenant companies may hire *SantandApps* graduates

  - New product/services concepts prototyped in *SantandApps* may be adopted by tenant companies for productization and full market entry
  - Tenant companies may send technical/management employees to participate/receive training in *SantandApps*
  - Top employees at tenant companies may be invited to become instructors and/or mentors
  - Qualified S&T Park/FTZ managers may be invited to become instructors, mentors and/or advisory board members
  - *SantandApps* may become 'feeder' of new tenant companies to S&T Parks and FTZs

# Industry Organizations 4

- **Technology Multinational Companies (MNCs)**
  - Qualified MNC employees may be invited to become instructors, mentors and/or advisory board members
  - *SantandApps* may become 'feeder' of new supplier companies and employees to MNCs

- **Camara de Comercio de Bucaramanga**
  - A Key Founding Organization and Stakeholder
  - CdC Rep is Member of the Board of Directors (Junta Directiva)
  - Plays important continuing role in establishing, designing, promoting, guiding and funding of *SantandApps*
  - Plays important continuing role in promoting *SantandApps* with govt entities in Santander Region and Bogota

- **Other Industry Federations**
  - ANDI, FENALCO, ACOPI , etc

# Universities and Education Institutions

- **Universities (Santander and elsewhere)**
  - Universities may source candidate individuals and/or teams for *SantandApps* participation (students)
  - Qualified administrators, professors and lecturers may be invited to become instructors, mentors and/or advisory board members
  - *SantandApps* may become 'feeder' of new tenant companies to university S&T Parks
  - A Key Founding Organization and Stakeholder
  - Universities representative is Member of the Board of Directors (Junta Directiva)
  - *SantandApps* activities may be performed at/on university facilities, if suitable

- **SENA**
  - SENA may source candidate individuals and/or teams for *SantandApps* participation (students)
  - Qualified administrators, professors and lecturers may be invited to become instructors, mentors and/or advisory board members
  - A Key Founding Organization and Stakeholder
  - SENA representative is Member of the Board of Directors (Junta Directiva)
  - *SantandApps* activities may employ SENA facilities, if suitable

- **Secondary Schools**
  - Secondary Schools may source candidate individuals and/or teams for *SantandApps* participation (students)
  - Qualified administrators, professors and lecturers may be invited to become instructors, mentors and/or advisory board members
  - *SantandApps* activities may employ school facilities, if suitable

# Roles of Founding and Partner Organizations
## Government

- **Santander Region Government** (Gobernacion de Santander)
  - A Key Stakeholder Organization
  - Governor's representative is Member of the Advisory Board
  - Access to government data sets, adoption of 'open data' policies, where possible
  - Provision of facilities for *SantandApps* activities
  - Funding of *SantandApps* program

- **Municipal Governments**
  - A Key Stakeholder Organization
  - Selected mayoral representatives may be invited to become Members of the Advisory Board
  - Access to government data sets, adoption of 'open data' policies, where possible
  - Provision of facilities for *SantandApps* activities
  - Funding of *SantandApps* program

- **Federal Government Ministries & Agencies** (Bogota)
  - Key Stakeholder Organizations
  - Selected Ministry/Agency representatives may be invited to become Members of the Advisory Board
  - Access to government data sets, adoption of 'open data' policies
  - Funding of *SantandApps* program

# Civil Sector Institutions

- **Regional Competitiveness Commission** (Comision Regional de Competividad)
  - A Key Founding Organization and Stakeholder
  - Commission representative is Member of the Board of Directors (Junta Directiva)
  - Plays important continuing role in establishing, designing, guiding and funding of *SantandApps*
  - Important interface and coordination roles with central government and industry

# New Co-Working Space in Bucaramanga
# **Facility Requirements I**

- Central Location
  - Easy to access from all parts of Bucaramanga and other cities
  - Close to key transportation routes and public transit lines

