

INTERNATIONAL DEVELOPMENT PROJECT IN NIGERIA



The George Washington University

DN5C 6254 Risk Management

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Table of Contents

Cover Page.....1

Table of Contents

Background 4

Risk Model Components 4

Risk Event Identification 4

Sources and Threats 5

Objectives 8

Measurements 8

Participants 9

Likelihood of Events 10

Risk10

Risk Map10

Risk Results 14

Controls 15

Controls for Consequences 17

Value of Controls 18

Overall likelihoods, Impacts and Risk Control.....18

Loss Exceedance Curve with and without control.....19

Optimization & Recommendation..... 19

Bow tie Diagram.....20

Annex A: Risk Event Details.....	21
Potential Control for the Project.....	22
<i>Controls for Threats</i>	23
<i>Controls for Vulnerability</i>	24
Control Optimization.....	24
Conclusion and Optimization.....	25
References.....	25

Background

Nigeria with approximately 187 million inhabitants, accounts for 47% of west Africa's population, and has one of the largest populations of youth in the world. Although Nigeria is one of the largest economies in sub-Saharan Africa, It must overcome significant development and governance challenges to fulfill its true potential. Per the United Nations, the country has one of the lowest per capita social spending levels resulting in sixty-five percent of the 186 million citizens living in extreme poverty. These conditions breed disaffection in youth, provide an entry point for Islamic extremism, entice corruption, and promote ineffective governance.

Northeast Nigeria has become one the world's most complex humanitarian crises due to the Boko Haram insurgency and extremely low levels of development in the region. Additionally, acute insecurity, protracted displacement, loss of income, and lack of agricultural production as a result of the Boko Haram insurgency have left millions of people vulnerable. Also, a restive insurgency in the Delta region, perennial inter- communal violence across the middle belt.

To combat these many challenges, USAID seeks to grow stability in Nigeria through improved social services, transparent and responsive government, a market -led economy, and humanitarian assistance. The world Bank Group(WBG) has employed a strong partnership with Nigeria that has deepened significantly over time and other international organizations. The Department for International Development(DFID) has defended its aid budget of E200m aid to Nigeria over the next four years.

It is essential for the donor agencies to be abreast with the risks their projects are vulnerable to, and also how to mitigate their exposure to and impact from them as well as the safety and well-being of their staff and properties.

Risk Models Components

The elements that make-up and prioritize the risks facing this project includes the following;

- (a) Events or risk events
- (b) Sources

- (c) Objectives. In order to identify, analyze and eventually manage these risk elements, Expert Choice Riskion software will be used. This tool enables a team of project experts to collaborate in identifying risks, prioritizing objectives and selecting controls to mitigate them.

Below are steps taken in order to build this risk model.

Risk Event Identification

For the purpose of risk analysis and management, an event, or risk event, is defined as an uncertain occurrence that results in a loss or other negative impact to an objective or asset. As this type of program would require a staff of approximately 50– 60 full-time employees on the ground in Nigeria, which would include about seven to ten foreign experts, I focused on risk events that would impact them and their work.

Find below the list of events, which ranges from highly unlikely to somewhat common. For a more detailed description of them, please see Annex A: Risk Event Details.

Unique ID		Events 
[1]		Bomb Detonation
[2]		Electrical Power Failure
[3]		Lower Exchange Rate
[4]		Lack of Access to Financing
[5]		Government harsh policies on investors
[6]		Inadequate Infrastructure
[8]		Staff not following policies and procedures properly
[9]		Economic crash
[10]		Communication loss

Figure 1: Risk Events Facing International Development Projects in Nigeria.

Sources and Threats

Following the identification of the risk events above, I researched to find the factors that cause them to take place, and/or increase their likelihood. These are defined as sources, or threats; although they may lead to an event, which in turn negatively impacts an objective or asset of the project, the sources do not themselves cause losses. Each source can potentially lead to one or more risk events.

Despite the aggressive military response, both local, national and international to the Boko Haram insurgency in the North East Nigeria, neither the army nor the Nigerian emergency services are up to the task. It is entirely possible that Boko Haram's attacks and suicide bombings in and around IDP camps are attempts by the insurgents to stop the flow of people from areas under their control.

Below are the types of sources that can be found in this type of environment.

