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The Impact of United States Investment for Civil Infrastructure in Developing Countries

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THE IMPACT OF UNITED STATES INVESTMENT FOR CIVIL INFRASTRUCTURE IN DEVELOPING COUNTRIES

THESIS

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Abstract

U.S. foreign assistance is used to support regional interests and to address the economic and social needs of host nation (HN) citizens. Within the Department of Defense (DoD), military exercises implement humanitarian and civic assistance (HCA) activities in developing nations as one method of accomplishing the U.S. foreign assistance objectives. To account for the impact of civil infrastructure projects on HN citizens, this research incorporated survey data collected during a DoD-sponsored exercise in Belize to test the expectancy disconfirmation model of citizen satisfaction and analyze the impact of constructing HCA projects on citizen satisfaction with HN government services. The research suggests that perceived performance and disconfirmation contribute the largest effect on citizen satisfaction, while no significant impact on citizen satisfaction was identified from the investment of civil infrastructure projects. Utilization of a geographic information system and an extensive literature review permitted the exploration of U.S. foreign assistance trends to examine the current precursors to U.S. foreign assistance and develop a list of proposed precursors. The research is exploratory and strives to improve the effectiveness of civil infrastructure investment in foreign countries through the measurement of HN citizen satisfaction of government services prior to project selection and during the post-project assessments.

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Joel N. Hansen

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THE IMPACT OF UNITED STATES INVESTMENT FOR CIVIL INFRASTRUCTURE IN DEVELOPING COUNTRIES

I: Introduction

This chapter serves as an introduction to the research topic, the impact of United States (U.S.) financial investment for civil infrastructure in developing countries. Within the introduction chapter, the purpose is to present the background material relevant to the research area, define the research problem, outline the research objectives, introduce the research methodology and scope, identify the anticipated significance, and present an overview of subsequent chapters of the thesis. The background section presents information on U.S. foreign assistance, assistance efforts pertinent to the U.S. military, and relevant research theories in the public administration sector. The introduction of the background material provides the foundation to the identification of the research questions and objectives. The chapter discusses the research approach to include the methodology used and the integration of the research with concurrent thesis research.

Background

The primary focus of this research is on the allocation of U.S. foreign assistance to developing nations with an emphasis on the precursors to investment and the impacts of investment on the host nation (HN) population. Within the subject area of U.S. foreign assistance, specific focus was placed on the investment of civil infrastructure projects conducted by U.S. armed forces. This section presents the background material on U.S.

foreign assistance, U.S. military investment in foreign countries, and the applicable research theories.

U.S. Foreign Assistance

U.S. foreign assistance finds its origins following World War II, with current assistance measures shaped by the enactment of the Foreign Assistance Act (FAA) of 1961 and U.S foreign policy. Foreign assistance, as defined by Section 634A of the FAA, is classified as:

> Any tangible or intangible item provided by the United States government to a foreign country, including but not limited to any training, service, or technical advice, any item of real, personal, or mixed property, any agriculture commodity, United States dollar, and any currencies of any foreign country which are owned by the United States Government…"Provided by the United States Government" includes but is not limited to foreign assistance provided by means of gift, loan, sale, credit, or guaranty. (FAA, 2015)

The U.S. government agency responsible for the administration and oversight of U.S. foreign assistance is the Department of State (DoS) in accordance with the strategic objectives related to a region or country (Department of Defense, 2014). In addition to the reforms made by the FAA, the modern period of foreign assistance dates to the end of World War II where the U.S. has invested $2.25 trillion (2012 constant dollars) to foreign countries as of 2012 (United States Overseas Loans and Grants, 2014b). To understand where the U.S. foreign assistance is going, Figure 1 depicts the countries that received assistance from the U.S. in 2014 and the corresponding assistance values provided to each country. This map highlights regions of Africa, South Asia, the Middle East, and Latin America that have received large amounts of assistance from the U.S.

While the amount of aid varies by country and region, the map depicts that the U.S. is investing in a majority of the developing countries in the world.

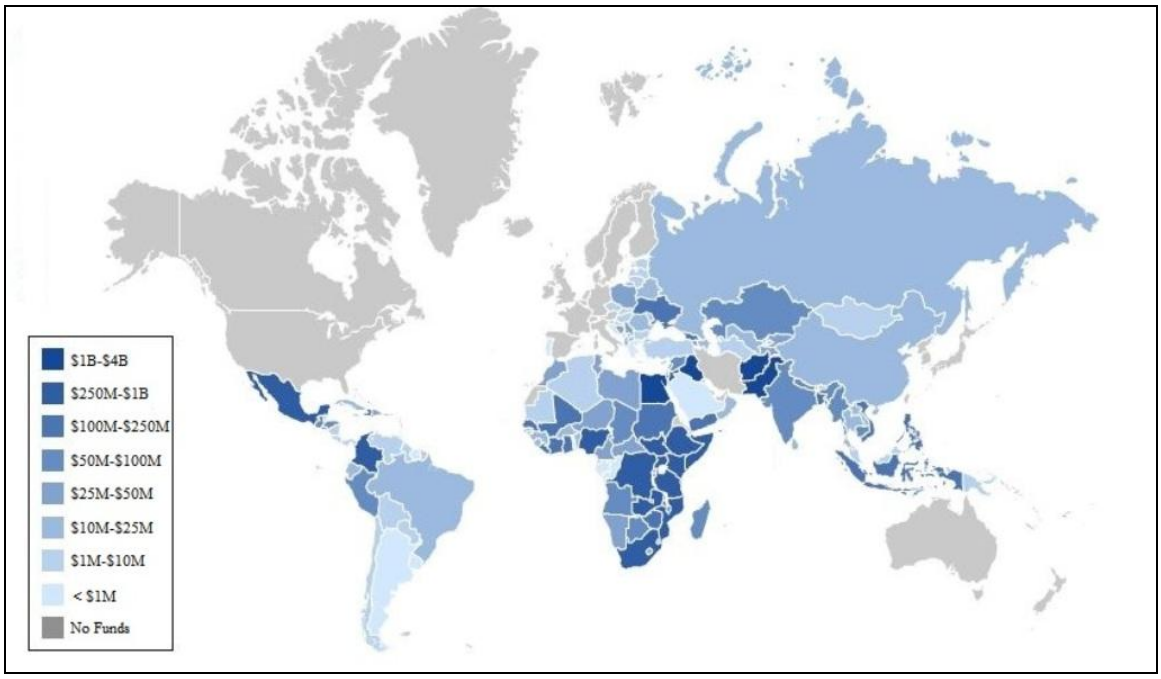


Figure 1: U.S. Foreign Assistance in 2014 (Foreign Assistance, 2014)

U.S. foreign assistance is further categorized into economic and military assistance. Economic assistance is the coordination responsibility of the United States Agency for International Assistance (USAID), an agency within the DoS, and includes assistance programs implemented by USAID, DoS, Department of Agriculture, and other government programs that are focused on humanitarian assistance (United States Overseas Loans and Grants, 2014b; Department of Defense, 2014). Military assistance consists of foreign humanitarian assistance (FHA) that is provided by the Department of Defense (DoD) in support of the DoS and USAID (Department of Defense, 2014). These programs include foreign disaster relief and other activities that address humanitarian

needs within the population and are limited in scope and duration (Department of Defense, 2014). A similar form of assistance to FHA is nation assistance (NA). While FHA is geared to short humanitarian assistance engagements, NA "refers to a long-term commitment to promote sustainable development and growth of responsive institutions" and are based on mutual agreements between the U.S. and HN governments (Department of Defense, 2014). One form of NA that is executed by U.S. armed forces is humanitarian and civic assistance (HCA) activities.

HCA Activities

HCA activities are conducted during the deployment of U.S. armed services for training or military exercises and are primarily used to improve the readiness of U.S. service members. Activities designated as HCA include medical, surgical, dental, and veterinary care; road construction; well drilling and construction of basic sanitation facilities; and repair and construction of public facilities (HCA Activities, 2014). These activities and civil infrastructure projects are controlled by Section 401 of Title 10, U.S. Code, and stipulate that HCA activities may use HN military cooperation but may not benefit a military group (HCA Activities, 2014). Table 1 shows the policy requirements designated by the DoD for HCA activities. Important themes from Table 1 are the coordination and approval of activities through the appropriate channels, selection of activities that benefit the local populace, promotion of interests common to both the U.S. and HN governments, promotion of the readiness of service members, and execution of an assessment following the completion of the HCA activity.

Table 1: DoD Requirements for HCA Activities (HCA Activities, 2014)

1)	Are conducted in conjunction with authorized operations and exercises of the Military Services in a foreign country (including deployments for training)
2)	Are conducted with the approval of the HN's national and local civilian authorities
3)	Complement, and do not duplicate other forms of social or economic assistance provided to the HN by the DoS and the USAID
4)	Serve the basic economic and social needs of the HN
5)	Promote the security and foreign policy interests of the U.S., the security interests of the country in which the activities are to be performed, and the specific operational readiness skills of the service members who participate in the HCA activities
6)	Are nominated through the appropriate geographic Combatant Commander and are approved at the appropriate level
7)	Require approval of the Secretary of State or designee
8)	Will be incorporated into the security cooperation annex of a geographic Combatant Commander's theater campaign plan
9)	Will be assessed to determine their initial and long-term effects within the HN

An example of HCA activities, and closely intertwined in the research effort, is the construction of civil infrastructure projects in Belize during a military exercise. These projects were constructed during New Horizons Belize 2014, a U.S. Southern Command (SOUTHCOM) sponsored exercise planned and executed by the Twelfth Air Force (Air Forces Southern). The exercise included medical, dental, and veterinarian readiness training exercises, exercise-related construction, and HCA construction projects. Five HCA projects were constructed by the 820th Rapid Engineer Deployable Heavy Operational Response Squadron Engineers (RED HORSE) Squadron and included four schools and one hospital. In accordance with the DoD policy requirements for HCA

activities, the construction projects were nominated by the HN government, coordinated through the U.S. Ambassador to Belize and USAID, and approved for execution by U.S. SOUTHCOM.

Serving as the foundation for the New Horizons Belize 2014 were the exercise objectives. These objectives focused on improving the operational readiness of U.S. armed service members through demonstrating deployment capability and HCA project management capability, incorporation of U.S. armed forces and HN agencies, improving HN relations, building HN capacity, and supporting U.S. SOUTHCOM objectives. Specifically, the HCA projects were selected to "serve the basic economic and social needs of the HN;" however, the opportunity to assess the impacts of the HCA projects on the HN community was previously unincorporated (HCA Activities, 2014). In a previous exercise, New Horizons Belize 2013, measures of effectiveness for specific objectives were assessed by surveying service members of the U.S., partner nations, and the HN. Additionally, limited emphasis was placed on capturing the opinions of the local citizens concerning how they were impacted by the HCA projects. This presented the opportunity to incorporate citizens' perceptions to identify the impact of constructing HCA projects on their assessment of HN government services.

Research Theories

Within the public administration field, the incorporation of citizen opinions regarding government services is prevalent in previous research. The physical collection of opinions through the use of citizen surveys is a well recognized method within the U.S. to assess the quality of local government services (Hatry, Blair, Fisk, Greiner, Hall,

and Schaenman, 1977; Miller and Miller-Kobayashi, 2000). However, the danger presented with using citizen surveys is that accounting for citizen satisfaction of government services might not accurately depict the true level of performance exhibited by the government service (Stipak, 1979).

Due to an element of subjectivity with citizens perceived satisfaction levels with government services, additional emphasis was placed on incorporating a model to better understand factor that influence citizen satisfaction levels. In 2004, Van Ryzin adapted the Expectancy Disconfirmation Theory, originally developed to measure consumer satisfaction with commercial products, into the public administration research field to measure citizen satisfaction with public services (Oliver, 1977; Van Ryzin, 2004). Van Ryzin's research incorporated citizen expectation of public services, perceived performance of public services, and the disconfirmation or difference between original expectations and perceived performance into a model with the outcome variable being citizen satisfaction with public services (Van Ryzin, 2004; Van Ryzin, 2005). At the conclusion of his research, Var Ryzin (2005) identified the validity of the expectancy disconfirmation model for citizen satisfaction.

In addition to support for the model, research was conducted that identified that citizens' perceived performance of government services (street maintenance, street cleanliness, and park conditions) is highly correlated with assessment ratings of trained professionals and established assessment scoring methodologies (Licari, McLean, and Rice, 2005; Van Ryzin, Immerwahr, and Altman, 2008). With the successful application of the model and identification that citizen perceptions can closely reflect actual performance of government services in the U.S., these concepts appear relevant for

application in developing countries to measure citizen satisfaction with HN government services.

Problem Statement

As previously identified, the opinions of HN citizens are not being incorporated into the impact assessments of HCA projects. Specifically, the civil infrastructure projects completed during U.S. military exercises have not been assessed to determine the impact of the projects on HN citizens' satisfaction with government services. Additionally, a consolidated list of precursors to U.S. foreign assistance does not exist for the investment of civil infrastructure projects. These identified research gaps prompted the research effort with the overall goal of incorporating citizens' perceptions with HN government services for the effective use of U.S. financial assistance.

Research Objectives

The objectives of this research effort were to (1) assess the U.S. investment of civil infrastructure projects to identify the current precursors to U.S. foreign assistance and (2) collect and incorporate the impact of HCA projects on citizen opinions of HN government services. To achieve these research objectives, research questions were developed to address the existing problems within the research area as previously noted. These questions include:

1. What are the precursors to U.S. foreign assistance?
2. How can the investment of U.S. military financial aid for HN civil infrastructure impact the HN citizens' satisfaction with government services?

Research Approach

The research questions previously depicted were developed to (1) explore the U.S. foreign assistance role in developing countries and (2) gain further insight into the impact and effectiveness of U.S. investment of civil infrastructure in developing countries. Multiple research methodologies were implemented to answer the research questions; as a background for the research framework, an extensive literature review was performed to identify previous research in this field. This exploration included material within the public administration field, U.S. foreign policy, historical events, and U.S. investment data.