- Facilities and Layout
  - Must feel like an 'open' space that promotes creativity, innovation, communication and collaboration between teams and individuals
  - Should have high ceilings, well lit room(s) with natural lighting
  - Large, open space(s) that can be reconfigured easily with movable tables, chairs
  - Ample room for network connections (Wired/WiFi), and for video-conferencing to Silicon Valley
  - Space on walls (inside) for whiteboards, posters, sponsor/partner logos, and space on exterior walls for highly visible signs aimed at the public
  - Space for kitchen (sink, refrigerator, microwave oven, storage, table)
  - Restrooms, closets to secure items
  - Office/secure space for instructors/mentors and sponsors/supporting organizations
  - Minimal interior renovation should be undertaken, should have an 'industrial' or 'factory' appearance, not an expensive polished appearance, to encourage experimentation and innovation

# New Co-Working Space in Bucaramanga
# **Facility Requirements II**

- Security
  - 24 x 7 operation desired
  - Safety of occupants at all times is important
  - Security arrangements should not impact
    - Visibility to the public and media of the co-working space
    - Ability of the general public and interested visitors to visit and spend time at the space

- Financial Package
  - Must be reasonable and affordable, minimum 2-3 year lease

# Example Co-Working Space
# San Francisco

One Candidate Co-Working Space Visited in Bucaramanga (Neomundo)

# Possible Partner Organizations

- Universities & Education Organizations
  - SENA
  - UniAndes Facultad de Ingenieria, Bogota
  - One or more universities in Santander Region

- Private Sector
  - Cartagena Accelerator
  - Venture Fund(s) in Cali, Medellin, etc
  - Promision
  - Technology MNCs

# Possible Funding Sources

- Government
  - CDMB ('Sustainable Cities' project)
  - SENA
  - Colciencias
  - MinTICS
  - Ministerio de Industria, Comercio y Turismo
  - BID

- Private Sector
  - Promision
  - Banks
  - MNCs
  - EcoPetrol
  - Foundations: Organización Ardila Lulle, etc

# Proposed Plan of Action
# **Recommendation 2**

- **Supporting Recommendation**
  - Strengthen CETICS Status in preparation for next Phase of execution

# Preparing CETICS for the Next Action Phase

- Successful execution of the proposed program will require that CETICS and its member companies play a much more visible role at the regional and national level over the next several months than it has up to this time

- CETICS, its Junta Directiva and member companies, must work as a team with the Executive Director to prepare themselves for this highly visible role, that will require:
  - Raising of funds to finance development of the Program Operations and Business Plan
  - Meeting, negotiating with, and convincing senior government and industry leaders in Bogota and elsewhere
  - Recruiting high level political and business leaders to the CETICS team
  - Speaking frequently before the national press, media and television

# Strengthen CETICS Status

- **Actions Recommended I**
  - Improve CETICS website
    - Website is the face of CETICS to the world – and to Bogota funding institutions and media
    - English language version is **Very Important** !!
    - Should reflect best-in-class website design in Colombia today
    - Photos and bios of all Junta Directiva members should be on website
    - Profiles of all CETICS member companies should be on website (sector, sales/revenues, leadership, # employees, photos, etc)
    - Sector profile of impact of ICT companies/CETICS members in Santander Region (sales, revenues, etc – with charts) should also be on website, updated once per year
  - Elect/Appoint a Chairperson to lead the Junta Directiva
    - Chairman/woman must be a senior industry executive with excellent national reputation, network and standing outside Santander Region, with strong ICT sector experience
    - Must be able to speak and negotiate with confidence before government Ministers, parliamentarians, President Santos, television andother media
    - Travels to Bogota, also within Santander Region
    - Works closely with Junta Directiva and Director Ejecutivo, investors , local government and main corporations to secure funding

# Strengthen CETICS Status

- **Actions Recommended II**
  - Junta Directiva
    - Issue CETICS business cards for all members of Junta Directiva, with CETICS logo, Spanish and English
    - Create commitees responsible for overseeing different parts of the work
    - Reward active members of the Junta Directiva with CETICS titles