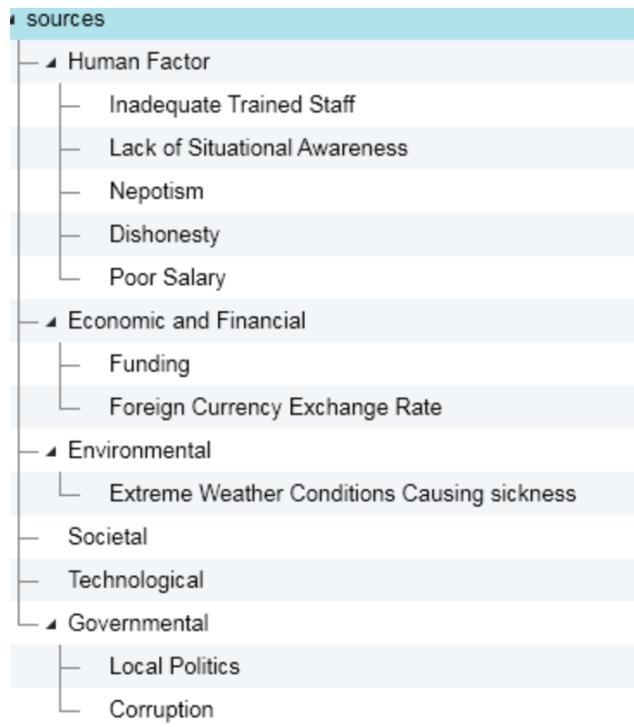


Figure 2: Sources /Threats Affecting the Project’s Vulnerability.

From the above, I identified twelve sources grouped into four clusters by their similarities. This allowed project managers and expert participants who assisted in the risk model, make effective and efficient judgements.

A review of the results of hundreds of world Bank projects by Youker indicated that success or failure often depends on factors in the general environment outside the control of the project manager. The review pointed out that in the management of projects, a good understanding of the different features and factors within the environment that can have an effect on the project is essential. This can form a basis for analysis for overcoming or mitigating their effects on projects performance.

Find below the four clusters:

- i) Human factors: Human factors played an important role in determining the performance of a project. These involves project managers, expatriate workers, contractors, sub-contractors and local staff. Five sub- sources are identified here, inadequate trained staff, lack of situational Awareness, nepotism, Dishonesty and poor salaries. Ugwu and Haupt remarked that both early contractor involvement and early supplier involvement would minimize constructability-related performance problems including costs associated with delays, claims wastages and rework.

A restive insurgency in the Delta region, incessant kidnapping of expatriate workers, militancy and demand by the groups of unemployed youths for illegal fees popularly called “settlement” usually causes delays ranging from days to weeks on project activities.

li) Economic and financial: The private sector being the major driver of the economy in Nigeria is faced with challenges mainly power, a poor regulatory environment and lack of access to finance. A challenging task for any project manager is to ensure that a project is financially viable within a fluctuating economic environment (Odeh and Battaineh 23) and since periodic economic cycles significantly affect the activities of international development projects, accurate trends both local and global is important.

lii) Environmental: Project environment in many developing countries like Nigeria present special challenges for project managers that almost presupposes extensive cost and time overruns even before a project commences. A review of the results of hundreds of world bank projects by Youker (19) indicated that success or failure often depends on factors in the general environment outside the control of the project manager. The review pointed out that in the management of projects, a good understanding of the different features and factors within the environment that can have an effect on the project is essential. This can form a basis for analysis for overcoming or mitigating their effects on project performance.

The physical environment within which projects is sited may impact considerably on its development as projects are always affected by physical influences. The geographical location of a project, ground conditions and weather patterns are the most common examples of physical influences. They are unpredictable and as such management actions has not been able to prevent their occurrence. Example of such was the recent flooding in Benue State Nigeria that rendered thousands of people homeless.

iv) Governmental: The significant roles played by government are that they regulate the national economy, enforce compliance with Acts and Regulations. As observed by Mansfield et al. (25), governments may also invoke their powers to initiate or stop projects on political, social and environmental grounds. Political stability, national unity and good political leadership are thus crucial to national development. Thomas and Martin believed that no project exists in a vacuum but is rather subject to an array of influences from regulatory control to political and industrial intervention and opined that project managers will take cognizance of the political aspect that can produce an uncertain environment such as unstable government, unpredictable shifts in the economy and unexpected changes in consumer demand.

Objectives

The next step in the process is to identify the objectives of the project and its team. Within the risk framework, objectives (or assets) are what's vulnerable. Should a certain risk event be triggered by one or more of its sources, it will cause a loss to one or possibly more objectives. I came up with the following list of objectives that would suffer losses from the identified risk events.



Figure 3: International Development Projects objectives and sub objectives

The identified variables are categorized under three clusters of financial, satisfaction and Environmental with their sub- objectives and it showed that they had significant relationship. Strategic plans and goals must take funding realities into account. Achieving short term financial objectives in a chaotic environment like North East Nigeria requires maximum flexibility and creativity. There must be greater appetite and reward for sensible risk taking.

The pursuit of short-term financial goals must not come at the expense of long term development. Explicit high level affirmation of the strategic importance of long term development programs in Nigeria would begin to even the balance between short term and long term priorities. The other two objectives deal with satisfaction that is the well-being of the Nigerian people, reputation of the international Agencies like World Bank Group who is an active partner in donor coordination and its partners in Nigeria and last cluster being environmental which was explained above.