In addition to performing a detailed literature review a geographic information system (GIS) was utilized to analyze U.S. foreign assistance to developing countries to complete the first research objective. The data for U.S. foreign assistance to a subset of Central American countries in close vicinity to Belize since 1946 and the population of these countries were incorporated to determine the U.S. foreign assistance per capita during each decade. The data were analyzed geospatially using ArcGIS® software to identify historical trends in U.S. foreign assistance to the selected countries. The map utilized bar charts to differentiate the assistance per capita provided to each country during a specified time period. This map was used in conjunction with assessment of the literature on U.S. foreign policy, assistance efforts in this region, and historical events to indentify the current precursors to U.S. investment. Further investigation into previous research studies provided sufficient information to propose a list of precursors to U.S. investment of civil infrastructure projects.

The research approach to complete the second research objective involving the identification of the impact of civil infrastructure investment on HN citizen satisfaction of

government services was executed using multiple methodologies in two phases. The shared methodology for both phases was the development and administration of a survey instrument to collect citizen opinions of HN government services. Citizen surveys are commonly used in the U.S. to collect the opinions of the public concerning government services and assist community leadership and policy makers (Stipak, 1979; Miller and Miller, 1991). The foundation of the survey instrument developed for the New Horizons Belize 2014 exercise was Van Ryzin's expectancy disconfirmation model for citizen satisfaction. Figure 2 shows the research model which depicts an adaptation of Van Ryzin's model. As denoted by the positive symbols in the figure, a positive relationship is hypothesized to exist among all of the research variables. Additionally, disconfirmation is hypothesized as a mediator variable of independent variables, expectation and performance, on citizen satisfaction, the dependent variable. Although the hypotheses are not explicitly stated, they were tested as discussed in Chapter II.

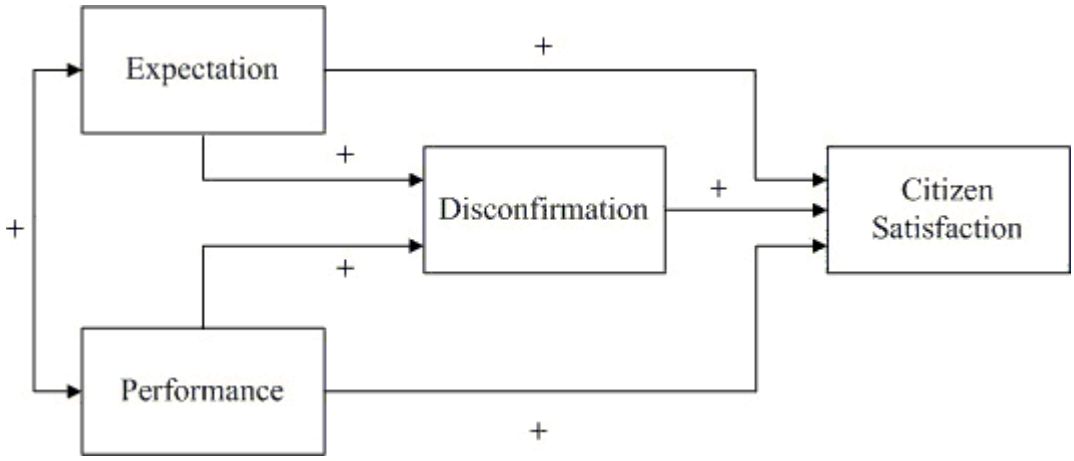


Figure 2: Research Model (Van Ryzin, 2005)

The survey instrument administered during the New Horizons Belize 2014 exercise is located in Appendix A and was designed to be verbally administered to Belize citizens by trained members of the Belize Defence Force (BDF). The survey instrument included qualitative and quantitative questions and was organized into five sections. Section one included the prioritization of HN government services to identify the top three areas of interest as identified by the citizens. A list of services was not provided to the survey recipient and answers were coded based on the responsibilities of the Belize government ministries. Sections two through four included quantitative questions measured on a Likert scale of one to five which corresponded to a survey response of strongly disagree to strongly agree. Section two included questions oriented toward variables in the research model. A sample of survey questions for each of the research variables include:

- Expectation: I expect the government to provide quality education.
- Performance: I am happy with the schools.
- Disconfirmation: The government has met my expectations for education.
- Citizen Satisfaction: I am satisfied with the public services in my community.

Quality of education and health care questions were included in section three as the completed HCA projects pertained to these government service sectors. Questions within this section pertained to the quality of facilities, professionals, materials and equipment, and the ability to provide quality services. Survey questions in section four were focused on citizen perceptions of the U.S., and the last section of the survey included demographic questions.

Prior to the survey distribution in Belize, the survey instrument was reviewed by members of the BDF and representatives from the Belize Ministry of Education for content and interpretability by Belize citizens. Additionally, the survey was approved for exemption from experimentation requirements by the Air Force Institute of Technology Institutional Review Board and approved for distribution in Belize by the Office of the Air Force Surgeon General. The approval documents are located in Appendix B. Following approval, all of the surveys were administered between April and June 2014 when the HCA projects were under construction.

To interpret the results of the survey the research objective concerning the impact of HCA projects on citizen satisfaction to HN government services was conducted in two phases. Multiple phases allowed the second research objective to be fully explored by (1) testing the research model and (2) determining the impact of the HCA projects on citizen satisfaction over time. Within each phase there are distinct objectives and methodologies.

Phase One

In phase one, the objectives were to statistically test the research model, identify variable relationships, and develop a revised model. In this phase, all of the surveys were collected during the same period. The methodologies for this approach are discussed in Chapter II. These methodologies include linear regression and testing disconfirmation as both a moderator and mediator variable (Frazier, Tix, and Barron, 2004). If the overall model is identified to be statistically significant, it will provide justification for the research hypotheses as previously shown in Figure 2. Additionally, it will allow further

analysis of the research questions and determine whether the Expectancy Disconfirmation Theory is applicable for modeling citizen satisfaction with government services in Belize.

Phase Two

The objective of phase two was to assess the impact of constructing the HCA projects on citizen satisfaction with government services through the implementation of an experimental design. Instead of incorporating all of the survey data in one time period as interpreted in phase one, phase two separated the surveys into two rounds that included the initial and final construction phases of the projects. The overall hypothesis for phase two was that there would be an increased statistical difference in mean citizen satisfaction values between in round two of locations that received a HCA project and both rounds of locations without a project and round one on locations with a project. This hypothesis was tested and discussed in Chapter III.

Phase Two Survey Methodology

The overall design of the experiment is a nonequivalent control group design (Patten, 2009). This experimental design is represented in Figure 3. The section above the dashed line represents the treatment group, a community with a HCA project constructed during the New Horizons 2014 Belize exercise, and the section below the line represents the control group location (Patten, 2009). The control group is defined as a location in Belize that did not receive a HCA project.

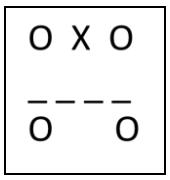


Figure 3: Experimental Design (Patten, 2009)

The desired survey sample size for each community is 76 based on performing a multiple regression with a medium effect size (Cohen, 1992). For each community in which the survey is administered, 76 surveys are required for each round of surveys. Based on five treatment group locations and one control group location, the total amount of surveys required for this experimental design to satisfy the sample size requirements is 912. The subjects participating in this study were residents of the location surveyed and were randomly selected by the interviewers. Additional effort was taken for the sample population to be reflective of the overall population for the location surveyed; however, the final sample population was generated based on subject availability.

Phase Two Statistical Analysis

For the statistical analysis of the survey data, the statistical modeling software, IBM Statistical Package for Social Sciences® was used. To determine the impact of U.S. investment of civil infrastructure on citizen satisfaction, an analysis of variance and Tukey tests were conducted to test the hypothesis. The analysis of variance compares the mean citizen satisfaction values for the treatment and control group for each survey round to determine the p-value for the overall F-test. This will identify if the p-value is statistically significant and determine if there is a statistical difference between location

and round of the experiment. The Tukey test identifies that locations are statistically different and develops revised statistical groupings.

Phase Two Investigative Questions

To assist in answering the second research question, investigative questions were developed. The first investigative question seeks to identify why citizen satisfaction is suitable as a measure of effectiveness. Defining the baseline satisfaction levels prior to completing the HCA projects is the focus of the second question. Answers to the remaining two questions identify the government service focus areas for Belize citizens and assess how the investment of civil infrastructure projects affects citizen satisfaction ratings with government services.

1. Why is citizen satisfaction a measure of effectiveness?
2. What is the current HN citizen satisfaction rating prior to the investment of U.S. military financial aid for civil infrastructure?
3. What are the priorities assigned to the government services by the HN citizens?
4. Can HN citizen satisfaction of government services be improved through the investment of civil infrastructure projects?

Scope

The research effort was performed in conjunction with concurrent thesis research in an attempt to fully explore the impacts of U.S. investment of civil infrastructure on citizen satisfaction with government services for the sponsoring agency, Twelfth Air Force. This research effort serves to (1) identify the proposed precursors of U.S. foreign assistance in the form of civil infrastructure projects and (2) analyze and assess the

impact generated from the HCA projects constructed during the New Horizons Belize 2014 exercise. Through statistical analysis, a research model was created to understand the relationship of tested variables on citizen satisfaction with HN government services. This model was applied in a separate thesis to predict citizen satisfaction. Figure 4 shows the relationship of the overall research, the delineation of thesis efforts, and the opportunity to expand upon the research in future studies.

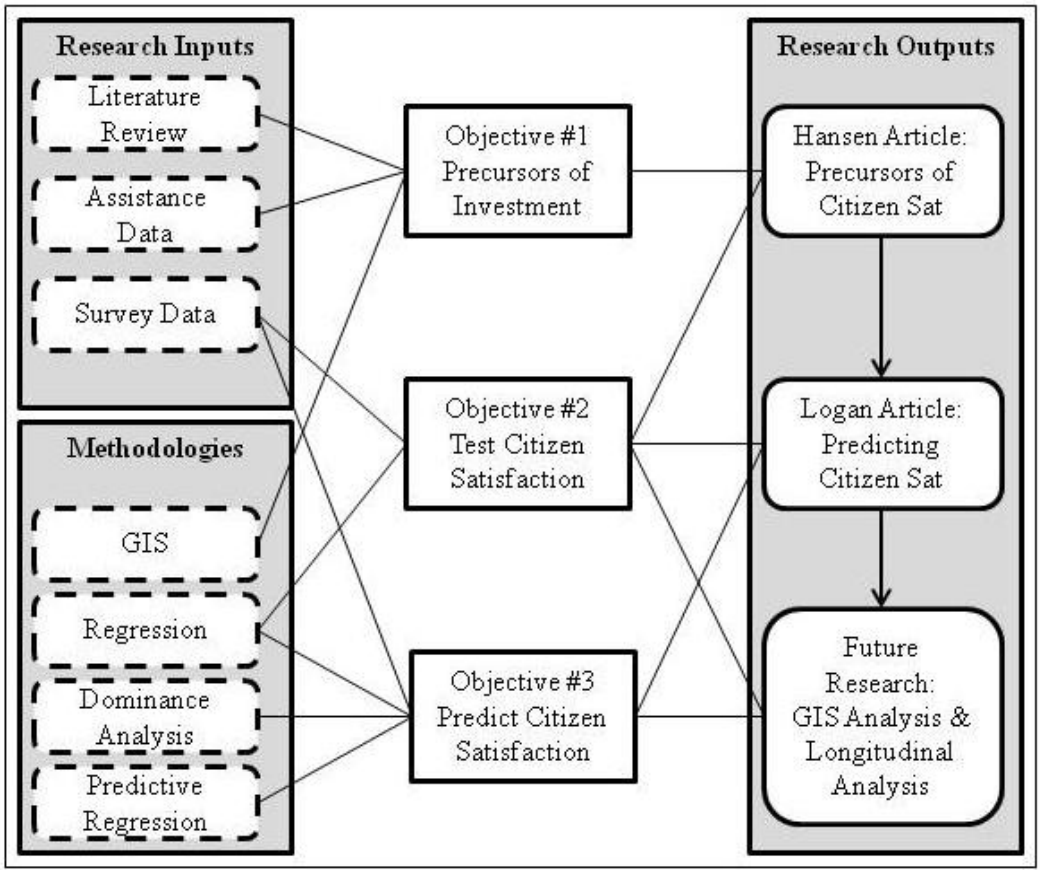


Figure 4: Research Map

Assumptions and Limitations

For phase two of the research, the largest assumption concerned the timeline between survey rounds. The first round of surveys was administered during the initial phase of construction in April 2014, and the second iteration was deployed in May and June 2014 as the projects were nearing completion. The implementation strategy required the assumption that after 3 months of construction activity, the HN citizens would have learned about the civil infrastructure projects and would be able to project what their opinions would be when the facilities were in use by the local populace. Under ideal conditions, the infrastructure would be in use for a few months or years to understand the effects of the projects prior to performing follow-up assessments. Additionally, to capture a true baseline of the citizens' perceptions concerning government services, the initial round of surveys would be conducted prior to the start of the military exercise and the HCA projects. The timeline of survey deployment was controlled by operational constraints that required the survey to be administered during the New Horizons Belize 2014 exercise when the BDF was available to assist.

Additionally, in a true nonequivalent control group designed experiment, the individuals surveyed in round two are the same as in round one. Due to the survey being voluntary and citizens not entering into a long-term study, it was not feasible for the same individuals to be resurveyed. Another limitation of the research effort is that the citizen responses are rolled up to the group level by location. This commits an ecological fallacy that generalizes group level responses from the individual responses of the personnel that are within the group (Klein and Kozlowski, 2000). This further identifies that citizen perceptions with HN government services might be disconnected from the HN government's assessment of the quality of its services. Additional research limitations

are addressed in Chapter II. These limitations include the use of the BDF as the survey administrators, the constraints posed by the type of projects suitable for execution as HCA activities, and the focus of this research narrowed to assistance efforts through DoD-sponsored exercises.