  - Leadership and Personnel Resources
    - All members of Junta Directiva must agree to dedicate some of their time (a minimum of x hours per week) to support the activities of the Chairperson and the Director Ejecutivo
    - CETICS initiative cannot be seen as a single-person effort of only the Director Ejecutivo

  - Advisory Relationships
    - CETICS needs to establish several senior advisory relationships in areas where it is missing knowledge, skills and networks in Santander and Bogota: legal counsel, political, investment/financial
    - Consider establishing formal Advisory Board with persons from Santander, Bogota, Silicon Valley

  - CETICS Membership
    - CETICS should undertake to increase its membership of companies in the Santander Region by at least 20% if possible during the next six months (to 35-40 firms)

# Strengthen CETICS Status

- **Actions Recommended III**
  - Training for Member Companies and Possible Members
    - Business plan preparation
    - Investor pitch preparation and presentation
    - Use of social media in sales, marketing
    - Use of ICT tools in company operations

CETICS Website – May 5 2012

**CETICS**

**CETICS Website – July 27 2012**

*Cluster de Empresas de Técnologias de Información y*

*Carr*

### Conócenos

- **Principal**
- Nuestra Historia
- Campo de Acción
- Misión y Visión
- Apuesta Final
- ¿Quienes Somos?
- Envianos tu hoja de vida

### Comunicación

- Proximos Eventos
- Contactenos
- Premios y/o Reconocimientos
- Noticias
- Videos y fotos de Eventos
- Participa en Foros

## Principal

### Inscripciones en el Seminario - Taller Internacional

**Desarrollar, guiar y gestionar las decisiones estratégicas con Inteligencia del Entorno de Futuro (IEF).**

Le invitamos para el 22 de agosto de 2012 a las 2:00 p.m. en Camara de Comercio de Bucaramanga al seminario taller "Desarrollar, guiar y gestionar las decisiones estratégicas con Inteligencia del Entorno de Futuro"

------------------------------------

Empresas globales se benefician de la IEF; son líderes y se mantienen vigentes y competitivas en el entorno global. Este entorno obliga a las organizaciones (Empresas, Estado, Academia) a desempeñarse de forma dinamica y proyectada a la anticipación, antes que a la reacción o la reparación, lo cual se logra por medio un modelo en que la inteligencia orienta la toma de decisiones en base a la información obtenida y gestionada de forma óptima en tiempo, calidad y cantidad. REALIZAR INSCRIPCIÓN...