Measurements

The likelihoods of events occurring, and the degree of their impacts can be calculated. To derive this information, I used the help of expert evaluators' judgements, logic and historical data where available.

Participants

For the purpose of this project, I used my course mates as fictional characters. To help analyze the likelihood of the risk events and sources, as well as their relationships with one another, a panel of three technical experts who have worked on International Development Projects in Nigeria were selected.

Together, they used their experience-based judgements to measure and determine the likelihoods of the events and sources, as well as the impacts the events would have on the objectives. Using Riskion software, the three experts and two project managers conducted measurements that, once synthesized with one another, would provide a risk event hierarchy.

Add Participants		Edit	Set Permissions	Remove Participants	Priorities	Participant Attributes	Participant Groups	Export...	Search:
<input type="checkbox"/>	Email Address	Participant Name			Permission	Has Data?	Disabled?	Action	
<input type="checkbox"/>	Admin	Admin user			Project Manager	No	<input type="checkbox"/>		
<input type="checkbox"/>	davidstein@gwu.edu	David Stein			Evaluator	No	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	drobertson86@gwu.edu	Douglas Robertson			Evaluator	No	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	bombaito@gwu.edu	Francis Bombaito			Evaluator	Yes	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	minapnh@gwu.edu	Mina Panahi			Evaluator	Yes	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	nstavrakakis@gwu.edu	Nicholas Stavrakakis			Project Manager	Yes	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	ofuni_agada@gwu.edu	Ofuni Agada			Project Manager	Yes	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	forman@gwu.edu	Professor Forman			Project Manager	No	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	drobertson86@gwmail.gwu.edu	Robert Douglas			Evaluator	No	<input type="checkbox"/>	🔑 🗑️ 🔗	
<input type="checkbox"/>	swaroop82@gwu.edu	Swaroop Bantwal			Evaluator	No	<input type="checkbox"/>	🔑 🗑️ 🔗	

Figure 4: List of Participants and Roles

Copy Roles
Paste Roles
Allow All
Drop All
Restrict All
Manage Groups
Edit Mode
 Roles Statistics

Participants
Groups

	Participant Name
<input checked="" type="checkbox"/>	Admin user
<input type="checkbox"/>	David Stein
<input type="checkbox"/>	Douglas Robertson
<input type="checkbox"/>	Francis Bombaito
<input type="checkbox"/>	Mina Panahi
<input type="checkbox"/>	Nicholas Stavrakakis
<input type="checkbox"/>	Ofuni Agada
<input type="checkbox"/>	Professor Forman
<input type="checkbox"/>	Robert Douglas
<input type="checkbox"/>	Swaroop Bantwal

- sources
 - Human Factor
 - Inadequate Trained Staff
 - Lack of Situational Awareness
 - Nepotism
 - Dishonesty
 - Poor Salary
 - Economic and Financial
 - Funding
 - Foreign Currency Exchange Rate
 - Environmental
 - Extreme Weather Conditions Causing sickness
 - Societal
 - Technological
 - Governmental
 - Local Politics
 - Corruption

Figure 5: Project Participants' Roles for Evaluating Sources / Threats

In many cases, the evaluation of one team member, or group, would be based in more experience or specialty with specific sources and/or events, and therefore be more valuable. When this is the case, one might exclude others from types of evaluations. Because this project evaluators have all worked in Nigeria and are technical experts in international Development projects, they are fully aware of the multiple events and sources that this project is vulnerable to. Therefore, they have all contributed equally in this evaluation.