Anticipated Significance

This research may provide support for the assessment of HN citizen opinions of government services as a precursor to the selection of civil infrastructure projects and to measure the effects of HCA projects. Additionally, this research may serve as a platform for fostering the growth of assessment techniques and establish a baseline of citizen perceptions towards government services in Belize. The survey instrument is capable of being easily adapted for use in DoD exercises in other areas of responsibility.

Overview of Remaining Chapters

This thesis subscribes to a scholarly article format. The article provides the body of the thesis and contains all of the material required for submission to a peer reviewed journal. The article is an independent chapter of the thesis and contains an abstract, introduction, presentation of applicable theories and relevant literature, research questions, methodological approach, analysis and results, and discussion. In Chapter III, a more detailed analysis summarizing the findings of the research, presentation of recommendations for future research, and a discussion that summarizes the research are presented.

II. Scholarly Article

United States Foreign Assistance: A Case Study of Belize

Abstract

United States (U.S.) foreign assistance is used to support regional interests and to address the economic and social needs of host nation (HN) citizens. Within the Department of Defense (DoD), military exercises implement humanitarian and civic assistance (HCA) activities in developing nations as one method of accomplishing the U.S. foreign assistance objectives. To account for the impact of civil infrastructure projects on HN citizens, this research incorporated survey data collected during a DoD-sponsored exercise in Belize to test the expectancy disconfirmation model of citizen satisfaction. The research suggests that perceived performance and disconfirmation contribute the largest effect on citizen satisfaction. Utilization of a geographic information system and an extensive literature review permitted the exploration of U.S. foreign assistance trends to examine the current precursors to U.S. foreign assistance and develop a list of proposed precursors. The research is exploratory and strives to improve the effectiveness of civil infrastructure investment in foreign countries through the measurement of HN citizen satisfaction of government services prior to project selection and during the post-project assessments.

Introduction

Background

Following the conclusion of World War II the United States (U.S.) has invested financial aid in foreign countries to provide humanitarian assistance to the local population (Freiden, 1988). Review of the financial assistance data identifies that investment strategies have changed over time based on the presidential agenda and worldwide events occurring at the time (U.S. Overseas Loans and Grants, 2014a). To provide a visual of how assistance has changed over time, Figure 5 presents the amount of U.S. foreign assistance from 1946 to 2010.

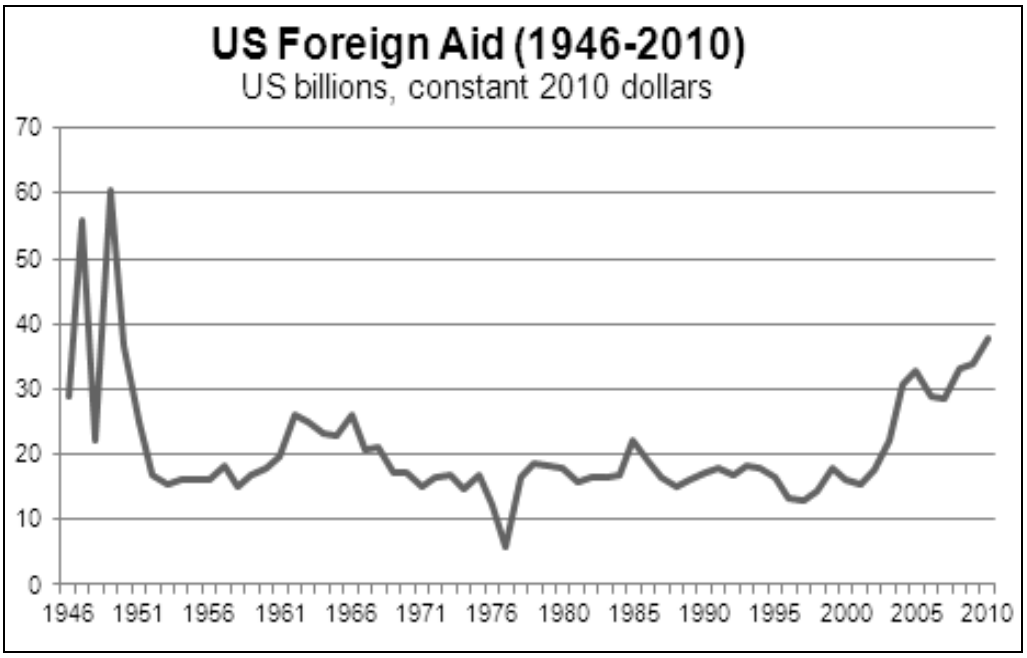


Figure 5: U.S. Foreign Assistance 1946-2010 (How Big is U.S. Foreign Aid, 2012)

In recent history in the conflict torn Middle East, the U.S. has provided foreign assistance for reconstruction of the region and development of the host nation (HN) military. This increase in financial aid was thought to improve the lives of the people affected by the violence, win their hearts and minds, and bring stability to the region (Berman, Shapiro, and Felter, 2007). In addition to aid provided during conflicts, the U.S. has provided humanitarian assistance to regions not affected by conflict and countries considered to be in a developing status, classified as countries with low or medium gross national income levels as categorized by the World Bank (World Bank, 2014).

Currently, there is an area of literature regarding humanitarian assistance in developing countries that has received minimal documented research. This research gap illustrates a need to assess the current assessment techniques pertaining to the investment of financial assistance for civil infrastructure. Assessment of the impact of construction projects that have recently been completed will permit the development of new investment strategies and shape how the U.S. provides assistance to developing countries.

The Department of Defense (DoD) conducts military exercises that occur all over the world with an emphasis placed on building and sustaining partnerships with allied countries and their military forces. These exercises commonly involve humanitarian assistance efforts to the local community through the provision of vital supplies, medical care, and the development of civil infrastructure using U.S. military construction units. Within this research effort, the effects of U.S. military construction and the investment civil infrastructure through humanitarian and civic assistance (HCA) projects that involved U.S., partner nation, and HN military forces were analyzed.

Problem Statement

An accurate assessment of the impact of U.S. investment in civil infrastructure in developing countries through U.S. military exercises on the HN citizens' satisfaction with government services currently does not exist. Additionally, a defined list of precursors to U.S. foreign assistance has not been established. The presented research questions seek to define a further understanding of the precursors to U.S. foreign assistance and citizen satisfaction with HN government services.

Research Objectives and Questions

The objectives of this research effort were to (1) assess the U.S. investment of civil infrastructure projects to identify the current precursors to U.S. foreign assistance and (2) collect and incorporate the impact of HCA projects on citizen opinions of HN government services. These research objectives were met by developing research questions to address the existing problems within the research area as previously noted. These questions include:

1. What are the precursors to U.S. foreign assistance?
2. How can the investment of U.S. military financial aid for HN civil infrastructure impact the HN citizens' satisfaction with government services?

Assumptions, Scope, and Limitations

This research effort was conducted in support of the sponsoring agency, Twelfth Air Force (Air Force Southern), and provides further analysis and assessment of the impact generated from civil infrastructure projects constructed during the command-

sponsored exercise as part of New Horizons Belize 2014. The conducted research established a foundation for the use of assessment techniques and refinement of how the command invests financial assistance in the form of civil infrastructure in future exercises.

One research assumption involved the administration of the survey instrument. Collection of the survey data was limited to the use of the Belize Defence Force (BDF) to administer the surveys to the civilian populace. Due to the BDF's lack of familiarity with survey assessment techniques, introductory training was provided to the personnel administering the surveys. Because observation of the survey deployment techniques was not performed the survey administration was assumed to be conducted properly.

Additional limitations involved the type of civil infrastructure projects that are executable as HCA projects. Funding for HCA projects is controlled by Section 401 of Title 10, U.S. Code, and is subject to procedural requirements concerning the use of assistance funds (HCA Activities, 2014). HCA projects are limited to medical, surgical, dental, and veterinary care; road construction; well drilling and construction of basic sanitation facilities; and repair and construction of public facilities (HCA Activities, 2014). Due to this constraint in the use of funding, not all government service sectors can benefit from civil infrastructure projects during U.S. military exercises, even if a greater need for improvement exists.

There are many categories of humanitarian assistance provided to developing countries for improvement of civil infrastructure. Some forms of assistance pertain to the provision of funds to construct new or upgrade existing infrastructure. Other types of assistance involve the use of non-governmental organizations (NGOs) to provide

education programs for construction training, funding to perform civil infrastructure projects, or programs to equip facilities with the proper furniture or necessary supplies such as medical and educational supplies. Due to the broad range of forms of humanitarian assistance, the scope of the research was narrowed to the assessment of the impact of constructing new or upgraded infrastructure through the use of U.S. military exercises. The information pertaining to HCA projects, assessment strategies, and project selection and definition was available for this research effort.

Methodology

To answer the research questions multiple methodologies were used. A geographic information system (GIS) was utilized to analyze the U.S. foreign assistance data retrieved from the U.S. Overseas Loans and Grants database (United States Overseas Loans and Grants, 2014a). This graphical depiction illustrated where the U.S. has provided foreign assistance and how the assistance has changed over time. The map generated from ArcGIS® provided a visual display of information was complemented with a thorough literature review to answer the first research question and provide a proposed list of precursors to U.S. foreign assistance.

The analysis plan for answering the second research question required the use of quantitative data acquired by surveying residents of Belize. Data collected from this survey included citizen opinions of HN government services, HN government, and U.S. humanitarian assistance. The interviewers interacted with the subjects, Belize adults that were 18 years and older, and recorded their responses to the survey questions. The subjects participating in the study were residents of the location surveyed and were

randomly selected by the interviewers. Additional effort was taken for the sample population to reflect the overall population for the location surveyed; however, the final sample population was generated based on subject availability. The survey was administered during the initial and final stages of execution of the HCA projects.

Through the use of the data collected from the surveys, a statistical analysis was performed utilizing the statistical modeling software IBM Statistical Package for the Social Sciences®. Linear regressions were conducted to test the Expectancy Disconfirmation Theory, as studied by Van Ryzin (2004), and measure citizen satisfaction with HN government services. The goal of this methodology was to statistically test the applicability of Van Ryzin's adaptation of the model with the collected survey data and determine the impact of HCA projects on citizen satisfaction.

Research Framework

U.S. Foreign Assistance

In concert with its foreign policy strategy, the U.S. has allocated monetary assistance to countries through federal foreign assistance programs. The U.S. uses this assistance to achieve its strategic goals in a region or country that aligns with protecting citizens of the U.S. while improving the safety, security, and overall quality of life for the local population. Since the end of World War II to 2012, the U.S. has provided $2.25 trillion (2012 constant dollars) in total assistance to foreign countries (United States Overseas Loans and Grants, 2014b). The modern day U.S. foreign assistance evolved from the post World War II relief programs, the Marshall Plan, President Truman's Four Point Plan, and the Foreign Assistance Act (FAA) signed in 1961 (United States Agency for International Development, 2014). With the enactment of the FAA, the United States

Agency for International Development (USAID) was created and established a single organization for the economic development of foreign countries (United States Agency for International Development, 2014).

Regions involved with conflict, experiencing the impact of a natural disaster, possessing a weak economy, or having other concerns are a few of the many reasons why the U.S. has provided foreign assistance. In Latin America, the U.S. has provided over $148 billion in assistance to the region since 1946 with peak years of financial assistance identified as periods of conflict and natural disasters (Meyer and Sullivan, 2012). Specifically regarding the country of Belize, the U.S. foreign assistance programs have focused on the Department of State (DoS) country objectives of fostering a peaceful land free of drug trafficking and improving the health sector with a dedicated effort on the fight against HIV/AIDS (Department of State, 2014). In addition to the assistance provided by the DoS, other federal agencies, to include the DoD, have invested financial assistance to foreign countries (Withers, Isacson, Haugaard, Olson, and Fyke, 2008).

Overview of Belize

An examination of the country of Belize established the required background information to better understand the country's current development efforts and conduct the research effort. This review provided an overview of the country's history, government type, industry, demographics, and public accessibility to civil infrastructure and government services. Located in Central America and bordering Mexico and Guatemala, the country of Belize gained the ability to rule itself with its independence from Britain in 1981 (CIA: The World Factbook, 2014). Classified as a parliamentary

democracy, the government of Belize consists of three branches to include the Executive, Legislative, and Judicial branches (CIA: The World Factbook, 2014). Within the Executive branch a constitutional monarchy exists in addition to the parliamentary democracy, Queen Elizabeth II holds the title of Head of State and she appoints a Governor-General to attend to the countries affairs on her behalf (CIA: The World Factbook, 2014). The Governor-General appoints the Prime Minister, who is deemed the leader of the majority party of the popular vote for positions within the House of Representatives (Government of Belize, 2014). The Prime Minister selects members of his cabinet to lead the government ministries to include the Ministry of Health and Ministry of Education, Youth, and Sports, among others (Government of Belize, 2014). Leading sources of economic revenue in the country include the tourism industry, marine products, agriculture, and textiles (CIA: The World Factbook, 2014). The country has a population of approximately 340,000 people and of those citizens, 41% live below the poverty line (CIA: The World Factbook, 2014).

Review of the nearby Central American countries to include El Salvador, Guatemala, and Honduras provided the ability to assess Belize's current development status. Table 2 shows the demographic information and government service statistics for all four countries. In regard to health care resources, Belize ranked the best for hospital bed density and near the mean value for physician density, but regarding HIV/AIDS prevalence and life expectancy Belize, was the lowest ranking country. Regarding adult literacy rate, Belize ranked third behind El Salvador and Honduras. For drinking water and sanitation access, Belize ranked first for citizen access to improved infrastructure. Compared to its regional neighbors, Belize has only 17% of its total roads paved

compared to 59%, 46%, and 24% for Guatemala, El Salvador, and Honduras, respectively. In certain development sectors, Belize is a leading country in Central America but the country has the potential for continued improvement in areas where it lags other regional countries.

