

Achieving Indigenous Adoption and Sustainability

David E. Walker and Cassandra M. Gale
Dept. 10667
International Cooperative Threat Reduction



Sandia National Laboratories

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.



**U.S. DEPARTMENT OF
ENERGY**

OFFICIAL USE ONLY

ABSTRACT

This study sought to develop a framework which would assist project implementers in their efforts to effectively indigenize technical and policy expertise in SNL's international partners. The initial assumption was that current and past projects undertaken by the Center for Global Security and Cooperation (CGSC) had produced many successful and effective tools and techniques to achieve indigenization and sustainability. As such, this study would be able leverage those tools and techniques to produce a common framework that would enhance SNL's ability to reproduce those past successes. Data was collected for this study by conducting a series of interviews and focus groups in order to elicit information about SNL's efforts and capabilities. The interviews focused on collecting data ranging from understanding definitions of sustainability and indigenization to financial considerations and various project management considerations. Initial findings showed that the problem statement originally formed in this study's hypothesis was missing elements of customer and in-country partner needs and goals which lead the interview team to adapt the original goal to determine what elements produced a success project rather than developing a framework. Overall the study found four main components that each successful project shared: the need to answer the right question, involve an institutional champion, the need to understand key stakeholders, and finally the need continually survey the project landscape.

They needed to answer the right question in terms of defining sustainability and indigenization and the goals associated with those definitions. They needed an institutional champion at the in-country partner organization to support project goals and gain support. They needed to understand key stakeholders, the roles they play, and when to engage those stakeholders. And last they needed to understanding of the landscape of the project to develop the correct definitions, to gain the support of the institutional champion, and to develop an effective stakeholder engagement plan.

CONTENTS

1.	Introduction.....	5
1.1.	The Project and Goal	5
2.	The Hypothesis	5
2.1.	Expected Outcome.....	5
2.2.	Assumptions	6
3.	The Approach.....	6
3.1.	The Interview Process.....	6
3.2.	Focus Group	8
4.	Results	8
4.1.	Answering the Correct Question-Competing Goals and Definitions	9
4.2.	Institutional Champion.....	9
4.3.	Understanding Key Stakeholders and When to Involve Them.....	9
4.4.	Surveying the Project Landscape	10
5.	Recomendations	10
5.1.	Project Constraints.....	10
5.1.1.	Competing Goals	11
5.2.	Suggestions to Improve Upon Current Results	11
6.	References.....	12
7.	Appendix A: A Framework of considerations.....	13
8.	Appendix B: Follow-On Studies.....	15
8.1.1.	The Integrated Security Design Workshop.....	15
8.1.2.	Developing In Country Buy-In: An Experiment in Cross Discipline Engagement	15

Nomenclature

CGSC Center for Global Security and Cooperation

CMC Cooperative Monitoring Center

CTR DOS's Cooperative Threat Reduction

DOE Department of Energy

DOS Department of State

HEU Highly Enriched Uranium

NA-20 NNSA's Defense Nuclear Nonproliferation

NNSA National Nuclear Security Administration

PI Principal Investigator

SNL Sandia National Laboratories

WMD Weapon of Mass Destruction

U.S. United States

USG United States Government

VRS Visiting Research Scholar

1. INTRODUCTION

This report will discuss the findings of a study conducted by members of the Business Operations Staff at Sandia National Laboratories (SNL) who support the Center for Global Security and Cooperation (CSGC). The study sought to develop a framework which would assist project implementers in their efforts to effectively indigenize technical and policy expertise in SNL's international partners. Throughout SNL's Center for Global Security and Cooperation a recurring goal is to indigenize skills and capabilities in accordance with U.S. government (USG) policy objectives within our partner nations. As such, an accompanying expectation is that the USG will provide our partner nations with these indigenized skills and capabilities that they will eventually sustain domestically without USG funding and support. Through meeting these objectives, SNL fulfills USG goals in many mission areas including "...Work(ing) closely with a wide range of international partners, key U.S. federal agencies, the U.S. national laboratories, and the private sector to detect, secure, and dispose of dangerous nuclear and radiological material, and related WMD technology and expertise,"¹ and "...Support(ing) cooperative research and development worldwide to prevent terrorist access to dangerous biological agents."²