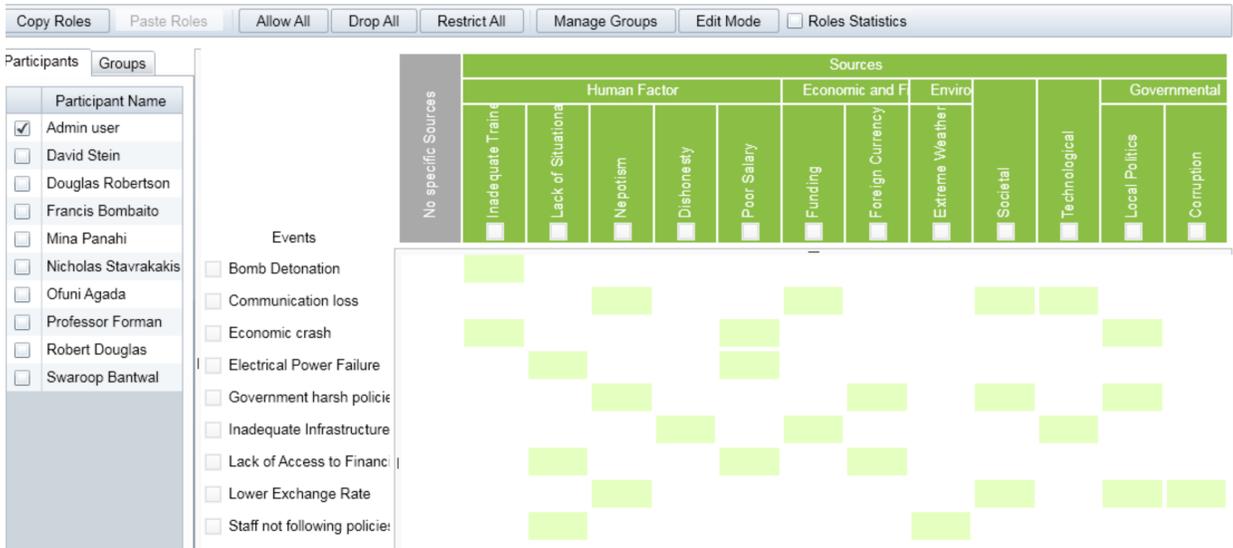


Figure 6: Example of one project Participant’s Role for Evaluating Risk Events.

Likelihood of Events

With the two structured hierarchies of identified events and their sources, we may begin to derive the likelihood of each event. I did so by identifying the links between the sources and the events they contribute to. As mentioned earlier, some sources may cause more than one event. A matrix was used to make the task easier to complete and visualize.

Events	Attributes		sources											
	Cost	Risk	Human Factor					Economic and Financial		Environmental		Governmental		
			Inadequate Training	Lack of Situation	Nepotism	Dishonesty	Poor Salary	Funding	Foreign Curr	Extreme Wea	Societal	Technological	Local Politics	
Bomb Detonation			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication loss			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Economic crash			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Electrical Power Failure			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government harsh policies on investors			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Inadequate Infrastructure			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of Access to Financing			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lower Exchange Rate			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Staff not following policies and procedures properly			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 7: Project vulnerability Grid

The grid above outlines the vulnerabilities the project is exposed to. As shown above the events on the left each have multiple sources that may or may not trigger them. The following charts, which are parts of what’s called a Bow-Tie diagram, show the direct

connections between individual sources (in green squares) and risk events (in the circles), and vice versa.

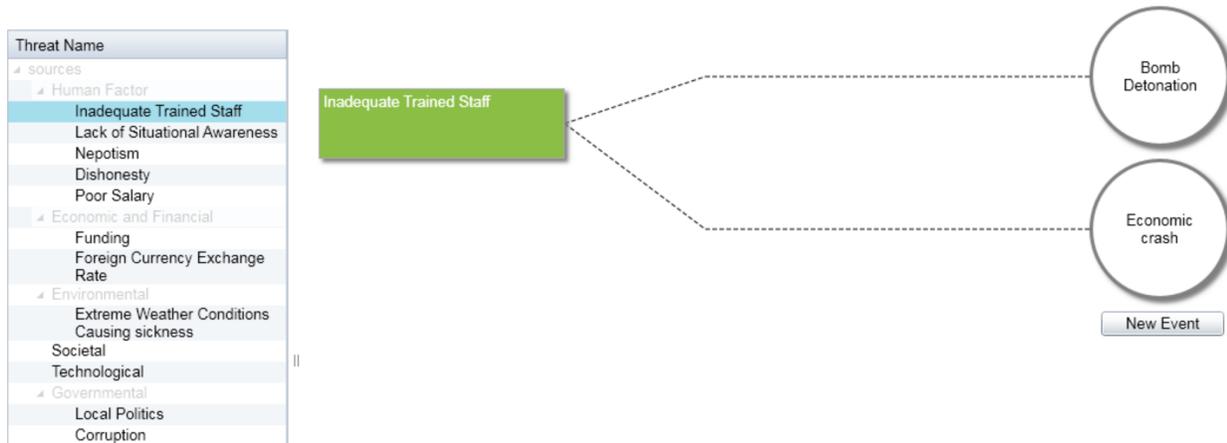


Figure8: Events that are vulnerable to a specific Source

The participating experts used Pairwise Comparisons to turn decisions into mathematically meaningful data.