CONFERENCISTA: Peter Jähne. Ciudadano alemán, con 20 años de dedicación al desarrollo, investigación y educación en los diversos aspectos del proceso de la inteligencia. Empresas como Petronas, CISCO, GM, Pioneer, Shell, Ecopetrol, Rockwell se cuentan dentro de sus clientes. Su más reciente proyecto fue la preparación estratégica para una empresa global para entrar y desarrollar una presencia estratégica y segura en Iraq.
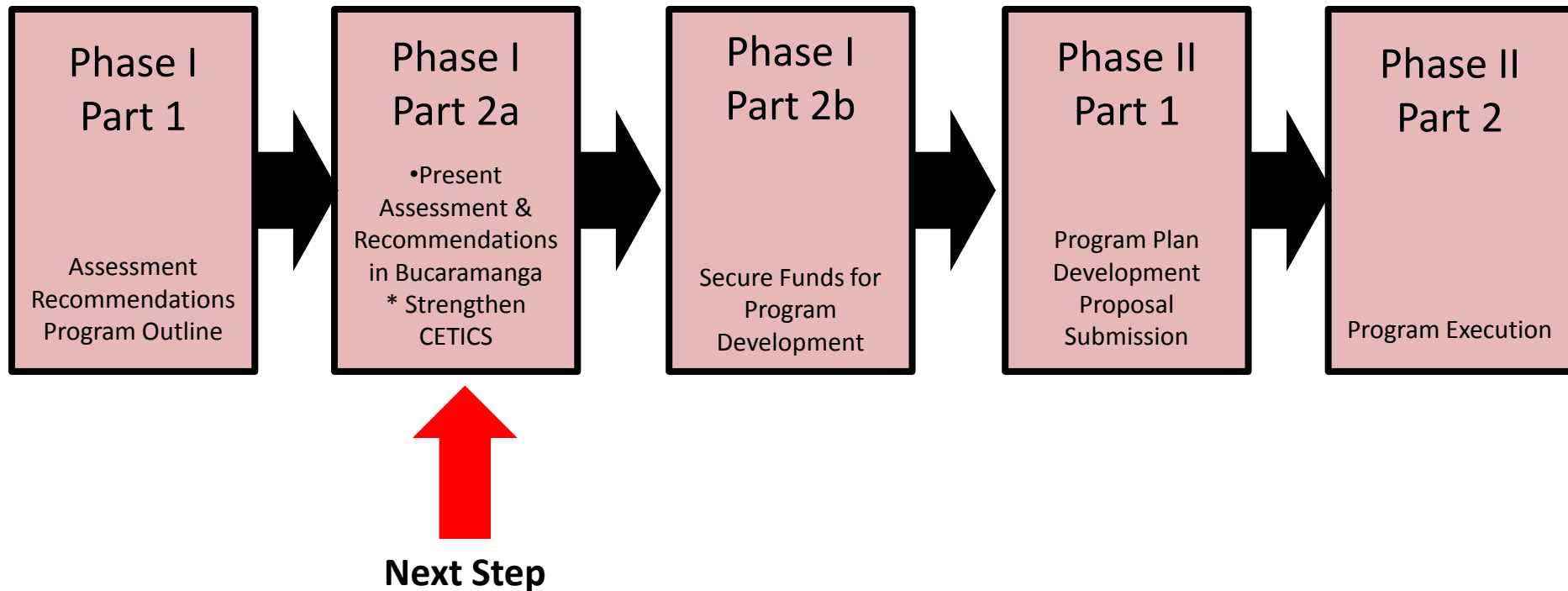
# *Acknowledgements*

- The project team would like to hereby acknowledge the invaluable contributions of Sergio Cajias, CEO of CETICs, for:
  - His personal leadership of this project from 2010
  - Organizing of the first visit of Bucaramanga to Silicon Valley
  - Development and promotion of the project vision
  - Securing funding from private and public sources to support this project
  - Overcoming multiple challenges and hurdles to make this vision a reality for Bucaramanga and Santander

# Next Steps

- **Phase I, Part 2a**
  - Present Findings and Proposed Plan of Action and Program from Phase I
  - Strengthen CETICS Status in preparation for Phase III

- **Phase I, Part 2b**
  - Secure support and inputs for recommended action plan from key stakeholders in Bucaramanga and Bogota
  - Secure funding for development of Program Plan, Operations, Team & Budget and Proposals
  - Lay groundwork for successful execution of Phase II

- **Phase II, Part 1**
  - Development of detailed Program Plan, Operations, Team and Budget
  - Submission of Program Plan Proposals to identified Funding Sources

- **Phase II, Part 2**
  - Program Execution

# Project Phases and Roadmap
# Next Steps

| Phase I Part 1 | Phase I Part 2a | Phase I Part 2b | Phase II Part 1 | Phase II Part 2 |
|---|---|---|---|---|
| Assessment Recommendations Program Outline | •Present Assessment & Recommendations in Bucaramanga * Strengthen CETICS | Secure Funds for Program Development | Program Plan Development Proposal Submission | Program Execution |

**Next Step**

# Appendices

# Appendices Summary

- ## Appendix A (see separate document)
  - Photographs of Onsite Visits – Assessment & Diagnostic
- ## Appendix B (see separate document)
  - Global Trends in ITC Technologies
- ## Appendix C
  - Summary of Meetings and Onsite Visits: March 19 – April 14 2012
- ## Appendix D
  - Additional Photographs of Co-working Spaces in Silicon Valley