Table 2: Central American Country Profiles (CIA: The World Factbook, 2014)

Variable	Variable Characteristic	Country			
		Belize	El Salvador	Guatemala	Honduras
Population		340,000	6,100,000	15,000,000	8,600,000
Urban Population		45%	65%	50%	52%
HIV/AIDS Prevalence	Adult Population	1.4%	0.60%	0.70%	0.50%
Hospital Bed Density	Beds/1000 people	1.1	1.0	0.70	0.70
Life Expectancy	Years	68	74	72	71
Physician Density	Physicians/1000 people	0.83	1.6	0.93	0.37
Literacy Rate	Adult Population	77%	85%	76%	85%
Drinking Water Source	Improved	99%	90%	94%	90%
	Unimproved	1%	10%	6%	10%
Sanitation Facility Access	Improved	90%	70%	80%	80%
	Unimproved	10%	30%	20%	20%
Roadways	Paved (km)	490	3,200	6,800	3,400
	Unpaved (km)	2,400	3,700	4,700	11,000

Development within Belize

Assistance partnerships between U.S. government agencies and Belize are rooted in economic development and capacity building. The DoD, DoS, Department of Homeland Security, Peace Corps, USAID, and the Inter-America Foundation comprise the main U.S. government agencies that have implemented assistance programs in the country (U.S. Overseas Loans and Grants, 2014b). Figure 6 shows that the U.S. has provided assistance to Belize since 1956, with a spike in economic assistance occurring

during the period of 1983 to 1996 when USAID had a country office and military assistance programs surpassed economic assistance in 2010.

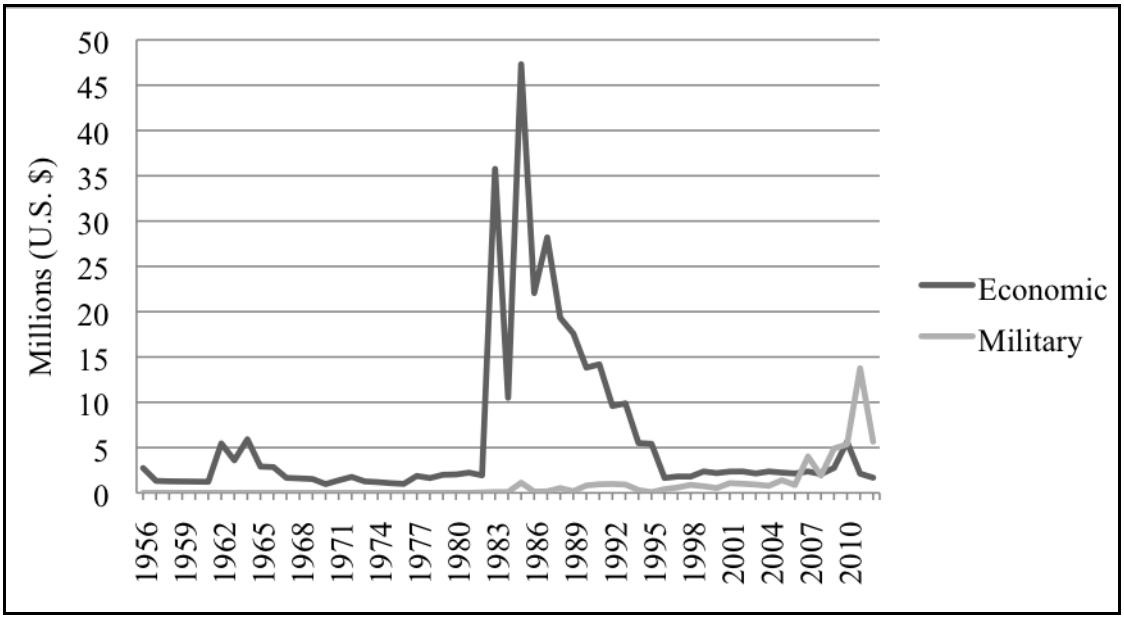


Figure 6: U.S. Foreign Assistance to Belize 1956 to 2012 (U.S. Overseas Loans and Grants, 2014c)

In addition to the assistance from the U.S. government, other non-federal entities have contributed to civil infrastructure development within the country to include NGOs dedicated to a specific mission set and financial organizations. The Inter-American Development Bank (IDB) is a financial organization focused on providing development assistance to countries in Latin American and the Caribbean by defining the common ground between the bank's mission and the priorities established by the host country government (IDB, 2013). In Belize, the IDB has provided financial loans and grants to support the development of civil infrastructure since its partnership began with the country in 1992 (IDB, 2013). In an effort to improve Belizean's quality of life and access

to reliable infrastructure, this partnership has improved existing infrastructure and constructed new infrastructure. A few examples of IDB cosponsored projects include the construction of the Southern Highway to upgrade 149 miles of previously dilapidated roadway and the Solid Waste Management Project which involved the construction of a new landfill with a 20-year lifespan for municipal solid waste in Belize City and the surrounding areas (IDB, 2013).

Civil Assessments

Citizen satisfaction surveys have been used in local communities in the U.S. to gauge citizen opinion of public services (Miller and Miller, 1991; Stipak, 1979). These surveys are used to capture the opinions of the public and provide feedback to community leadership on the citizen satisfaction assessment of government services. This technique of capturing public opinion of government services proves applicable to not only U.S. communities but also in countries receiving U.S. foreign assistance. As it pertains to U.S. foreign assistance, administration of an initial survey captures the current opinions of the HN citizens. With a baseline established for citizen satisfaction of government services, this information provides decision-makers another factor to consider in the selection of civil infrastructure projects and identifies which government service sector of the community is in need of assistance the most. Assessment post construction and after the project has been in use by HN provides the opportunity to gauge how the investment has impacted citizen satisfaction with government services.

Theories

Accounting for the impact of civil infrastructure projects on HN residents is a missing element that is necessary to incorporate as a measure of effectiveness. A relevant theory surrounding citizen opinion is the Expectancy Disconfirmation Theory. This theory was established by Oliver in 1977 to measure consumer satisfaction with commercial products (Oliver, 1977). Since its development, other research areas have instituted the theory to account for citizen opinions to include public administration research. Van Ryzin's (2004) application of the theory measures citizen satisfaction with public services. Through the use of data collected from phone surveys of New York City residents, Van Ryzin (2004) analyzed multiple variables and their relationship within the Expectancy Disconfirmation Theory. These variables included the citizen expectations with public services, the perceived performance of individual services, the overall quality assessment of all public services, the disconfirmation or gap between their expectations and quality of the service, and citizen satisfaction with government services (Van Ryzin, 2004).

Van Ryzin (2005) performed an additional study using this theory to account for citizen opinion of government services in multiple locations. As the results from both studies were consistent, Van Ryzin (2005) concluded that this "lends support to the expectancy disconfirmation model of citizen satisfaction." This conclusion presented the opportunity to build on the research of citizen satisfaction with government services by analyzing how the construction of HCA projects impacts citizen opinion of their government. Through the identification of applicable literature, the application of the theories was incorporated into the research methodology.

Methodology

Through identification of the research questions and relevant theories, the missing component in the doctrine regarding the U.S. humanitarian assistance role in developing countries was examined. A research methodology was established to explore the research questions and assess the impact and effectiveness of U.S. investment of civil infrastructure in developing countries. A GIS and a review of existing literature were the methodologies used to answer the first research question. To answer the second research question, a survey instrument was developed and the data collected were analyzed, specifically through linear regression. This analysis was performed to test the Expectancy Disconfirmation Theory and its applicability to the research.

GIS

The mapping program ArcGIS® was used to depict the U.S. foreign investment data to visually display U.S. foreign assistance to Central American countries. Due to their close proximity to Belize, the countries included in the GIS analysis were El Salvador, Guatemala, and Honduras. The map incorporated financial data collected from the U.S. Overseas Loans and Grants website and population data published by the United Nations. Using the data, a map was created to display U.S. foreign assistance per capita from 1946 to 2011 for each country. This map was used to illustrate how U.S. foreign assistance has changed over time and identify patterns in the data in an attempt to provide support for a proposed list of precursors to U.S. foreign assistance.

Research Model and Variables

An adaption of the Expectancy Disconfirmation Theory was utilized to explore the factors affecting citizen satisfaction with government services (Van Ryzin, 2005). To provide further understanding of the research model, it was necessary to define the variables selected for measurement. All variables were measured on a Likert scale of one to five, where one corresponded to a survey response of strongly disagree and five corresponded to a survey response of strongly agree. It was hypothesized that a positive relationship would exist between all of the variables. The hypotheses were statistically tested and discussed later in the chapter.

The variables for this research effort consisted of dependent, independent, and potential mediator and moderator variables. The dependent variable that was measured was citizen satisfaction. This variable was defined as the HN citizens' overall approval of the government services within their community and was measured by the level of agreement with the satisfaction measurement survey questions. The two independent variables that were included in the research model were citizen expectations of government services and perceived performance of government services. Citizen expectations were citizens' outlook on what the performance level should be for government services in their local community. Perceived performance was HN citizens' assessment of the government services (schools, school management, health care, local police service, garbage removal, quality of drinking water, community cleanliness, and road quality). One variable, disconfirmation, was tested for moderation and mediation on citizen satisfaction for both independent variables. This variable was defined as HN citizens' discrepancy between the anticipated quality of government service and the

quality that was actually received as measured by citizens' level of agreement with the disconfirmation survey questions.

HCA Projects

The constructed HCA projects were selected by members of the Twelfth Air Force and the 820th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Squadron based on multiple factors to include project scope, project timeline, project location, and operational convenience. Five projects were selected from a list of planned projects developed by the Belize Ministry of Education, Youth, and Sports and the Belize Ministry of Health; the projects were constructed in three cities within Belize as identified in Table 3, along with the project costs and the project start and completion dates.

Table 3: New Horizons Belize 2014 HCA Projects

Project Title	Location	Project Cost	Project Start Date	Project Completion Date
Western Regional Hospital	Belmopan	$204,000	3 April 2014	13 June 2014
Hattieville Preschool	Hattieville	$173,000	3 April 2014	17 June 2014
Sadie Vernon School	Belize City	$144,000	3 April 2014	17 June 2014
Stella Maris School	Belize City	$119,000	3 April 2014	11 June 2014
Edward P. York School	Belize City	$75,000	30 March 2014	23 May 2014

Survey Methodology

As a means to test the Expectancy Disconfirmation Theory and its applicability to the research, a survey instrument was developed to capture citizens' opinions of government services. The survey instrument fits the category of a citizen survey which provides an avenue to capture factual information, the needs of citizens, information on citizen satisfaction levels, and an evaluation of government services (Stipak, 1980). Through the administration of citizen surveys, the variable effects on citizen satisfaction and the variable relationships that the survey data supports were defined.

The survey instrument administered during the New Horizons Belize 2014 exercise was designed to be verbally administered by trained members of the BDF to Belize citizens, specifically adults with a minimum age of 18 years. Components of the survey included a qualitative section for citizens to prioritize government services; quantitative sections that model the Expectancy Disconfirmation Theory variables; more detailed questions on education, health care, and perception of U.S. government; and a demographics section. For all of the variables that were measured via Likert scale responses, there were a minimum of three questions asked per variable. The survey instrument included multiple questions per variable to verify that each variable was reliable and yielded consistent responses within variable questions (Patten, 2009).

The surveys were administered throughout the execution of the HCA projects. Key collection periods were focused on the initial phase of project execution in April 2014 and during the final stages of construction in May and June 2014. In an attempt to capture a true assessment of Belizean citizens' opinion of government services, the survey was administered in locations that did not receive infrastructure improvement

projects as a part of the New Horizons Belize 2014 exercise. To facilitate this goal, a survey plan was created to identify the proper amount of surveys to administer in each location. As defined by Cohen (1992), the desired survey sample size for each community is 76 based on performing linear regression with a medium effect size.

Regression Analysis

Following the collection of the surveys, the data were analyzed through linear regression tests. To support the execution of this statistical analysis, a control variable was identified as the target quality of education variable. This variable accounted for the quality of instructional facilities, teachers, learning materials, and the overall ability of schools to provide a quality education. This variable was selected since the schools were out of session during the execution of the HCA projects and the administration of the survey instrument. These factors resulted in consistent values for this variable throughout the survey period of April to June 2014. Prior to performing the regression analysis, reliability testing of the variable questions was performed. Through a reliability analysis, questions that reduced a variable's reliability below a Chronbach's alpha of 0.70 were considered for removal from further analysis. With only the reliable questions included, the average value for each variable was calculated and was incorporated into the regression analysis.

An overall F-test was performed to test the hypotheses, positive and statistically significant relationships existed in the expectancy disconfirmation model, to identify if there was statistical significance between the tested variables. In addition to the linear regression tests to identify the links in the expectancy disconfirmation model that the data

supports, it was necessary to test disconfirmation as a moderator and mediator of performance and expectation on citizen satisfaction. To test for mediation, the procedural steps taken were: 1) linear regression of expectation on citizen satisfaction, 2) linear regression of expectation on disconfirmation, 3) multiple regression of expectation and disconfirmation on citizen satisfaction noting the values for disconfirmation, and 4) account for expectation's values (Frazier, Tix, and Barron, 2004). The same procedures were completed to test disconfirmation as a mediator of performance. In the mediation evaluation, the unstandardized coefficient was compared between steps one and four to determine if there is a drop in value. Complete meditation occurred if the unstandardized coefficient reduced to zero in step four and partial mediation occurred if the unstandardized coefficient reduced closer to zero and was statistically significant (Frazier et al., 2004). Additional steps were necessary to test for moderation; the steps taken were: 1) linear regression of the independent variable on citizen satisfaction, 2) disconfirmation on citizen satisfaction, and 3) the interaction of the independent variable and disconfirmation variables on citizen satisfaction (Frazier et al., 2004). Based on the statistical significance level of the interaction term, determination of disconfirmation as a moderator of the independent variable on citizen satisfaction was made.

The linear regression tests and tests for moderation and mediation were conducted to identify if the hypothesized positive relationships between variables were statistically supported. Additionally, the analysis highlighted if the research model or a variation of the research model was supported by the data. Overall, the analysis plan sought to answer the research questions and identify if the Expectancy Disconfirmation Theory was applicable for measuring citizen satisfaction with government services in Belize.