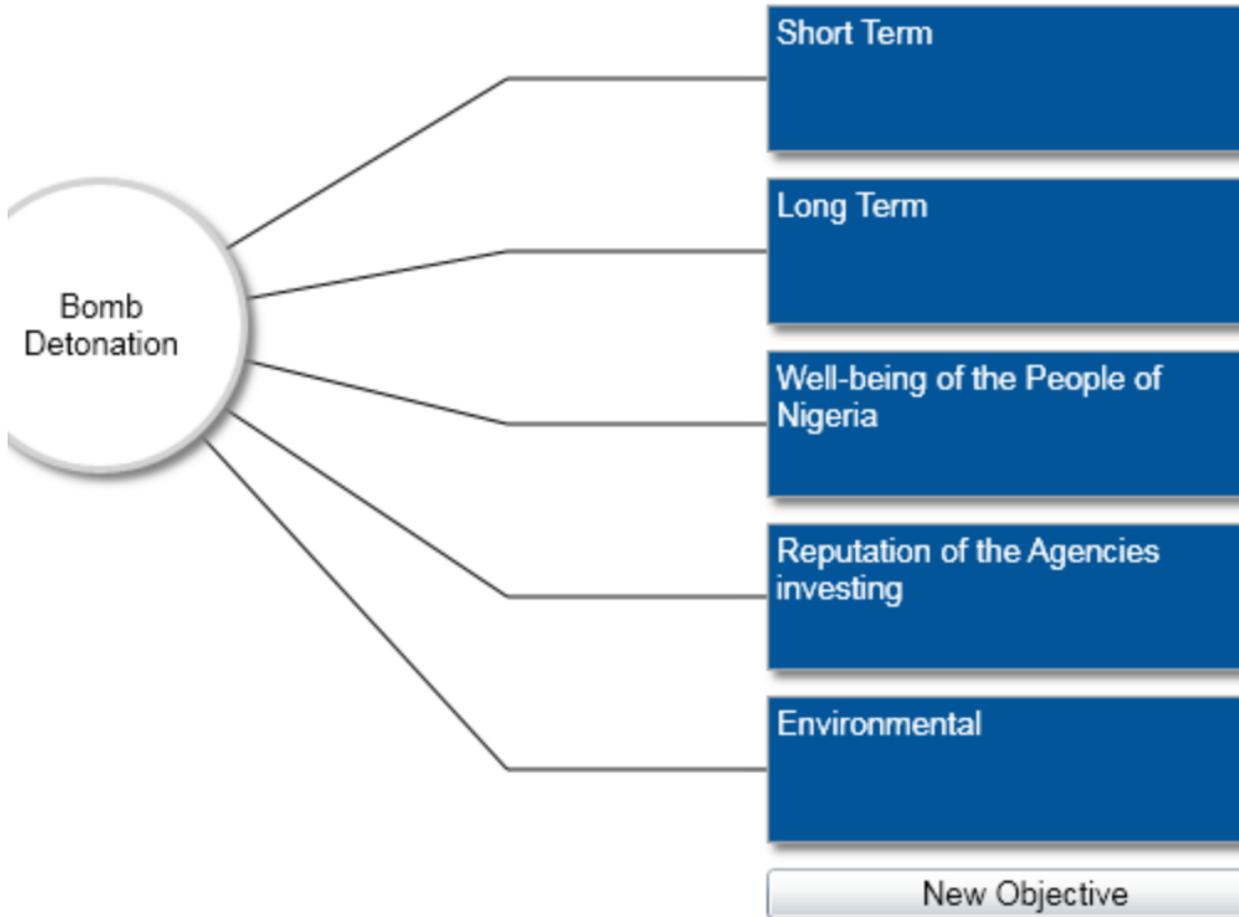


Figure9:Events Impacts to objective

The concept of project development may be impaired without a good knowledge and successful management of the impact. The results of this finding may be useful for project managers in prevention of cost and time overrun which is one of the major causes of clients' dissatisfaction. Strategic plans and goals must take funding realities into account. Achieving short term goals in a chaotic environment like North east Nigeria requires maximum flexibility and creativity. There must be greater appetite and reward for sensible risk taking. The pursuit of short-term goals must not come at the expense of long term development. Project environmental factors in Nigeria as identified by Walker and Hughes are political, legal, institutional, cultural, sociological, technological resources, economic , financial and physical

Events	Objectives/Consequences				
	Financial		Satisfaction		Environmental
	Short Term	Long Term	Well-being of the P	Reputation of the A	
<input type="checkbox"/> Bomb Detonation					
<input type="checkbox"/> Communication loss					
<input type="checkbox"/> Economic crash					
<input type="checkbox"/> Electrical Power Failure					
<input type="checkbox"/> Government harsh policies					
<input type="checkbox"/> Inadequate Infrastructure					
<input type="checkbox"/> Lack of Access to Financial					
<input type="checkbox"/> Lower Exchange Rate					
<input type="checkbox"/> Staff not following policies					

Figure 10: Objectives and Consequences of Events

International organizations that are ready to finance development projects in Nigeria should carefully identify the above events, assess and mitigate risks while working closely with government to create an economic and political stability that is sufficient to rekindle donor agencies confidence.