# Appendix A
## Photographs of Onsite Visits

- Innovation Ecosystem Capability Issues Covered
    - Mobile Apps Development
    - Use of Social Media
    - English Language Competencies
    - High-End Software Development
    - Traditional Arts & Crafts
    - Utilization of ICT
    - Mobile Robotics & Mechatronics in Teaching
    - Product Design & Development
    - Design Competency (Fashion)
    - Electronics & AudioTech Competencies
    - Process Innovation

*See separate document*

# Appendix B
## Global Trends in Information Technologies

- Major ICT Platform Trends Today
  - Shift from Desktop to Mobile
  - Shift from 'Dumb Phones' to Smart Phones & Tablets
  - The 'Dumb Phone Conversion Cycle'
- What are 'Mobile Apps' and Why are They Important?
  - Emerging New Platforms and Economic Development Models
  - US 'Apps Economy' Study, TechNet, Feb 2012
  - 'Mobile Apps' Ecosystem Initiatives in Europe, Latin America & Africa
    - Finland, UK, Germany, Colombia, Kenya

*See separate document*

# Appendix C

# Summary of Meetings and Onsite Visits

## *Bucaramanga, Santander & Bogota*

# March 19 – April 14 2012

# Summary of Meetings & Onsite Visits

- **Companies/Private Sector Institutions Visited/Meetings - Bucaramanga**
    - Promitec (Agropecuaria PYME)
    - Mediimplantes S.A. (Medical Device PYME)
    - ElectroSoftware (ICT PYME)
    - TyT (ICT PYME)
    - Penagos (Agricultural Equipment PYME)
    - PENSEMOS S.A. (ICT PYME)
    - Inkco (ICT PYME)
    - EcoPetrol R&D Center (ICP)
    - SENA
    - Proditexco (girls clothing designer PYME)
    - Suenos Shoes (Calzado infantil PYME)
    - Comertex (clothing/textiles design PYME)
    - Sistemas y Computadores S.A. (SYC) (ICT Empresa)

    - Fondo Regional de Garantias de Santander FGS S.A.
    - Comultrasan
    - Zona Franca Santander S.A.

    - Camara de Comercio de Bucaramanga
    - Asociacion Nacional de Empresarios de Colombia (ANDI), Seccional Santanderes
    - Federacion Nacional de Comerciantes (FENALCO)

    - Fundacion CardioVascular (Healthcare - Foundation)

OpenTech (ICT PYME)
SOMIC (ICT PYME)
BTG (ICT PYME)
Neomundo (Foundation)
Xeo Software (ICT PYME)
ISL S.A. (ICT PYME)
SisteCo Ltda. (ICT PYME)
Genesis Data (ICT PYME)
Shareppy (ICT PYME)

Promision

# Summary of Meetings & Onsite Visits

- **Companies Visited - Bogota**
  - BBVA Horizonte
  - Red de Angeles Inversionistas/Fundacion Bavaria
  - Wayra Colombia (& portfolio companies)
    - Yimup
    - Desafios Aceptados
    - Go2do
    - Movi
    - Celotor
  - Intel de Colombia S.A.
  - Heinsohn (ICT Outsourcing)
  - EcoPetrol (Headquarters)
  - Founder Institute – Bogota Chapter

# Summary of Meetings & Onsite Visits

- **Universities/Educational Institutions Visited - Bucaramanga**
  - Unidades Tecnologicas de Santander (UTS)
  - Universidad Autonoma de Bucaramanga (UNAB)
  - Universidad Industrial de Santander (UIS)
  - Universidad de Santo Tomas (UST)

  - Colegio San Pedro Claver

  - Servicio Nacional de Aprendizaje (SENA), Santander Region
    - Two Facilities visited

