

**Final Report for Period:** 05/2008 - 04/2009

**Submitted on:** 05/17/2009

**Principal Investigator:** Cozzens, Susan E.

**Award ID:** 0647126

**Organization:** GA Tech Res Corp - GIT

**Submitted By:**

Cozzens, Susan - Principal Investigator

**Title:**

Doctoral Dissertation Research: International Collaboration and Research Capabilities

### Project Participants

#### Senior Personnel

**Name:** Cozzens, Susan

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

#### Post-doc

#### Graduate Student

#### Undergraduate Student

#### Technician, Programmer

#### Other Participant

**Name:** Ordonez, Gonzalo

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

This project supports Gonzalo's dissertation research. He is doing all the data preparation and analysis and also the writing.

#### Research Experience for Undergraduates

### Organizational Partners

#### Other Collaborators or Contacts

Ordonez is interviewing researchers in several institutions in Colombia.

### Activities and Findings

#### Research and Education Activities:

Data preparation: gathering and checking information, preparing data set for analysis.

Statistical analysis of data on teams.

Interviews with Colombian researchers.

#### Findings: (See PDF version submitted by PI at the end of the report)

International research collaboration is positively associated with team output and team ability to contribute to local knowledge.

Collaborating with partners from the global South yields greater productivity counts than collaborating with partners from the global North.

Collaboration with partners from the North is strongly associated with a team's ability to contribute to local knowledge, while collaboration with partners from the South is not.

The number of participating researchers holding doctorates positively affects team output but negatively affects a team's contribution to local knowledge.

#### **Training and Development:**

The project has contributed to Ordonez's research skills through data set preparation and in particular finding the right statistical technique to use with the kinds of data he has to analyze.

#### **Outreach Activities:**

### **Journal Publications**

### **Books or Other One-time Publications**

### **Web/Internet Site**

#### **URL(s):**

<http://smartech.gatech.edu/handle/1853/3739/browse?type=author&order=ASC&rpp=20&value=Ordonez-Matamoros%2C+Gonzalo>

#### **Description:**

This is the dissertation completed under the award.

<http://smartech.gatech.edu/handle/1853/3739/browse?type=author&order=ASC&rpp=20&value=Ordonez-Matamoros%2C+Gonzalo>

### **Other Specific Products**

### **Contributions**

#### **Contributions within Discipline:**

There has been no previous research that demonstrated the effect of international collaboration on building research capacities in developing countries. The findings are a first look at that phenomenon.

#### **Contributions to Other Disciplines:**

Because the research is about science, it contributes broadly to many fields by increasing understanding of how a particular policy affects them.

#### **Contributions to Human Resource Development:**

The project supports the Ph.D. dissertation of Gonzalo Ordonez. People with doctoral degrees are rare in the social sciences in Colombia, so this project is making a significant contribution there.

#### **Contributions to Resources for Research and Education:**

#### **Contributions Beyond Science and Engineering:**

The project will inform science policy in developing countries.

### **Conference Proceedings**

### **Categories for which nothing is reported:**

Organizational Partners

Activities and Findings: Any Outreach Activities

Any Journal

Any Book

Any Product

Contributions: To Any Resources for Research and Education

Any Conference

**INTERNATIONAL RESEARCH COLLABORATION, RESEARCH  
TEAM PERFORMANCE, AND SCIENTIFIC & TECHNOLOGICAL  
CAPABILITIES IN COLOMBIA –A BOTTOM-UP PERSPECTIVE**

A Dissertation  
Presented to  
The Academic Faculty

by

Gonzalo Ordóñez-Matamoros  
gonzaloord@hotmail.com

In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy in the  
Joint Program of the School of Public Policy and the  
Andrew Young School of Policy Studies

Georgia Institute of Technology and Georgia State University  
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## SUMMARY

Recent trends show that Colombian science and technology (S&T) performance is improving rapidly. This is presumably the result of two ‘mega trends’ characterizing the Colombian S&T system: 1) the rapid professionalization of the R&D enterprise, as reflected by the formation of research teams with the support of the Colombian government and the elite research institutions; 2) the internationalization of its scientific community, especially since the 1990s after the opening of the economy to foreign trade.

This dissertation examines the factors affecting Colombian S&T performance, and particularly the ways international research collaboration affects local scientific and technological capabilities. S&T capabilities are measured by the ability of research teams to produce bibliographic outputs, and to contribute to local knowledge.

Research hypotheses are tested using Zero Inflated Negative Binomial Regression models and logistic regressions to account for the effects of international research collaboration on team output while controlling for team characteristics, partner characteristics, scientific discipline, sector, the characteristics of the teams’ home institution, and team location. The study uses control groups and the Propensity Score Matching approach to assess the overall impact of international research collaboration on research team performance while controlling for the effects of endogeneity and selection bias.

Results show that international research collaboration is positively associated with both team output and teams’ ability to contribute to local knowledge. The study shows that such effects depend on the type of collaboration chosen and the type of partner

involved. Particularly, it shows that while co-authoring with colleagues located overseas or receiving foreign funding increases team output, hosting foreign researchers does not seem to affect a team's productivity once all other variables are held constant. It also finds that collaborating with partners from the South yields greater productivity counts than collaborating with partners from the North, and that funding from southern countries is associated with greater productivity rates than any other combination of collaboration activity and origin of partners.

The study also finds that hosting foreign researchers does not appear to be associated with the probability of teams to involve Colombia in their research process either, and that receiving foreign funding or co-authoring with colleagues located overseas increases a team's probability to contribute to local knowledge. Similarly, the study finds that collaboration with partners from northern countries is strongly associated with a team's ability to contribute to local knowledge, while collaboration with partners from southern countries is not. The study finds that although the number of participating researchers holding doctorates positively affects team output, it negatively affects a team's ability to contribute to local knowledge -- but as team size increases beyond 9 members with a PhD, its effects become positive at an increasing rate. Finally, the study finds curvilinear effects of team size, team age and number of active R&D projects a team manages. Theoretical and policy implications of these and other counterintuitive findings are discussed.