Events	Attributes		Objectives				Environmental
	Cost	Risk	Financial		Satisfaction		
			Short Term	Long Term	Well-being of the People of Nigeria	Reputation of the Agencies investing	
<input checked="" type="checkbox"/> Bomb Detonation			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Communication loss			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Economic crash			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Electrical Power Failure			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Government harsh policies on investors			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Inadequate Infrastructure			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Lack of Access to Financing			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Lower Exchange Rate			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Staff not following policies and procedures properly			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 11: Project Vulnerability Grid

The grid above outlines the vulnerabilities this project is exposed to. As shown above, the events on the left each have multiple sources that may or may not trigger them. The following charts, which are parts of what's called a Bow-Tie diagram, show the direct connections between individual sources (in green squares) and risk events (in the circles), and vice versa.

Risk

In this project, Risk is defined as an uncertain event or condition that, if it occurs, has a positive or negative effect on the project's objectives. After identifying the likelihood of the events and impact of the events, I will be able to identify the project risks and sources that are related to them.

Risk Map

Risk map is a data visualization tool for communicating specific risks project faces. The goal of a risk map is to improve an organization's understanding of its risk profile and appetite, clarify thinking on the nature and impact of risks, and improve organization's risk assessment model. It is also defined as a graphical presentation of risk events that represent the likelihood and impact of risk events. The vertical axis is the impact of the risk event in percentage of the total loss. The horizontal axis is the likelihood of the risk event, also as a percentage. The size of the bubbles represents the assessment of the risk events. The larger the bubble, the higher likelihood and impact of that risk on the project. This in turn shows which event risks should have a higher priority and be taken care of.

If the size of a specific bubble is small, that event won't have much of an impact on our project, and therefore will be a lower priority. These provide us with an idea of what we need to focus on, and controls need to be sought and implemented to the sources and/or consequences that are related to the high priority risk events.

From the figure below, Event 5 which is Government harsh policies on investors and 3 lower exchange rate, have the largest bubbles. The associated monetary risk for loss on Government harsh policies on investors is \$ 525,515, and \$431,430 in losses is associated with lower exchange rate. Therefore, we should focus on these events and find out what their related sources/threats are.

The monetary amounts used for this project is \$1 million dollar.