1.1. The Project and Goal

This purpose of this study was to identify actions that successfully facilitated indigenous adoption and sustainability. Once identified, these successes would be leveraged to support the same types of efforts in other projects. By assessing and collating successes from many mission areas and regions of the world, a framework would be produced that would assist principal investigators (PI's) as they manage projects which have indigenous adoption and/or sustainability as an end goal.

2. THE HYPOTHESIS

In this study, the initial assumption is that current and past projects undertaken by the CGSC have produced many successful and effective tools and techniques to achieve indigenization and sustainability. As such, this study would be able leverage those tools and techniques to produce a common framework that would enhance SNL's ability to reproduce those past successes. Given the widely varied nature of the work in the CGSC, due to vertical mission spaces at the NNSA and CTR, there was a clear and distinct opportunity to leverage existing tools to increase the CGSC ability to achieve indigenization and sustainability by conducting a cross-disciplinary study.

2.1. Expected Outcome

¹ (Nuclear Nonproliferation Program Offices)

² (Office of Cooperative Threat Reduction)

The expectation of this study is that if the key capabilities currently employed within the CGSC are identified they can be combined into a tool set that will increase the overall effectiveness of the Center. Each project throughout the history of the CGSC has overcome obstacles and developed processes that are valuable to the greater Center objectives. These opportunities for improvement can be applied across the CGSC, creating efficiencies by leveraging successes.

2.2. Assumptions

Initial assumptions were developed to provide the study's structure—the goals of the Center, the capabilities currently employed, and methods of collecting data are explored in this section. This study began by assuming the CGSC could be better served by leveraging current capabilities into a tool set because multiple organizations within the Center share common and consistent goals and definitions of indigenization and sustainability. It was also assumed that, because of their familiarity with project work and capabilities, manager's recommendations for interview candidates would be the most effective means of selecting interviewees. It was also assumed that the interviewees provided a representative sample of the population.

3. THE APPROACH

Data was collected for this study by conducting a series of interviews and focus groups in order to elicit information about SNL's efforts and capabilities. Through this process the interview team would be able to identify best-practices, considerations, and capabilities. This information was then used to better understand how to produce indigenization and sustainability in CGSC projects.

3.1. The Interview Process

Interviews were conducted with managers and PI's representing International Nuclear/Radiological Security, International Nuclear Threat Reduction, International Nuclear Security Engineering, and International Biological/Chemical Threat Reduction, organizations within the CGSC. Interviews were chosen as the means of collecting data due in part to the wealth of undocumented experience within the CGSC. A general interview guide was used in order to adapt the questions based on the interviewee's answers while obtaining information pertinent to the following categories:

The relevance of indigenous adoption and sustainability in project goals. It was determined that if indigenous adoption and sustainability were not primary goals of the project, then it would need to be understood that our initial assumption may skew the results of our questioning. This is to say that it was assumed that all projects had these common goals and that our questions were designed to find out how they worked toward achieving them and that if they did not in fact have those goals our questions would not provide the desired information. However, if the interviewee stated that these topics should be, but were not, considerations in their project the other interview questions may give insight into disconnections between SNL, its partners, and its customers.

Personal definition of indigenous adoption and sustainability. In an attempt to understand the interviewee's perspective of what sustainability would include and the requirements for a project to develop indigenous adoption, this topic area was used to solicit a definition provided by the interviewee. The definitions also provided the identification of actions that were already being taken in order to support these initiatives. In addition, this question would determine if the interviewee viewed these topics interchangeably or if they perceived them to have unique meanings.