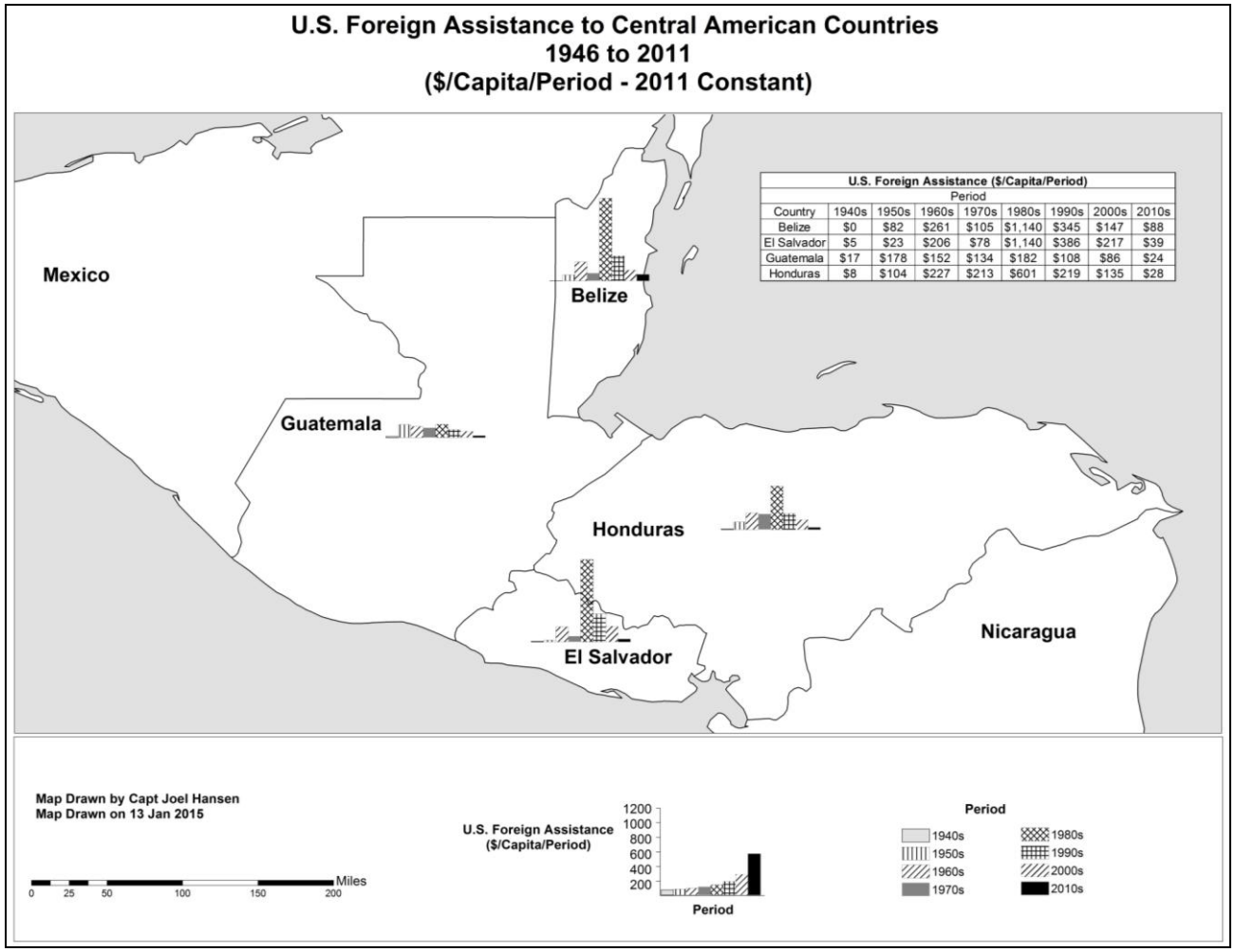
In this section the methodology for the research effort was presented. The GIS, research models, operational definitions of measured variables, selected HCA projects, details concerning the development and distribution of the survey, and the statistical analysis plan were introduced and discussed. In the next section the results of the GIS, literature review, surveys, and statistical analysis are presented.

Results

Precursors to U.S. Infrastructure Investment

To identify possible precursors to U.S. infrastructure investment in developing countries, it was necessary to identify historical trends of U.S. foreign assistance. To explore the assistance beyond Belize alone, three other Central American countries in the vicinity of Belize, to include Guatemala, Honduras, and El Salvador were incorporated in the review of U.S. foreign assistance. Figure 7 shows the incorporation of total foreign assistance data and average country populations by period and illustrates U.S. foreign assistance per capita. This map covers the period of 1946 to 2011, with the bar charts depicting U.S. foreign assistance per capita over the designated period (i.e., 1940s, 1950s, etc.).

Due to its close physical proximity to Central America, the U.S. has held interests to include security, political, and economic interests in the region (Molineu, 1986). To achieve its goals of maintaining independent states and preventing Latin American from becoming a launching ground for conflict against America, one technique to accomplish these goals is to "use military and economic assistance to promote stability" (Molineu, 1986). In the past century, these policy measures have grown from President Roosevelt's



Note: Sources of Data (ArcGIS®, 2012; United States Overseas Loans and Grants, 2014b; United Nations, 2014)

Figure 7: U.S. Foreign Assistance to Central American Countries, 1946 to 2011

Good Neighbor Policy which was rooted around the concept of not intervening in another country's internal affairs (Molineu, 1986). This concept extended through the war and after the war's conclusion until Western Hemisphere countries entered into a strategic alliance to protect one another with the Inter-American Treaty of Reciprocal Assistance of 1947 and the formation of the Organization of American States in 1948 which established a lasting regional partnership (Zarate, 1994). The U.S. foreign policy of non-intervention was drastically shifted in the 1950s and 1960s due to the threats of communism. During this period, Central America became a recipient of U.S. foreign assistance as effort was placed on strengthening militaries to protect against Communist attacks (Leonard, 1985). Additionally, in 1961 President Kennedy announced the Alliance for Progress to promote economic development and democracy in Latin America through the investment of $20 billion over 10 years and build a partnership between Western Hemisphere nations based around these common values (Molineu, 1986). To achieve the goals of the alliance, the U.S. invested monetary assistance, to include funding for civil infrastructure projects, to countries that made an effort to reform. This policy complemented the signing of the FAA in 1961 which established USAID as the U.S. government's responsible office for foreign assistance and separated military and economic assistance (United States Agency for International Development, 2014).

As captured in amendments to the FAA and the International Security Assistance Act, the focus of 1970s foreign assistance evolved to consider human rights and provided the legislature to restrict economic and military assistance funds to countries that committed or fostered human rights violations (Molineu, 1986). The 1980s saw

implementation of the Reagan Doctrine, which refocused America's strategic efforts for security and led to the increase in foreign assistance to support militant groups in order to suppress the spread of communism in the region (Molineu, 1986). The 1990s were a transitional period as "U.S. aid flows declined…following the dissolution of the Soviet Union, the end of the Central American civil conflicts, and the spread of electoral democracy throughout the region" (Meyer et. al, 2012). Policy measures were enacted in the 2000s that sought to improve human conditions in developing countries. These measures included the President's Emergency Plan for AIDS Relief (PEPFAR) and the Millennium Challenge Corporation (MCC). PEPFAR focused on addressing the AIDS disease and improving the lives of those living with it and MCC was founded on the premise of supporting the needs of countries that are dedicated to development policies that serve the needs of their citizens (Meyer et.al, 2012).

Coupled with the information on U.S. foreign policy, review of the region's historical events provided clarification on the trends identified in U.S. foreign assistance to individual countries. Events that relate to the provision of U.S. foreign assistance are categorized into groupings to include: periods of conflict, natural disasters and severe weather events, and economic development. Guatemala entered a period of unrest following the 1954 Central Intelligence Agency backed coup d'état to overthrow the Socialist government and the 1957 assassination of its president which led to the start of the 36-year Guatemalan Civil War in 1960 (Zarate, 1994; A Timeline of Latin America, 2011). In El Salvador, a 12-year civil war surrounding the government's treatment of civilians began in 1980 with the assassination of Archbishop Romero, a leading voice against the government's actions (Central America: Opposing Viewpoints, 1990). Due to

its centrality in Central America and political stability, Honduras became the staging ground for U.S. military equipment and training advisors as the U.S. sought to bring stability to the region during the Salvadorian Civil War and the conflict against the Communist regime in Nicaragua (Honduran History, 2015). Belize did not experience a civilian conflict during this period but was vulnerable to security challenges as a result of their 1981 independence from Britain, the threat of communism in the region during the 1980s, and a border dispute with Guatemala (Belize: A Country Study, 1992).

In addition to conflict, this region of Central America was devastated by natural disasters and severe weather events. A 1986 earthquake in El Salvador resulted in 1,500 deaths (Central America: Opposing Viewpoints, 1990). During the first decade of the Twenty First Century, El Salvador experienced earthquakes, volcanic activity, flooding, drought, and landslides that resulted in home loss, death, and famine (National Climatic Data Center, 2009). Despite efforts to improve the civil infrastructure in the country, Hurricane Mitch devastated Honduras in 1998. As a result of the hurricane, an estimated 5,700 people were dead and 8,100 missing, and there was extensive damage to the country's infrastructure, residential homes, and agricultural crops (United States Agency for International Development, 1998).

Despite periods of conflict and severe weather events within the region, the U.S. outreach of foreign assistance has also extended its involvement to economic development. Examples of this include the establishment of USAID country offices and more recently, five year MCC compacts, multi-year agreements between the MCC and the recipient country, for development efforts (i.e., transportation and agricultural projects). MCC compacts were issued to Honduras in 2005 ($205 million) and to El

Salvador in 2006 ($461 million) and 2014 ($277 million) (Millennium Challenge Corporation, 2015). This identifies that the U.S. is not only interested in reactionary assistance but is invested in providing support to countries that enable them to achieve their development goals.

From the review of U.S. foreign policy and recent historical events, the U.S. investment strategy for foreign assistance funds historically has been influenced by numerous factors. Due to the many reasons why the U.S. provides foreign assistance, it was necessary to propose potential precursors to U.S. infrastructure investment. These proposed precursors stem from a critical review of literature pertaining to foreign assistance. A consolidated list allows U.S. government agencies to consider the precursors prior to committing their agency to funding an infrastructure project in a foreign country in order to optimize the use of the agency resources on worthwhile investments.

The first precursor identifies that a country should possess a stable government that is dedicated to development and has the policies, plans, and personnel to make the best use of a proposed investment. The premise of this precursor was rooted in a 2002 speech by the former president of the World Bank, James Wolfenshon, when he said "we have learned that corruption, bad policies, and weak governance will make aid ineffective" (World Bank, 2002). This statement was further echoed in President Obama's 2010 speech at the Millennium Development Goals Summit when he said:

> The purpose of development-what's needed most right now-is creating conditions where assistance is no longer needed. So we will seek partners who want to build their own capacity to provide for their people. We will seek development that is sustainable. And building in part of the lessons of the Millennium Challenge Corporation…we will invest in the capacity of countries that are proving their commitment to development. (The White House, 2010)

Coupled with government stability, there must be a vision and policy measures in place by the recipient country's government concerning development within the country. The Accra Agenda for Action in 2008 highlighted the importance of country ownership in the statement "developing country governments will take stronger leadership of their own development policies, and will engage with their parliaments and citizens in shaping those polices" (The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action, 2008). This places an emphasis on aid recipient countries being invested in their own development and not relying on the government agencies providing monetary assistance to shape recipient country development. Instead of the approach to gauge development based on dollars spent, government ownership reclassifies development as a process that requires commitment by the HN above and beyond the investment by the donor agency. In this regard, the infrastructure investment should be a part of the HN government's country development plan and not proposed or dictated by the U.S.

Ownership of internal development prevents a country from becoming dependent on foreign assistance to properly execute the functions of the government, to include maintenance of its existing infrastructure (Bräutigam and Knack, 2004). This statement identifies a second proposed precursor concerning the ability for the HN to maintain the infrastructure. Nested within this proposed precursor is the necessary coordination of the U.S. and aid recipient countries to define the project requirements and account for the local conditions as maintenance alone will not prevent the failure of infrastructure (Ostrom, Schroeder, and Wynne, 1993). This initial coordination can define infrastructure requirements to meet the intended function while accounting for long-term sustainment by incorporating the proper materials and design features that will enable the

host country to maintain the infrastructure. To keep the infrastructure at the appropriate level of service, the HN government should possess the equipment, trained personnel, and dedicated financial resources to foster continued maintenance to safely sustain the infrastructure. Without the HN possessing these resources, the donor government enters into an implied contract to provide additional funds for infrastructure maintenance and creates a lasting dependency. To combat this long-term dependency, the U.S. and recipient country's governments should enter into an agreement during the coordination phase that the HN government agrees to maintain the infrastructure at or above the required level of service. This concept is currently included as a DoD policy requirement for HCA projects as "all nominations will indicate the HN is willing and able to maintain the facility and use it for its intended purpose upon project completion" (HCA Activities, 2014).

In addition to identifying if the recipient government has the maintenance capability, assessments of previously invested infrastructure projects should be conducted. Performing visual inspections determines the current condition of the facility and identifies if the facility has been used for the intended purpose. Completing these assessments of earlier projects provides the prospective donor source another factor to consider in their determination of whether to invest in civil infrastructure in the developing nation by identifying if the investment will be put to a good use.

A third precursor to the U.S. investment of infrastructure in a developing nation is a legitimate need identified by the community. Natsios (2005) identified that "any allocation of resources, whether in combat operations or infrastructure must take into consideration…ground-level need." To identify if there is a need within the community,

members of the U.S. and HN government agencies should collaborate to (1) assess the current usage and infrastructure condition and (2) collect the input of HN citizens. Gathering the opinions of HN citizens is accomplished through the distribution of citizen surveys to identify the priority of government services and gauge citizen satisfaction levels with government services (Stipak, 1979; Stipak, 1980; Miller et. al, 1991). Distributing a survey provides a baseline to determine if the residents are satisfied with the current level of service concerning key government sectors to include those involving infrastructure. Assessment of the current infrastructure and administration of surveys can determine if a need exists in the community for additional or improved infrastructure. By defining the level of community need, the U.S. government can be judicious when selecting civil infrastructure projects for investment. As identified by Natsios (2005) as one of the nine principles of reconstruction and development, selectivity is required "to maximize effectiveness, donor resource allocation must be targeted where it can have an appreciable impact and where the recipient community demonstrates commitment to development goals." In addition to identifying projects that fulfill a defined community need, it is critical to assess the impact of the infrastructure through a post-project assessment.