Impact vs. Likelihood

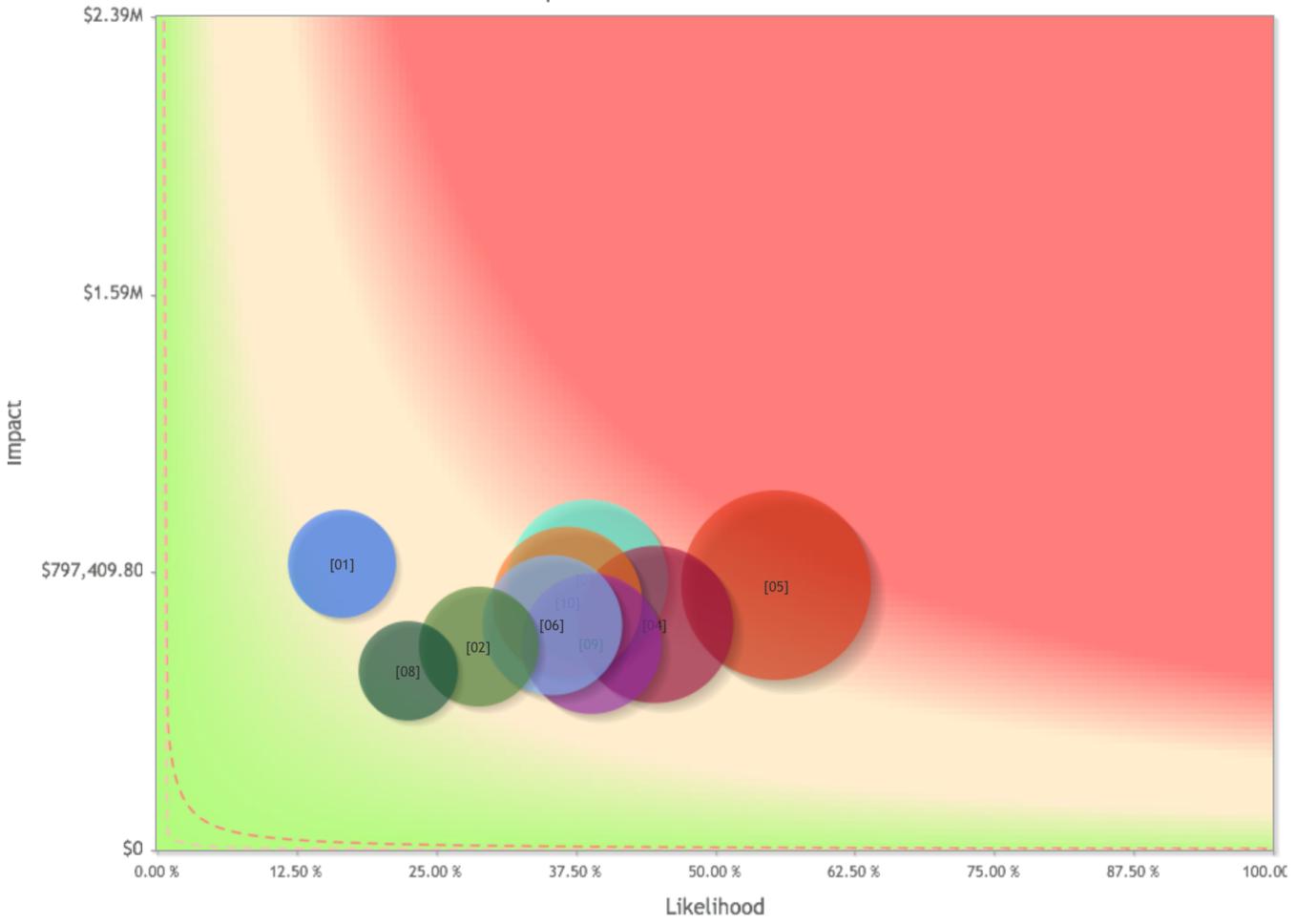


Figure 12: The project map showing Impacts vs Likelihood

Events				
<u>No.</u> ▲	<u>Name</u>	<u>Likelihood</u>	<u>Impact, \$</u>	<u>Risk, \$</u>
[01] ●	Bomb Detonation	16.70%	\$911,110.64	\$169,817.6
[02] ●	Electrical Power Failure	28.90%	\$701,759.83	\$245,779.3
[03] ●	Lower Exchange Rate	38.70%	\$721,944.53	\$431,430.4
[04] ●	Lack of Access to Financing	44.70%	\$710,653.36	\$408,258.5
[05] ●	Government harsh policies on investors	55.60%	\$707,520.66	\$525,515.1
[06] ●	Inadequate Infrastructure	35.50%	\$572,412.25	\$242,369.6
[08] ●	Staff not following policies and procedures properly	22.60%	\$596,241.18	\$144,551.5
[09] ●	Economic crash	39.00%	\$623,562.23	\$354,154.2
[10] ●	Communication loss	36.90%	\$709,056.79	\$304,129