Congruence of indigenous adoption and sustainability goals between SNL and the customer. Inconsistent goals between USG customers and SNL can affect indigenization efforts and program sustainability. Exploring this question, the study sought to understand how goals between partner organizations were prioritized.

Using a business plan to determine indigenous adoption and sustainability efforts. In order to better understand the extent to which projects are planned and executed, the outline of a basic business plan was used to conduct interviews. By asking questions relating to a business plan, the study sought to compare the requirements to produce a sustainable business to that of a sustainable CGSC project. As is typical to creating business plans, questions were developed which pertained to the products/services mix, economics, marketing, operations, scheduling, risk management, finances, and politics.

Products and services. By focusing questions on the products/services mix, this study attempted to determine how capabilities are adopted by the in-country partners. Using this traditional concept of providing products and services to the in-country partner allowed the study to better capture how both SNL and the in-country partner conceptualized the engagements. Inquiries were also made to understand if future products or services were considered in order to support sustainability.

Economics. This section of questioning was intended to understand how projects intended to transition from fully USG funded to obtaining domestic funding. Since the USG intends for their engagements to be limited in time, the questions in this section sought to understand if the country could support the equipment and skills SNL provided, if there were competing organizations with similar skills and equipment, and if the in-country partner had a means of obtaining the funding available in their country or region.

Marketing. As part of considering the complete lifecycle of the in-country partners' organization the questions in this section were intended to better understand if SNL had the means or intention to support the efforts of our in-country partners to promote their new skills and capabilities, to elicit financial support, to raise awareness and gain regional support.

Operations. Interviewees were asked to discuss SNL's ability to influence the selection of management teams, integrate indigenous adoption and sustainability efforts into daily operations, and affect staffing considerations.

Schedule. This series of questions was designed to determine if SNL used comprehensive scheduling from project initiation to project closeout to ensure their ability to meet end goals. By

investigating the breadth of considerations within projects throughout their lifecycle at SNL, the study sought to better understand if efforts to support sustainability were continuous or a series of intermittent bursts of effort.

Risk. The study sought to understand both the types of risks considered and any available means to mitigate risk. Consideration was given to how risks are documented, managed, and mitigated or leveraged.

Finances. After considering economic environments in order to understand the availability of funding for the in-country partners, this section focused on understanding if the organizations would have the financial means to sustain and utilize the skills and capabilities put in place by SNL. Interviewees provided insight into SNL's ability to assist in-country partners in obtaining funding to operate their facilities or equipment on a daily basis.

Politics. The effect of in-country national policies on the sustainability of projects was also examined in order to understand them as sources of risk and opportunity. The questions in this section were meant to provide a better understanding of the types of considerations necessary in international projects as well as determining if SNL had the ability to impact those considerations in any substantive manner.

3.2. Focus Group

The objective of this exercise was to understand the multidisciplinary prospective of the various departments within Sandia's CGSC. During the focus group, attendees were asked to review the findings of the study. They were then led in a discussion to explore ways to improve on completeness, provide missing elements, and increase utility. During this exercise attendees chose an existing project and worked through applying the findings of the study to that project. As they worked through the findings the interviewer's noted inconsistencies in interpretation, missing elements, suggested additions and revisions.

4. RESULTS

The findings of this study were useful in understanding the circumstances and capabilities that lead to success and failure. Initial findings showed that the problem statement originally formed in this study's hypothesis was missing elements of customer and in-country partner needs and goals. It was found that determining the correct question to answer in terms of defining sustainability and indigenization and the goals associated with those definitions was the foremost need. Second, the study shows that an institutional champion at the in-country partner organization directly impacts the ability of our projects to reach these goals. Third, the need to understand key stakeholders, the roles they play, and when to engage these stakeholders greatly impact indigenous adoption and sustainability goals. Stakeholder engagement strategies are of utmost importance as the goals and expectations of each can vary widely. Creating the

stakeholder strategy requires a thorough understanding of the landscape of the project and also demands considering the needs and goals of competing stakeholders. One of the points made by interviewees was the need to understand both the technical and political landscape in which they worked and the impact those perspectives had on project success.