This highlights a fourth precursor to U.S. investment that the government agency must have the resources in place to evaluate the impact of the infrastructure and be accountable for the aid that it provides prior to executing a project. To execute this, it is necessary to complete an impact evaluation to determine the effectiveness of foreign assistance and the resulting impact of a project on the desired development objective (Lawson, 2013). Impact evaluations are a necessary gauge of "whether a foreign

assistance program 'works'" but also require an agency commitment to assessment and the necessary investment of resources to include time, funding, and trained personnel to execute a quality evaluation (Lawson, 2013).

The organization must place an importance on reviewing how the infrastructure investment is performing and how it is meeting the objectives identified prior to construction. This dedication to assessment goes beyond verbal commitment by organization leadership and must be seen in the commitment of resources. Policies identified by USAID and the DoS identify an average of three percent and three to five percent of a program's budget respectively should be allocated to evaluation activities (United States Agency for International Development, 2011; Department of State, 2012). To retain these funds for evaluation, the government agency must not reclassify the funds towards other factors in the project execution. Evaluation should be considered a necessary element and not a resource pool to reallocate towards the infrastructure project. This is currently not the case within the DoD, as the agency did not complete 90% of the required 1-year humanitarian assistance project evaluations or half of the required 30-day assessments between fiscal year 2005 and 2009 (United States Government Accountability Office, 2012).

A necessary prerequisite to perform a quality evaluation, agencies should develop performance indicators in partnership with the recipient country's leadership and develop their evaluation questions to appropriately measure the indicators. Execution of quality evaluations permit organizational accountability to the involved stakeholders and contribute to a continuous cycle of learning to improve the effectiveness of future infrastructure investments (United States Agency for International Development, 2011).

This accountability and advancement of knowledge contribute to agencies improving their investment strategy and decisions regarding agency resources, to include funding civil infrastructure projects.

Similar to how an investment of civil infrastructure made by the U.S. must fit within the parameters of a recipient country's development plans, the investment must also meet the U.S. strategic objectives for the country or region. This fifth precursor to U.S. investment of infrastructure identifies that the investment must be applicable to the U.S. foreign policy interests (Natsios, 2005). To be a worthy investment, infrastructure projects must contribute to achieving a development objective and not independently selected without consideration of U.S. foreign policy for a region or country. An overarching driver of U.S foreign policy in Latin America is the desire to keep the challenges that face these regions from entering into the nearby states and safeguard the people of the U.S (Johnson, Forman, and Bliss, 2012). U.S. government agencies considering infrastructure in this region must define how a proposed infrastructure project seeks to reduce the hardships of local citizens while remaining relevant to the protection of U.S. citizens from regional challenges (i.e., disease, drug trafficking, etc.). Embedded within the U.S. strategic outlook for foreign assistance, civil infrastructure is a key element to achieve these requirements. Of the five strategic plans involved in the U.S. DoS and USAID Joint Strategic Plan for fiscal years 2014 to 2017, three of the five strategic goals involve infrastructure development. These include "(1) strengthen America's economic reach and positive economic impact; (2) strengthen America's foreign policy impact on our strategic challenges; (3) promote the transition to a low-emission climate-resilient world, while expanding global access to sustainable energy"

(Department of State and United States Agency for International Development, 2014). To determine relevance of a proposed project to U.S. foreign policy requirements, each project should be assessed individually for its value and it ability to meet the objectives.

Survey Results

Of the 1,400 surveys distributed during the exercise, a total of 660 surveys were completed. Due to some surveys possessing incomplete information, 33 surveys were removed resulting in a sample size of 627 to complete the statistical analysis. Overall, there was a 45% response rate to the survey instrument as compared to the average response rate of 37% for The National Citizen Survey™ that is administered in communities throughout the U.S. (Miller, 2014). To interpret the survey responses, a standardized approach was used to process the data with specific focus on questions where the individual responded with duplicate answers. High disparity between response values was coded as a blank response (i.e., 1,3 became blank) and adjacent values (i.e., 1,2) were coded as the difference in the values (i.e., 1,2 became 1.5). This removed responses that were indefinable and permitted the data to be properly analyzed.

Statistical Analysis

The descriptive statistics for the collected survey data are seen in Table 4 for the measured variables. Overall, the sampled population had a very high expectation for government services with a mean of 4.50 and standard deviation of 0.62. The perceived performance of and the public's disconfirmation with government services were slightly below average with means of 2.96 and 2.87, respectively. The standard deviations were

0.75 and 0.93, respectively, for these two variables. Additionally, the citizen satisfaction rating was low with a mean of 2.58 and a larger standard deviation of 0.96. This identifies that a majority of the sampled population's satisfaction with government services range from well below average to slightly above average. For the target quality variables, there was a higher citizen evaluation of education, mean of 3.46 with a standard deviation of 0.83, and slightly below average assessment for health care, mean of 2.85 with a standard deviation of 1.00. Lastly, the citizen perception of the U.S. government was above average with a mean of 3.69 and a standard deviation similar to the other variables of 0.93.

Table 4: Survey Data Descriptive Statistics

Variable	N	Mean	Standard Deviation
Expectation	627	4.50	0.62
Performance	627	2.96	0.75
Disconfirmation	627	2.87	0.93
Citizen Satisfaction	627	2.58	0.96
Target Quality of Education	627	3.46	0.83
Target Quality of Health Care	627	2.85	1.00
Perception of U.S.	627	3.69	0.93

Table 5 shows the linear regression results and identifies the tested variables and their relationship, as well as the unstandardized and standardized coefficients, the coefficient of determination, and the statistical significance. As a result of testing the Expectancy Disconfirmation Theory, statistical support was found for all of the independent variables on citizen satisfaction and the relationship between expectation and performance. In addition to determining the statistical significance of the variable

relationships, Table 5 shows the effect of each independent variable on citizen satisfaction. The results of the linear regression tests identified that performance had the largest effect on citizen satisfaction, disconfirmation had a limited role, and expectation had an almost negligible effect on citizen satisfaction with government services. Additionally, the sign of the coefficients indicate that a negative relationship exists between expectation and citizen satisfaction and disconfirmation. A negative relationship also exists between expectation and performance. These results were contrary to the original research hypotheses that a positive relationship existed between all variables.

To further understand disconfirmation's role in the model, it was tested as a mediator and moderator. As a result of these tests, disconfirmation was not supported as a mediator or moderator of expectation on citizen satisfaction. The statistical tests did, however, provide support for disconfirmation as a moderator and partial mediator of performance on citizen satisfaction. The unstandardized coefficient for performance on citizen satisfaction reduced from 0.80 to 0.57 between mediation testing steps one and four and was statistically significant. These results met the requirements to classify disconfirmation as a partial mediator of performance on citizen satisfaction. As a result of the moderation testing, the interaction of performance and disconfirmation on citizen satisfaction was statistically significant with a p-value of less than 0.001. Therefore, disconfirmation was established as a moderator of performance on citizen satisfaction.

Table 5: Linear Regression Results

Independent Variable	Dependent Variable	Unstandardized Coefficient, B	Standardized Coefficient, β	R^2	p-value
Expectation	Citizen Satisfaction	-0.15	-0.10	0.26	0.000
Expectation	Disconfirmation	-0.16	-0.11	0.33	0.000
Performance	Citizen Satisfaction	0.80	0.62	0.47	0.000
Performance	Disconfirmation	0.57	0.46	0.44	0.000
Disconfirmation	Citizen Satisfaction	0.57	0.56	0.46	0.000
Expectation	Performance	-0.08	-0.06	0.41	0.000
Performance	Expectation	-0.09	-0.11	0.01	0.028

As a result of performing the linear regression tests and tests for moderation and mediation, the model that the data supports was established. This model, portrayed in Figure 8, depicts the direct links of expectation and performance on citizen satisfaction and the inclusion of disconfirmation in both a moderating and mediating role of performance on citizen satisfaction. Moderation influences the direction and strength of relationship between the independent and dependent variables and meditation explains the relationship between the variables (Baron and Kenny, 1986). Disconfirmation does help explain when (moderation) and how or why (meditation) citizens' evaluation of the performance of government services is related to citizen satisfaction (Baron and Kenny, 1986). The collected data closely supports the model tested by Van Ryzin (2005) with exception of disconfirmation's link with citizen expectation of government services.

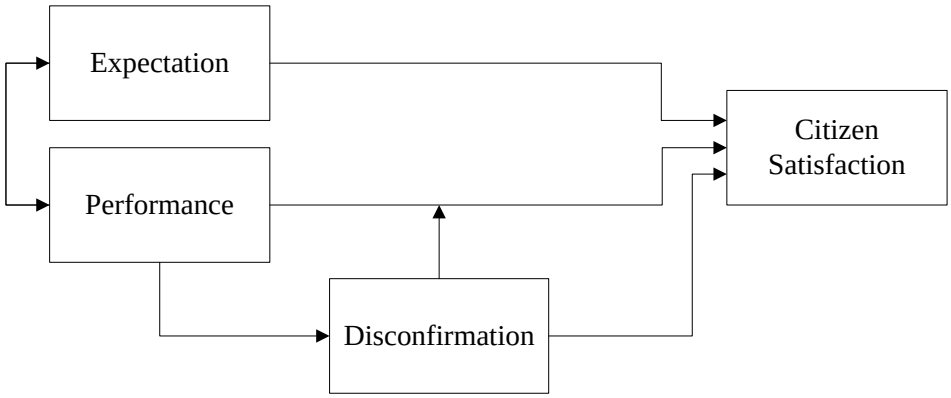


Figure 8: Research Model

Discussion

Through identification of the proposed precursors to U.S. investment of infrastructure in developing countries, U.S. government agencies can become more selective of which infrastructure projects to execute and where to execute them. Having a HN government that is stable and involved in the country's development are necessary as ownership of the development process is critical to successful infrastructure investment. Similarly, having the capability to maintain the infrastructure is important to identify before it is constructed. Citizen opinion must be incorporated as the needs of the end user do not always align with the HN government identified priorities. An important measure to capture this is citizen satisfaction with government services as this provides an assessment of the current level of support for the government service. Additionally, U.S. government agencies should have designated resources to evaluate the impact of a project and measure the predefined indicators in order to improve assistance accountability and make a commitment to learning and strategy development. Relevance

and applicability of the project to the U.S. foreign policy interests should be identified prior to project selection and resource commitment. Use of these proposed precursors would permit U.S. government agencies to make sound infrastructure investment decisions and not independently develop and construct projects without consideration of these precursors.

The foundation for this case study sought to explore citizen opinion regarding satisfaction with government services in Belize. The New Horizon 2014 Belize HCA projects were an opportunity to develop a baseline for expectation, disconfirmation, performance, and satisfaction that citizens have with government services. In this study emphasis was placed on testing Van Ryzin's (2005) adaptation of the Expectancy Disconfirmation Theory to further define the impacts of U.S. investment of infrastructure. The data supported the previously tested theory with the exception of disconfirmation's role in explaining expectations of government services relation to citizen satisfaction. Overall, the results identified that performance of government services had the largest effect on citizen satisfaction, disconfirmation had a reduced effect, and expectation had an almost negligible effect. The purpose of this study sought to build the foundation for future research surrounding the impacts that infrastructure investment projects have over time in Belize and develop a research model that can be tested in future U.S. military exercises in other regions around the world.

Disclaimer

The views expressed in this paper are those of the author and do not reflect the official policy or position of the United States Air Force, The Department of Defense, or the United States Government.

References

The references of this article are combined with the thesis following the appendices.

III: Results and Conclusions

This chapter discusses the findings of the research as related to the research questions presented in Chapter I. The scholarly article discussed the precursors to United States (U.S.) foreign assistance and presented a list of proposed precursors to the investment of civil infrastructure projects. Additionally, the article highlighted the results of phase one of the research through the presentation of the research model and an understanding of the relationship of variables on the dependent variable, citizen satisfaction. This chapter discusses the findings of phase two of the research through exploration of the investigative questions for the second research question. The significance of the overall research effort is discussed, future research is presented, and a summary of the thesis concludes the chapter.

Phase Two Investigative Questions Results and Discussion

The overall objective of phase two was to answer the research question, "How can the investment of U.S. military financial aid for host nation (HN) civil infrastructure impact the HN citizens' satisfaction with government services?" Phase two utilized an alternate methodology in the form of an experimental design to capture the HN citizens' opinions in locations in both the treatment and control group over two survey rounds.

Investigative Question One

The first investigative question posed was: "Why is citizen satisfaction a measure of effectiveness?" As defined by the Department of Defense (DoD), a measure of

effectiveness is "a criterion used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect" (United States Joint Chiefs of Staff, 2014). As related to this research effort, the construction of humanitarian and civic assistance (HCA) projects is rooted in serving the social and economic needs of a HN population. To assess how the construction of these projects address these needs, the effect on the end user, the HN citizen, must be measured to identify the effectiveness of meeting the original objective. As this is the case, citizen satisfaction with government services is classified as a measure of effectiveness for HCA projects.

Investigative Question Two

The second investigative question was: "What is the current HN citizen satisfaction rating prior to the investment of U.S. military financial aid for civil infrastructure?" To establish a baseline of citizen satisfaction levels, surveys were administered during the initial stages of HCA project construction in April 2014. A total of 172 surveys were collected in round one, with a majority of surveys completed in locations without a project. Outside of the control group, the required amount of surveys collected for this administration period was not met. Table 6 shows the descriptive statistics for the survey responses to the citizen satisfaction questions.