# Summary of Meetings & Onsite Visits

- **Universities Visited - Bogota**
  - UniAndes - Facultad de Ingenieria
    - Informal meeting with Prof. Jose Tiberio Hernandez (scheduled by Constanza Nieto and Burton Lee)

# Summary of Meetings & Onsite Visits

- **Govt Organizations Visited - Bucaramanga**
  - Office of the Governor, Region of Santander
  - Alcaldia de Bucaramanga
  - Area Metropolitana de Bucaramanga

  - Public Hospital at UIS
  - Hospital del Norte

# Summary of Meetings & Onsite Visits

- **Government Organizations Visited - Bogota**
  - Colciencias
  - Ministerio de TICS
    - Vive Digital
  - Ministerio de Comercio, Industria y Turismo
    - ProExport Colombia
    - INNpulsa
    - Productive Transformation Program (PTP)

  - Banco Interamericano de Desarrollo (BID)

# Summary of Meetings & Onsite Visits

- **Civil Organizations Visited - Bucaramanga**
  - Santander Competitivo – Comision Regional de Competitividad
  - Fundacion CardioVascular (FCV)
  - Fundacion Colombia Competitiva

# Summary of Meetings & Onsite Visits

- **Civil Organizations Visited - Bogota**
  - Colombia Digital

# Appendix D

## Additional Photographs of Co-Working Spaces

## Silicon Valley and San Francisco, CA

## 2012

# Co-Working Spaces
# in Silicon Valley and San Francisco, CA

- Open spaces and shared workspaces where teams can come together in a free and creative environment to collaborate on a 24x7 basis
  - Promotes communication and cross-pollination of ideas between employees

**HACKER DOJO**

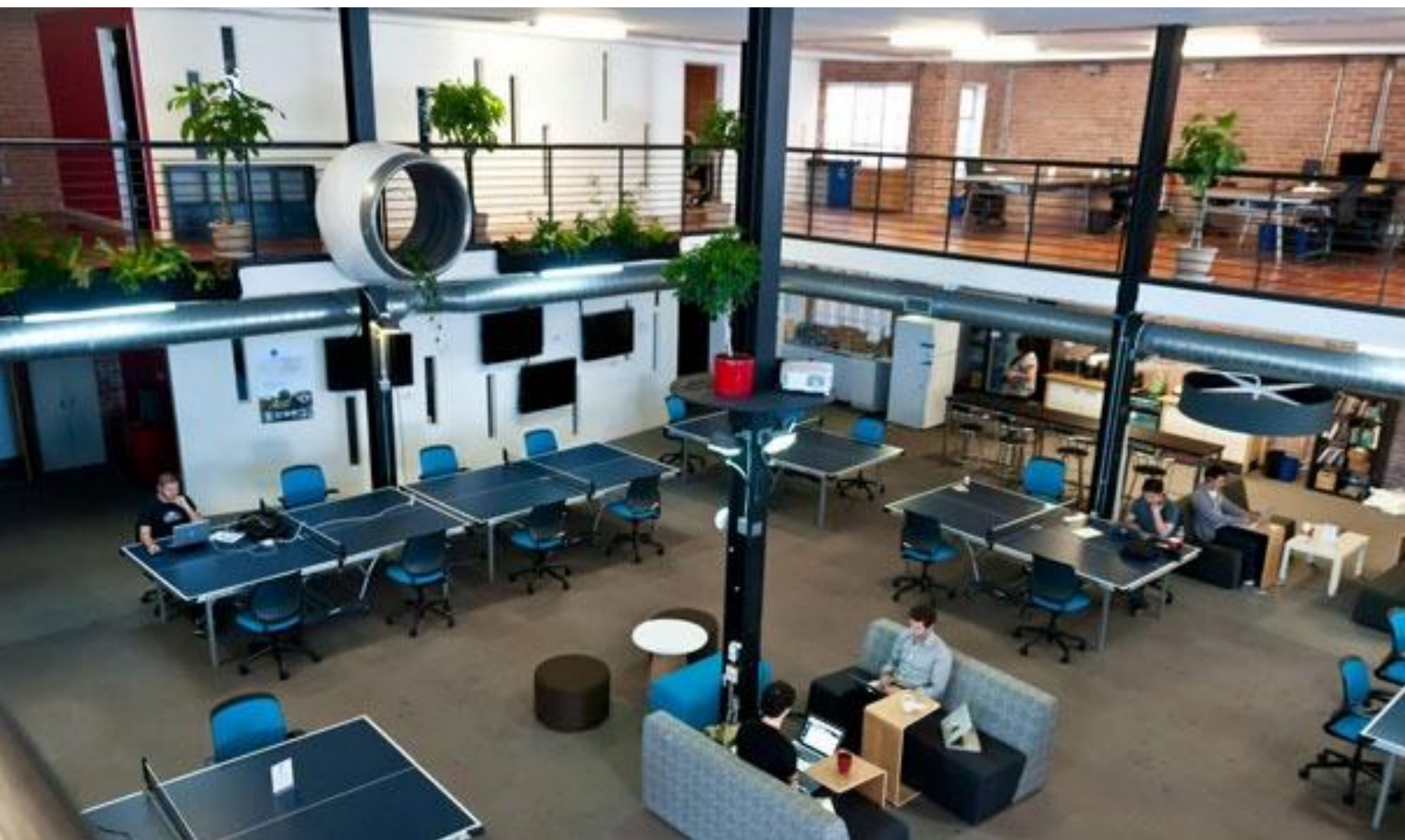Copyright 2012 Burton H. Lee & Innovarium Ventures