4.1. Answering the Correct Question-Competing Goals and Definitions

The original objective of this study was to support the indigenization and sustainability goals of SNL's CGSC. As the study progressed, it was realized the USG goals often dictate the actions of CGSC projects more than any other. While USG goals are ultimately the reason for conducting CGSC projects, the goals of the in-country partner as well as SNL play a key role in achieving success. This is to say the USG goals are those driven by US policy and are of paramount importance, SNL goals are aimed at producing long term success that can be repeated and easily adopted by our in country partners, and our in-country partner goals are often a mix of their own policy and technical objectives. The realization that there were these three often competing sets of goals became a significant finding. In order to end a project successfully, PI's must take the time to fully understand these competing goals, prioritize them, and work to steer the project to achieve them in a manner that satisfies the three key stakeholders.

4.2. Institutional Champion

The concept of an institutional champion reappeared often in projects that had great success. Those projects that have a single key individual at the institution of the in-country partner often experience great success in consistently achieving stakeholder objectives, largely due to their personal interest in the project. Interviewees in the CGSC commonly commented that they have experienced levels of post engagement success parallel to the level of interest and engagement by their in country partners. The project's champion has a personal interest in the outcome of the project. This interest promotes close collaboration with the in-country organization which ensures their goals are clearly defined while ensuring that USG and SNL goals are incorporated into the goals of the in-country partner. Examples of this range from projects like the Middle East Scientific Institute for Security (MESIS) to Khalifa University's Gulf Nuclear Energy Infrastructure Institute (GNEII). The projects were equipped with key individuals who held the authority to make decisions for their organizations and were also able to negotiate with SNL and USG representatives to ensure the goals of their organization, the USG, and SNL were met.

4.3. Understanding Key Stakeholders and When to Involve Them

Throughout the lifecycle of a project there is consistently a need to involve stakeholders in a substantive manner that does not disrupt the flow of work. In order to produce long term sustainability and indigenization there is a clear need to define the various stakeholders' level of control, whether real or perceived, and the level of impact they view themselves having on

project goals. Project milestones and reporting must be tailored around these stakeholders, providing information consistent with these expectations. Through this action projects are better able to make small adjustments to meet or mitigate competing needs and clarify misconceptions. Because all stakeholders, regardless of control over the project, have their own set of goals and definitions it is of paramount importance to involve them in a manner that allows the PI to make adjustments to the project that will produce the desired outcomes while minimizing project disruptions.

4.4. Surveying the Project Landscape

Nearly every individual interviewed was able to describe the landscape in which their projects operated, but each felt they only had the ability to impact specific elements of their project landscape. Interviewees articulated that early in the project lifecycle political and technical factors should be considered, both within the U.S. and in our partner countries. These considerations ranged from providing technical equipment, to providing trainings on technical skills, to training project managers. Understanding these competing constraints allows PI's to anticipate and proactively affect the areas that often have the most significant impacts on their projects. Many interviewees suggested that solutions provided to in-country partners by the CGSC may be under-utilized when direct engagement ends in the scenario that in-country goals do not align with USG objectives. This is to say that in-country partners are willing to work with SNL and USG goals so long as USG funding is provided, even when they have diminishing interest in the collaboration. In these cases, interviews suggest that when the US portion of the engagement ends the indigenization and sustainability goals are impacted in a negative way. By understanding the project landscape sufficiently enough to define the motivations and objectives of the in-country partner, CGSC projects have a higher likelihood of providing projects that gain the buy-in of those organizations engaged.

5. RECOMENDATIONS

5.1. Project Constraints

Consider the constraints of this study in order better understand the results. The constraints which varied from logistical considerations to overarching political constraints impacted the completeness of this study's result. Logistically, a lack of time and personnel availability hampered the ability to conduct an extensive set of interviews. There was an inability to fully control the number of focus groups, as well as who attended them. As we moved through this project, each interviewee provided information pertaining to what they viewed as important at the time of the interview. Therefore, it may be useful to repeat a series of these interviews to analyze the change in information and determine the impact.