Table 6: Round One Citizen Satisfaction Descriptive Statistics

Location	N	Mean	Standard Deviation
Belize City	32	2.96	0.99
Belmopan	5	3.80	0.45
Hattieville	19	2.53	0.71
Control Group	116	2.25	0.83
Total	172	2.45	0.91

Of the surveys collected, the mean citizen satisfaction value was 2.45 with a standard deviation of 0.91. The control group registered the lowest citizen satisfaction assessment with a mean of 2.25 and a standard deviation of 0.83. Hattieville and Belize City returned slightly higher mean values of 2.53 and 2.96, respectively, but still identify that citizen satisfaction with HN services is below average. Belmopan received the highest assessment with a mean of 3.80 and a lower standard deviation of 0.71. Potential reasons for this inflated value are due to the small amount of surveys collected from this location and Belmopan being the capital of Belize, which may see additional resources invested towards government services. Despite the limited survey responses for round one, the survey results identified that Belizean citizen satisfaction with HN government services is below average.

Similar results were identified in previous research conducted by the Latin American Public Opinion Project. In a survey deployed in 2008 to citizens in 23 Latin American countries, a question within the survey asked citizens to assess the quality of municipal services in their community (Montalvo, 2009). Of the 1,390 surveys collected from citizens in Belize, an average citizen satisfaction point value of 39.6 on a scale of 0 to 100, very poor to very good, was identified (Montalvo, 2009). This documented

citizen satisfaction value aligns with the results collected from round one of the survey instrument.

Further analysis identified that there was a statistically significant difference in mean citizen satisfaction levels between Belize City and the control group and between Belmopan and the control group. Reasons in the difference could be attributed to the small amount of surveys collected in Belize City and Belmopan. Additionally, Belize City is the largest city in Belize and the economic activity hub for businesses and tourism. Similar to Belmopan, Belize City may see additional resources for government services compared to the smaller cities and communities that were a part of the control group.

Investigative Question Three

The third investigative question posed was: "What are the priorities assigned to the government services by the HN citizens?" In section one of the survey instrument, Belize citizens were asked to list the top three government services in order of priority. Through categorization of the recorded responses to align with the responsibilities of the Belize government ministries and government sectors, Figure 9 was created. This figure illustrates that education, health care, and national security are the top three government services as defined by the Belize citizens with total percentages of 29.8%, 28.3%, and 19.9%, respectively. These three government services are substantially higher than the next highest government service, human development, which was identified as a top priority in 3.8% of the surveys. This figure further establishes that the HCA projects

constructed during New Horizon Belize 2014 exercise were within the top two government service sectors as defined by the HN citizens.

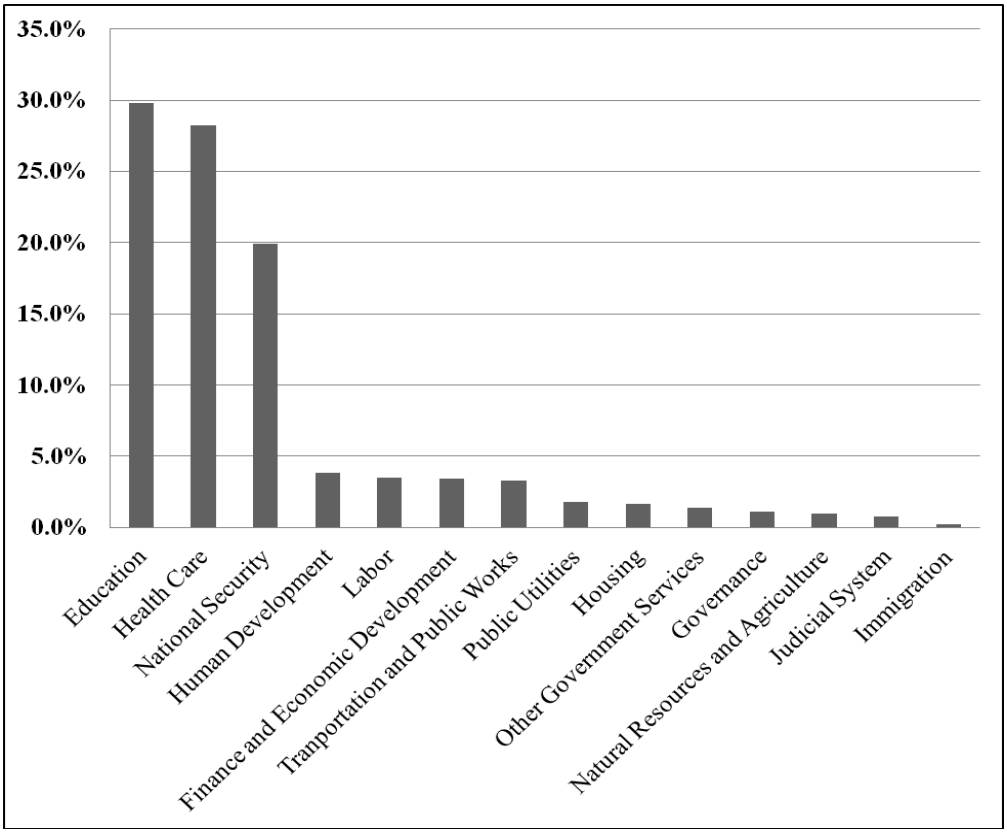


Figure 9: Citizen Priority of Belize Government Services

Investigative Question Four

The fourth and final investigative question was: "Can HN citizen satisfaction of government services be improved through the investment of civil infrastructure projects?" During the final construction phases of the HCA projects in May and June 2014, round two of the survey was administered. A total of 455 surveys were collected during this round. Table 7 presents the descriptive statistics of citizen satisfaction collected during both rounds; the results of round two were similar to the round one

survey results, the mean citizen satisfaction values were below average. In round two, the survey results from Belize City and the control group identified similar mean values, 2.61 and 2.74, and standard deviations, 0.84 and 1.06, respectively. Hattieville was slightly lower with a mean citizen satisfaction value of 2.33 and a standard deviation of 0.93. No surveys were completed in Belmopan during round two. Due to no results recorded during this round and limited results collected in round one, Belmopan was removed from further statistical tests. Review of the mean citizen satisfaction levels for each location between rounds identified that there was a drop in citizen satisfaction levels in Belize City and Hattieville and an increase in the control group. Further testing identified that there was a statistically significant difference between rounds for the control group but not in the locations that received HCA projects.

Table 7: Rounds One and Two Citizen Satisfaction Descriptive Statistics

	Round 1			**Round 2**		
Location	**N**	**Mean**	**Standard Deviation**	**N**	**Mean**	**Standard Deviation**
Belize City	32	2.96	0.99	175	2.61	0.84
Belmopan	5	3.80	0.45	0	-	-
Hattieville	19	2.53	0.71	72	2.33	0.93
Control Group	116	2.25	0.83	208	2.74	1.06
Total	172	2.45	0.91	455	2.62	0.97

To gain a further understanding of the statistical differences between citizen satisfaction values collected by location and round, an analysis of variance was performed in addition to application of the Tukey test. For the analysis of variance, the p-value of the overall F-test was significant at the 0.001 level, which identified that there

was a statistical difference between groupings. Execution of the Tukey test provided further exploration of which groupings were closely related. The multiple comparison Tukey test results are located in Appendix C and provide the comparison of each location by round against all other groupings. Additionally, the results of the Tukey test are seen in Figure 10 and Table 8. The means plot in Figure 10 visually depicts the differences in mean citizen satisfaction values and Table 8 identifies the statistically similar groupings. The first grouping includes both rounds of the control group and Hattieville and round two of Belize City. The second grouping includes both rounds of Belize City, round one of Hattieville, and round two of the control group. As a result of the Tukey test, the only statistically different locations and rounds are Belize City round one with Hattieville round two and control group round one.

The investigation question originally posed was revisited with the results of the statistical tests previously presented. Analysis of the collected survey data identified that there was no statistical impact on citizen satisfaction of HN government services as a result of constructing the HCA projects.

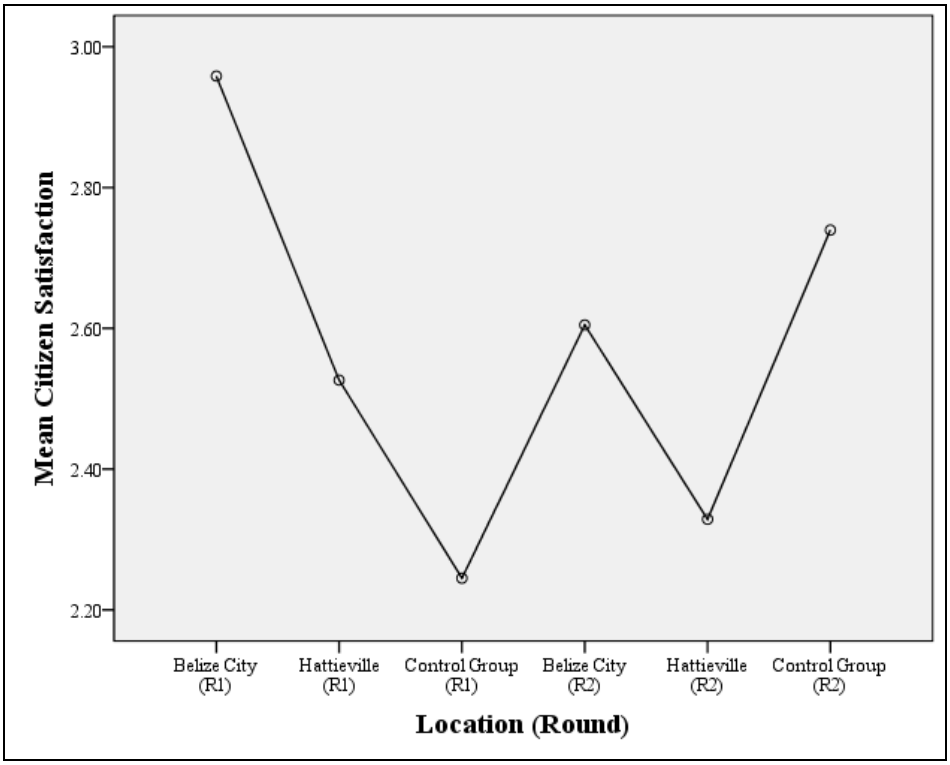


Figure 10: Means Plot of Citizen Satisfaction

Table 8: Citizen Satisfaction Tukey Test Results

Location (Round)	N	Subset for alpha = 0.05	
		1	2
Control Group (R1)	116	2.25	
Hattieville (R2)	72	2.33	
Hattieville (R1)	19	2.53	2.53
Belize City (R2)	175	2.60	2.60
Control Group (R2)	208	2.74	2.74
Belize City (R1)	32		2.96
Significance		0.08	0.18

Review of Findings

Review of the literature and current practices within the sector of foreign assistance, with specific emphasis on assistance provided through military exercises, exposed the existing problems that were explored through the research effort. In an effort to address these problems, the research questions were developed. To review the findings of the research, it is necessary to revisit the research questions that were originally posed. These questions include:

1. What are the precursors to U.S. foreign assistance?
2. How can the investment of U.S. military financial aid for HN civil infrastructure impact the HN citizens' satisfaction with government services?

In an effort to make the most effective use of foreign assistance funds, certain precursors must be in place prior to the selection and execution of a civil infrastructure project. Review of existing literature permitted the development of a proposed list of precursors to U.S. investment in foreign countries. The identified list includes a stable HN government that is committed to development, has the capability to maintain the infrastructure, an identified need within the HN community, resources within the U.S. government agency to perform a project impact evaluation, and the applicability of the investment to U.S. foreign policy interests. While all of the proposed precursors are recommended to be in place prior to the investment of a civil infrastructure, particular emphasis should be placed on assessing the needs of the end users of civil infrastructure, the HN citizens. Through the employment of citizen surveys, citizen satisfaction with HN government services is identified. This provides U.S. government agencies the baseline information to consider in conjunction with the development plans for a HN government to assess if a project is worthwhile.

Implementation of citizen surveys that integrated the concepts of the Expectancy Disconfirmation Theory to include citizen satisfaction with government services were utilized to collect the opinions of Belize citizens concerning their government services. When considered as a whole, the survey data provided support for a revised model in which citizen expectation of government services directly relates to citizen satisfaction and does not have a statistically significant relationship with perceived disconfirmation of government services. Statistical tests of the model also identified that perceived performance of government services has the largest effect on citizen satisfaction, followed by disconfirmation and expectations, which has a limited effect on citizen satisfaction.

Testing the survey data in two rounds identified that there was not a statistical impact of constructing the HCA projects on citizen satisfaction with government services. Contrary to the hypothesis, there was no statistical difference between the mean civil satisfaction values between round two of the treatment group locations and the values collected in round one of the treatment group and both rounds of the control group. Revisiting Figure 10, there was a drop in mean citizen satisfaction between round one and round two for locations with HCA projects and a rise in citizen satisfaction between rounds of the control group.

There are multiple possible explanations for these results. One explanation is the timeline for the two rounds of the survey. Both rounds were conducted during the exercise when the HCA projects were under construction. The limited timeframe between rounds and the fact that round two was collected prior to the completion of the HCA projects did not provide citizens the opportunity to utilize and experience the

benefits of the new civil infrastructure assets. Additionally, the impact of the construction could have had a negative effect on the lives of the HN citizens. Noise and congestion from the construction site, disturbances to other government services, and reduced access to citizen conveniences such as community businesses and transportation through the city are a few of the potential negative effects of the HCA projects. During the execution of the HCA projects, it was observed that adult citizens frequently observed the construction for extended periods of time. Unemployed citizens or HN citizens with a desire for new construction to utilize HN citizens vice armed services from the U.S., partner nations, and Belize could be a contributing factor to the decline in citizen satisfaction values. Further attention is brought to this potential reason for the drop in citizen satisfaction by the high unemployment rate in Belize, which as of 2013 was 15.5% (CIA: The World Factbook, 2014). Another potential reason involved the distribution of the survey. Lack of familiarity with the survey techniques resulted in the (Belize Defence Force) BDF allowing HN citizens to complete the survey themselves as opposed to verbally administering it as originally designed. Additional concerns revolved around the disparity in the number of collected surveys from the required amount of surveys in the survey distribution plan.