# Co-Working Spaces
# San Francisco

**pariSoma
Co-Working Space
San Francisco**

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# INNOVARIUM VENTURES

## Working in Silicon Valley, Europe, Latin America and Washington DC

- Senior financial, technical and strategy advisory services for global technology innovation organizations
- Professional Services
  - Technology startup and growth companies
    - Interim CXO and Advisory Board roles; coach and mentor roles
    - Expert guidance & decision-making at the interface between market/customers, technology and finance
    - Business development – industrial and government
    - Business plan preparation/research/review; Government Grant proposal preparation/review
    - Coaching and mentoring of CEOs and other CXO-level managers
    - Assistance with government regulatory and policy agencies
  - Angel, venture capital and private equity Investors
    - Fund strategy, team selection and market positioning
    - Due diligence: technical, financial, strategy and business models
  - Public and non-profit R&D laboratories
    - Technology transfer & partnerships; venturing and spin-out of companies; strategy and business development; grant applications
  - Research universities
    - Innovation-related models, policies and practices
    - Technology transfer and licensing; industry partnerships and relations; development and strategy; grant applications
  - National and regional government agencies
    - Innovation policy formulation, analysis and review; cluster development strategy; economic impact studies
    - Science & technology policy formulation, analysis & review: space, aviation, nanotechnology, software/AI/robotics, manufacturing
- Selected recent clients
  - US/European technology startup companies – alternative energy, robotics/AI, software, Internet, nanotech
  - Venture and private equity funds – aerospace, nanotechnology, ICT, computing, advanced materials, clean tech
  - Office of the Prime Minister, Ireland; European Commission; National Science Foundation; NASA, National Academies
- **Dr. Burton Lee PhD MBA, Managing Director**
  - Contact: Burton.Lee@innovarium.net                    Based in Palo Alto, CA near Stanford University
  - Bio/References: LinkedIn Profile
  - Lecturer, European Entrepreneurship & Innovation, Stanford School of Engineering

SPANISH

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Opening Markets in the U.S

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### Client Spotlight

**ASESOFTWARE**

### Events

Google 11 I/O
DEVELOPER CONFERENCE

### gb Globaltech Bridge
**globaltechbeat**

globaltechbeat Cisco to make strategic investments in Brazil
telecompaper.com/news/cisco-to-...
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