Recognizing the recurring conflict between USG customer goals, Sandia goals, and those of the in-country partner significantly impacts the conclusions drawn. This study was focused on a perceived desired outcome; therefore the results may have been skewed to support that outcome.

In order to correct this bias, further study should be conducted to understand the interdependency of competing goals and how this competition effects indigenous adoption and sustainability.

5.1.1. Competing Goals

The initial assumption of this study was that SNL goals to support indigenous adoption and sustainability were consistent across all projects. The belief was that each project did intend to reach these outcomes and that, if successful, SNL would be able to increase its impact on USG policy objectives. The goals of SNL's CGSC varied widely based on which of the USG objectives the projects were intended to meet. As such, this study adapted to better understand what went into indigenous adoption in order to better understand the problem.

Similar to the Sandia goals described above, this study initially made poor assumptions regarding the USG goals of the National Nuclear Security Agency's NA-20 and Department of State's Cooperative Threat Reduction (CTR), the two main funding providers of projects involved in this study. Initial assumptions were that the USG goals would be better served if SNL could reach complete indigenization and sustainability in every project. As with the Sandia goals this was found to be partially correct. While the USG does consistently have the goal of ending its engagement after some period of time, success is often measured in the number of engagements conducted, the change in capabilities over time, or the ability of the in-country partners to find and secure local funding. While these were found to be important factors, each taken alone does not provide an indigenous and sustainable end product.

5.2. Suggestions to Improve Upon Current Results

One of the most important steps is to improve on the problem statement by including the often opposing goals of the USG customer, SNL, and the in country partner and to repeat this study at some reasonable interval, long enough for goals and priorities to change, in order to determine if the findings remain accurate over time. Additionally, greater care could be taken in selecting interviewee's to ensure a more complete representative sample. In the current study, the Cooperative Threat Reduction group was studied extensively, the Global Engineered Security Systems group was considered to a lesser degree, and International Non-Proliferation and Arms Control group was not considered at all. Improved results could be obtained by including a more homogenous group. While there are other areas of improvement these key changes would produce a more impactful result.

6. REFERENCES

1. Jennifer Gaudioso, Ph.D.
2. Amir H. Mohagheghi, Ph.D.
3. Kent Biringer, PE
4. Dominic Martinez
5. Mark E. Ekman, Ph.D.
6. Adriane Littlefield, MPA, PMP
7. Geoff Forden Ph.D.
8. Ashley Stapp
9. Laura E. Jones, MS
10. Richard Kottenstette
11. Nicholas Winowich, PE
12. Janice Leach
13. John Pelletier
14. Paul Trask

7. APPENDIX A: A FRAMEWORK OF CONSIDERATIONS

The framework presented in this section was originally developed with the intention of providing a tool that could be used by project PI's to guide their projects toward achieving the goals of sustainability and indigenization. It was determined that the results of this study did not provide enough information to develop such a tool. As such the table presented below was developed as a visual aid to describe the suggested considerations and to illustrate the points in the project lifecycle they should be contemplated.

The framework is broken down into the five basic phases of a project—initialization, planning, execution, controlling, and closing. Under each of these phases the framework provides a list of considerations the PI may take into account as they see fit. In addition, each consideration provides a suggested flow to aid the reader in utilizing the framework. Most of the proposed considerations are connected on three or four sides by other considerations at different points in the project lifecycle. In order to guide the reader, axes are presented denoting the flow of general to specific considerations and project timeline.