Reasons for this significant increase in the control group can be attributed to a large amount of surveys collected in round two being from locations that did not return as many surveys in round one. For example, in round one 15 surveys were completed from Orange Walk in northern Belize and in round two 111 were collected from this location. Additionally, members of the BDF constituted a large portion of the round one control group population but not in round two. Due to these disparities, different demographic

populations within Belize were polled in each of the rounds, which yielded a higher citizen satisfaction assessment in round two.

Significance of Research

The identification of proposed precursors to the investment of civil infrastructure and the exploration impact of HCA projects on the citizen satisfaction with government services provides U.S. government agencies factors to consider during the project selection and assessment phases. The developed research model is a tool that is available for repetition and improvement in future U.S. military exercises in developing countries to assess citizens' perceptions with HN government services. This research identifies that citizen satisfaction with government services is a measure of effectiveness and should be assessed prior to the investment and after the completion of a civil infrastructure project. This inclusion of citizen opinions allows exercise planners to not only consider the development plans of the HN government but to also assess the needs of the end users of civil infrastructure. This attempts to make the most effective use of investment funds through identification of current needs within the community. Additionally, this highlights that HN citizens might be content with the current level of service of the government services and the proper course of action is to not construct a new project if it is not desired and the existing infrastructure is safe and functional.

Future Research

This research effort presents an initial investigation into the precursors and impacts of the U.S. investment of civil infrastructure projects and offers the opportunity for future research. Topics for future research include:

- Further assessment of the effects of the New Horizons Belize 2014 HCA projects on citizen satisfaction with HN government services through longitudinal research.
- Application of the survey instrument to other areas of responsibility where the U.S. is providing financial investment of civil infrastructure. The survey should be translated from English to the local language and reverse translated into English for proper question context. Additional effort should be placed on screening for HN citizen comprehension in the survey development phase.
- Further exploration of the precursors to U.S. financial investment with an emphasis on the nomination and selection processes for civil infrastructure projects. Specifically for HCA projects, what is the balance of improving the readiness of U.S. armed service members with the development plans of the HN and the economic and social needs of the citizens?
- Incorporation of a geographic information system (GIS) into the survey data to identify geospatial trends in citizen opinions with HN government services between communities and over time. This highlights the need for the incorporation of technology in the survey administration to associate the collected survey data to a geographical location.

Summary

The research examined the impact of civil infrastructure projects on citizen satisfaction with government services to understand the effectiveness of HCA projects in developing countries. Through the use of citizen surveys administered during the New Horizons Belize 2014 exercise, application of the expectancy disconfirmation model of citizen satisfaction was supported to model citizens' opinions of government services. Adaptation of the model identified the relationship of citizen expectations, performance, and disconfirmation on citizen satisfaction of government services and revealed that perceived performance of government services was the largest driver of citizen satisfaction. The supported model provides the opportunity for further testing in other developing countries and the exploration of other potential precursors to citizen satisfaction.

As the end users of civil infrastructure, citizens' opinions should be gauged to identify the needs within the community and measure the effect of civil infrastructure projects. As performed during this research effort, surveys to assess the citizen satisfaction of government services are an appropriate method to collect and evaluate citizen opinions. Despite the limited scope of the research on the investment of civil infrastructure in developing countries during military exercises, the assessment of citizen satisfaction is applicable to other U.S. government agencies and non-governmental organizations (NGOs) executing projects in foreign countries. Overall, the research promotes the assessment of citizen satisfaction with government services as a precursor to U.S. civil infrastructure investment and as a measure of effectiveness to gauge the impact of projects constructed during DoD-sponsored exercises on citizens' perceptions.

Appendix A: Survey Instrument

Section 1: What do you believe are the three most important government services? Rank them from 1 to 3 where 1 is most important.	1)
	2)
	3)

Section 2:

On a scale from 1 to 5, with 1 being strongly disagree and 5 being strongly agree, how would you rate each of the following statements for your community?	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I expect the government to provide quality education	1	2	3	4	5
I expect the government to provide quality health care	1	2	3	4	5
I expect the government to provide other public services	1	2	3	4	5
I am happy with the schools	1	2	3	4	5
I am happy with school management	1	2	3	4	5
I am happy with the health care	1	2	3	4	5
I am happy with the local police service	1	2	3	4	5
I am happy with the garbage removal	1	2	3	4	5
I am happy with the quality of drinking water	1	2	3	4	5
I am happy with the cleanliness	1	2	3	4	5
I am happy with the quality of roads	1	2	3	4	5
The government has met my expectations for education	1	2	3	4	5
The government has met my expectations for healthcare	1	2	3	4	5
The government has met my expectations for other public services	1	2	3	4	5
I am satisfied with the public services in my community	1	2	3	4	5
I believe my government is fair	1	2	3	4	5
I am satisfied with the benefits I have received from the government	1	2	3	4	5

Please turn to next page.

Section 3:					
Based on your overall experience in the last 12 months, please rate your community on a scale of 1 to 5, with 1 being strongly disagree and 5 being strongly agree, for each of the following items:	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
3.1) I am happy with the overall quality of the school buildings	1	2	3	4	5
3.2) I am happy with the overall quality of the school teachers	1	2	3	4	5
3.3) I am happy with the overall quality of the learning materials available to students (examples: textbooks, homework assignments, and technology)	1	2	3	4	5
3.4) I am happy with the ability of schools to provide quality education	1	2	3	4	5
3.5) I am happy with the overall quality of the hospitals	1	2	3	4	5
3.6) I am happy with the overall quality of doctors and nurses	1	2	3	4	5
3.7) I am happy with the overall quality of the medical equipment at the hospitals	1	2	3	4	5
3.8) I am happy with the ability of hospitals to provide quality medical treatment	1	2	3	4	5
Section 4:					
On a scale from 1 to 5, with 1 being strongly disagree and 5 being strongly agree, how would you rate each of the following statements?	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
4.1) I am familiar with the types of assistance my country receives from the United States	1	2	3	4	5
4.2) United States assistance helps provide a better standard of living in my community	1	2	3	4	5
4.3) United States training in Belize is good for my country	1	2	3	4	5
4.4) My opinion of the U.S. has improved due to the assistance received	1	2	3	4	5

Section 5: Demographics
5.Age) Age (circle one): under 16 16-25 26-35 36-45 46+
5.Job) Job:
5.Children) Number of children:
5.Education) Highest education level:
5.Location) Location of survey:
5.Gender) Gender: Male Female
5.Date) Date of survey:

Thank you for your participation!

Appendix B: Survey Instrument Exemption and Approval Documents

DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY
WRIGHT-PATTERSON AIR FORCE BASE OHIO

10 Apr 2014

MEMORANDUM FOR DR. AL THAL

FROM: Jeffrey A. Ogden, Ph.D.
AFIT IRB Research Reviewer
2950 Hobson Way
Wright-Patterson AFB, OH 45433-7765

SUBJECT: Approval for exemption request from human experimentation requirements (32 CFR 219, DoDD 3216.2 and AFI 40-402) for the Impact of U.S. Investment for Civil Infrastructure in Developing Countries.

1. Your request was based on the Code of Federal Regulations, title 32, part 219, section 101, paragraph (b) (2) Research activities that involve the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior unless: (i) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) Any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

2. Your study qualifies for this exemption because you are not collecting sensitive data, which could reasonably damage the subjects' financial standing, employability, or reputation. Further, you are not collecting any demographic data which could realistically be expected to map a given response to a specific subject.

3. This determination pertains only to the Federal, Department of Defense, and Air Force regulations that govern the use of human subjects in research. Further, if a subject's future response reasonably places them at risk of criminal or civil liability or is damaging to their financial standing, employability, or reputation, you are required to file an adverse event report with this office immediately.

4/10/2014

X Jeffrey A. Ogden, Ph.D.

Jeffrey A. Ogden, Ph.D.
IRB Exempt Determination Official

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC

APR 2 9 2014

MEMORANDUM FOR AFIT/ENV
ATTN: ALFRED E. THAL, JR., PHD

FROM: AFMSA/SGE-C
Research Oversight & Compliance Division
7700 Arlington Blvd. Ste. 5151
Falls Church, VA 22042-5151

SUBJECT: Human Research Protection Official (HRPO) Review of **FSG20140013E**

References: (a) 32 CFR 219, Protection of Human Subjects
(b) 10 USC 980, Limitation on Use of Humans as Experimental Subjects
(c) AFI 40-402, Protection of Human Subjects in Research
(d) DoDI 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research

In accordance with Reference (a), 101 (b)(2) & Reference (d), the HRPO has reviewed and concurs with the Exempt Determination Official of the following:

FSG20140013E, "Support for the study titled: The Impact of U.S. Investment for Civil Infrastructure in Developing Countries".

Please contact my office to discuss any substantive change to this activity prior to implementation to ensure it does not impact the determination herein or compliance with the above references.

JAMES BENJACK, Lt Col, USAF, BSC
Director, Research Oversight & Compliance Division

Appendix C: Citizen Satisfaction Tukey Test Multiple Comparisons

(I) Location (Round)	(J) Location (Round)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Belize City (R1)	Hattieville (R1)	0.43	0.27	0.60	-0.34	1.21
	Control Group (R1)	0.71	0.19	0.00	0.18	1.25
	Belize City (R2)	0.35	0.18	0.36	-0.16	0.87
	Hattieville (R2)	0.63	0.20	0.02	0.06	1.20
	Control Group (R2)	0.22	0.18	0.82	-0.29	0.73
Hattieville (R1)	Belize City (R1)	-0.43	0.27	0.60	-1.21	0.34
	Control Group (R1)	0.28	0.23	0.83	-0.38	0.94
	Belize City (R2)	-0.08	0.23	1.00	-0.72	0.57
	Hattieville (R2)	0.20	0.24	0.96	-0.49	0.89
	Control Group (R2)	-0.21	0.22	0.93	-0.85	0.43
Control Group (R1)	Belize City (R1)	-0.71	0.19	0.00	-1.25	-0.18
	Hattieville (R1)	-0.28	0.23	0.83	-0.94	0.38
	Belize City (R2)	-0.36	0.11	0.02	-0.68	-0.04
	Hattieville (R2)	-0.08	0.14	0.99	-0.48	0.32
	Control Group (R2)	-0.49	0.11	0.00	-0.80	-0.19
Belize City (R2)	Belize City (R1)	-0.35	0.18	0.36	-0.87	0.16
	Hattieville (R1)	0.08	0.23	1.00	-0.57	0.72
	Control Group (R1)	0.36	0.11	0.02	0.04	0.68
	Hattieville (R2)	0.28	0.13	0.28	-0.10	0.65
	Control Group (R2)	-0.13	0.10	0.72	-0.41	0.14
Hattieville (R2)	Belize City (R1)	-0.63	0.20	0.02	-1.20	-0.06
	Hattieville (R1)	-0.20	0.24	0.96	-0.89	0.49
	Control Group (R1)	0.08	0.14	0.99	-0.32	0.48
	Belize City (R2)	-0.28	0.13	0.28	-0.65	0.10
	Control Group (R2)	-0.41	0.13	0.02	-0.78	-0.05
Control Group (R2)	Belize City (R1)	-0.22	0.18	0.82	-0.73	0.29
	Hattieville (R1)	0.21	0.22	0.93	-0.43	0.85
	Control Group (R1)	0.49	0.11	0.00	0.19	0.80
	Belize City (R2)	0.13	0.10	0.72	-0.14	0.41
	Hattieville (R2)	0.41	0.13	0.02	0.05	0.78

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Vita

Captain Joel Hansen graduated from Michigan Technological University in Houghton, Michigan with a Bachelor of Science degree in Civil Engineering in December 2006. He was commissioned as a Second Lieutenant in the U.S. Air Force through the Detachment 400 AFROTC at Michigan Technological University. He was first assigned to the 17th Civil Engineer Squadron, Goodfellow Air Force Base (AFB), Texas.

While at Goodfellow AFB, Capt Hansen served in the Engineering Flight as a Project Manager and was the Deputy Flight Commander of the Operations Flight. Also, during his time at Goodfellow AFB he deployed to Bagram Air Base, Afghanistan where he was an engineer and project purchasing officer on the Kapisa-Parwan Provincial Reconstruction Team. His second assignment was as an exchange officer with the Navy Seabees where he was assigned to Naval Mobile Construction Battalion Seventy-Four stationed in Gulfport, Mississippi. He deployed with the unit to European Command and Pacific Command to support exercise-related construction and humanitarian and civic assistance projects. In August 2013, he entered the Graduate School of Engineering and Management at the Air Force Institute of Technology, where he earned a Master of Science degree in Engineering Management. Upon graduation from AFIT, he will be assigned to the Air Force Civil Engineer Center and stationed at RAF Mildenhall, United Kingdom.

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14. ABSTRACT
U.S. foreign assistance is used to support regional interests and to address the economic and social needs of host nation (HN) citizens. Within the Department of Defense (DoD), military exercises implement humanitarian and civic assistance (HCA) activities in developing nations as one method of accomplishing the U.S. foreign assistance objectives. To account for the impact of civil infrastructure projects on HN citizens, this research incorporated survey data collected during a DoD-sponsored exercise in Belize to test the expectancy disconfirmation model of citizen satisfaction and analyze the impact of constructing HCA projects on citizen satisfaction with HN government services. The research suggests that perceived performance and disconfirmation contribute the largest effect on citizen satisfaction, while no significant impact on citizen satisfaction was identified from the investment of civil infrastructure projects. Utilization of a geographic information system and an extensive literature review permitted the exploration of U.S. foreign assistance trends to examine the current precursors to U.S. foreign assistance and develop a list of proposed precursors. The research is exploratory and strives to improve the effectiveness of civil infrastructure investment in foreign countries through the measurement of HN citizen satisfaction of government services prior to project selection and during the post-project assessments.

15. SUBJECT TERMS
Foreign assistance, citizen satisfaction, civil infrastructure, humanitarian and civic assistance

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