	Initialization	Planning	Execution	Controlling	Closing
General Consideration	What are the goals of the USG's customer?	Can the goals of the USG, SNL, and the in-country partner be met simultaneously?	In this project, does indigenous adoption equate to sustainability? Or are they separate issues?	Is your USG customer goal indigenous adoption and sustainability?	Was indigenous adoption and sustainability achieved?
	What are the goals of the in-country partner?	Can goals be prioritized?	Is the in-country partner being asked to do more than the U.S. is required to do?	Should it be?	In order to track progress, can we maintain a relationship with our partner after SNL funding has been depleted?
	What are the goals of SNL?	Can goals impact sustainability and indigenous adoption? How?	If so, can we explain why?	Can SNL support indigenous adoption and sustainability on its own, without jeopardizing other goals? How?	
	What is the end goal?	Can a plan be developed and mapped that will support sustainability and indigenous adoption over time, or for the long-term?	Can we assess the impact of the situation and discuss it with the USG customer?	Will you be able to determine when the topic that has been taught has been adopted?	
	How does the USG define sustainability and indigenous adoption?	How will progress be measured?	Is sustainability/indigenous adoption measured by a "change-in" over time?	Will you be able to determine when the topic has been indigenized?	
	How does the in-country partner define sustainability and indigenous adoption?	Does the in-country partner have a need to gain regional support?	What metrics can be developed in order to measure the change?	Are metrics available?	
	How does SNL define sustainability and indigenous adoption?	Does the in-country partner need to obtain funding?	Should we support a "less-than-perfect" product in order to use in-country personnel and products?	Do they measure indigenous adoption and sustainability?	
	Who drives the goal definition? Can you define goal requirements? Will defining requirements help raise awareness through education? Will it support buy-in?	Can we help our partner make these gains? How?		What capabilities will the partner need in the future? How will those capabilities be obtained?	
	Is it possible for USG and partner to map their individual goals in order to define a common one?	Is there competition between in-country organizations? Could the competitive environment affect sustainability?	Is this project sustainable with the in-country resources?	How much funding will it take to operate in-country?	Does your final report provide insight into indigenous adoption and sustainability goals and effectiveness?
	Does the USG have in-country buy-in?	Are in-country funding levels able to support the competing organizations?	Who will be the in-country manager?	How can we help our partner obtain funding?	Can others access it?
	Are there other USG implementers that may have an impact on your project?	Should risks to indigenous adoption and sustainability be documented?	Should SNL influence the decision?	What staff will the partner need? What costs are associated with staffing needs?	
	What in-country political factors will affect sustainability?		Can SNL influence the decision?	Is the cost a threat to sustainability?	
Project Lifecycle					
Start			Finish		

8. APPENDIX B: FOLLOW-ON STUDIES

Throughout the course of this study there were various suggestions and ideas on how to improve sustainability and indigenous adoption efforts within the CGSC that did not fit within the parameters of the study. Because the ideas were strongly supported by various individuals throughout the center, those ideas are presented here as suggestions for future studies.

8.1.1. The Integrated Security Design Workshop

The International Security Engineering group has developed an Integrated Security Design workshop that is delivered to foreign partners and contains a module on maintenance and sustainability. The current module explains the roles that employees should fill and gives a brief overview of the costs of maintenance and repair of physical equipment. However, this module does not explore other sustainability topics, such as financing, project management, personnel development, staffing, etc. Expanding this module to include business topics which are vital to creating a sustainable organization, and teaching these topics to our foreign partners, would result in more completely indigenized skills and organizations which are able to self-sustain. This module could also be shared with our foreign partners via an online training database, in which the material would be available on demand.

8.1.2. Developing In Country Buy-In: An Experiment in Cross Discipline Engagement

This effort would combine a visiting research scholar (VRS) engagement designed to host a VRS who is also engaged in another CGSC project. By bringing in a single person or group VRS from one of the organizations involved in technical engagement, we would seek to prove that by combining SNL competencies we can not only provide the technical equipment and skills necessary to meet USG goals, but we can affect the organizational desire to maintain and continue to implement these technical skillsets post USG engagement. Using existing Sandia competencies in a cross disciplinary manner would enable the achievement of a greater degree of buy-in from our international partners.