Figure 13: Risk Priority Matrix

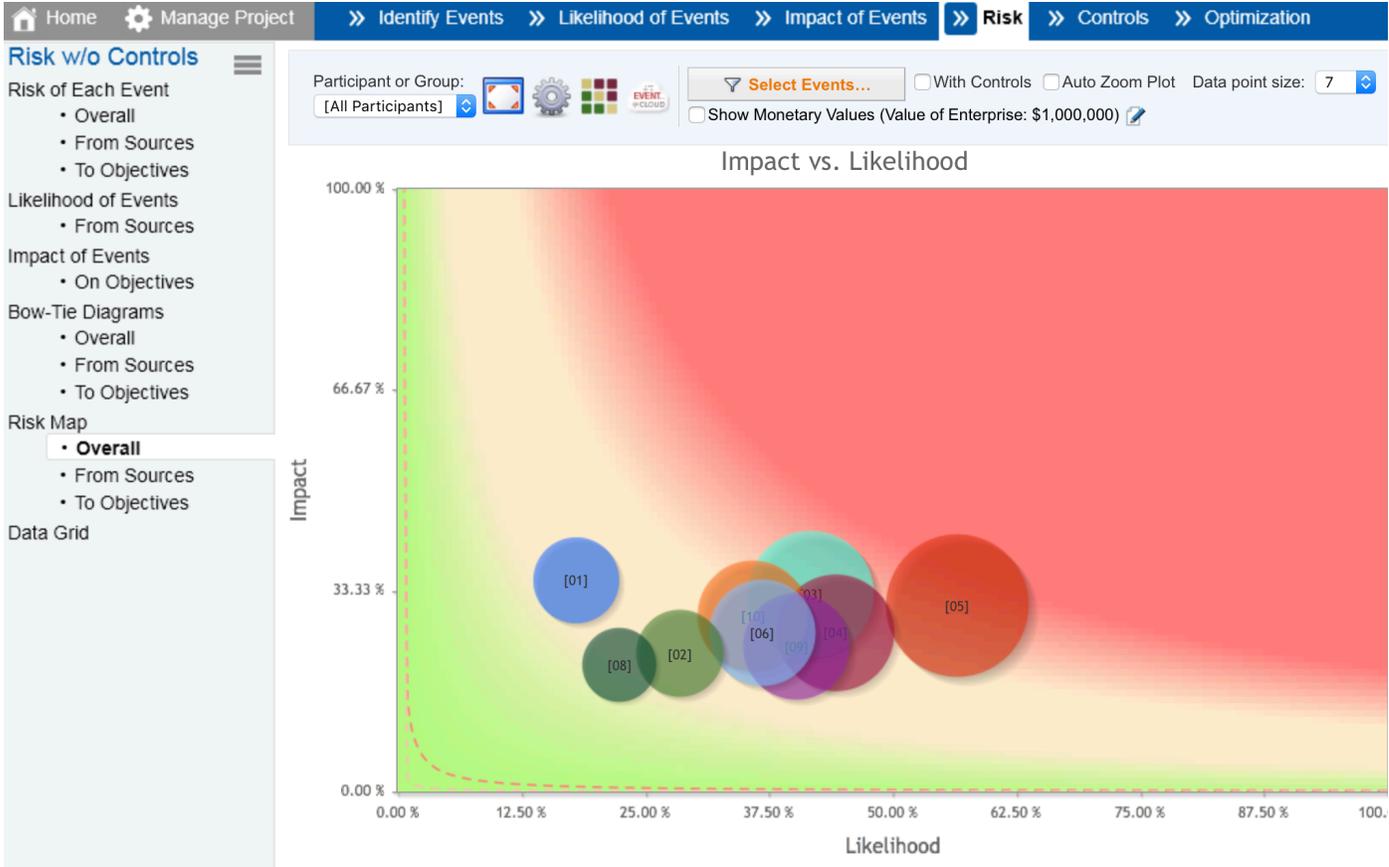


Figure 14: Showing Impacts Vs likelihood

Hide Regions
 Show Regions
 Heat Map with borders
 Heat Map

Risk Regions

■	Over 15 %
■	2 % - 15 %
■	Under 2 %

Events

<u>No.</u>	<u>Name</u>	<u>Likeliho od</u>	<u>Impact</u>	<u>Risk</u>
[08]	Staff not following policies and procedures properly	22.50%	20.88%	4.70%
[03]	Lower Exchange Rate	41.80%	32.67%	13.66%
[04]	Lack of Access to Financing	44.30%	26.32%	11.66%
[06]	Inadequate Infrastructure	36.90%	26.23%	9.68%
[05]	Government harsh policies on investors	56.60%	30.76%	17.41%
[02]	Electrical Power Failure	28.60%	22.76%	6.51%
[09]	Economic crash	40.40%	24.01%	9.70%
[10]	Communication loss	36.00%	29.09%	10.47%
[01]	Bomb Detonation	18.10%	35.04%	6.34%

Figure 15 showing priority matrix

Over all likelihoods, impacts and Risks with controls

The final product of all the Events, Threats, Objectives, Controls, different measurement methods, and Control Optimization is the Overall Likelihoods, Impacts, and Risks with Controls. The figure below shows the Simulated Risks facing international development projects in Nigeria with a total

Loss Reduction of 89.89% and with 10.11% of Risk remaining based on investment in Controls with a total of \$1million project investment.

No.	Event ▼	Likelihood		All Participants Impact		Risk	
		Computed	Simulated	Computed	Simulated	Computed	Simulated
[08]	Staff not following policies and procedures properly	24.24%	23.90%	59.62%	19.52%	14.46%	4.67%
[03]	Lower Exchange Rate	59.76%	40.20%	72.19%	31.84%	43.14%	12.80%
[04]	Lack of Access to Financing	57.45%	45.90%	71.07%	25.68%	40.83%	11.79%
[06]	Inadequate Infrastructure	42.34%	37.40%	57.24%	26.76%	24.24%	10.01%
[05]	Government harsh policies on investors	74.28%	56.20%	70.75%	29.63%	52.55%	16.65%
[02]	Electrical Power Failure	35.02%	30.60%	70.18%	23.12%	24.58%	7.07%
[09]	Economic crash	56.80%	44.60%	62.36%	24.10%	35.42%	10.75%
[10]	Communication loss	42.89%	35.70%	70.91%	29.25%	30.41%	10.44%
[01]	Bomb Detonation	18.64%	17.40%	91.11%	32.79%	16.98%	5.71%
Total Risk (Computed)						282.60%	
Total Loss (Simulated)							89.89%

Figure 16: Overall Likelihoods, Impacts, and Risk for the Project.

Loss Exceedance Curve with and without Controls

Another option to show the simulated Risk of the project is the Loss Exceedance Curve. The Loss Exceedance Curve is the mirror of the Cumulative Frequency Chart showing the probability that a loss to the organization will be above a given value. The curve below shows a 5% probability loss exceedance curve



Figure 17 Loss Exceedance Curve for all Participants.

Bow-Tie for «*Project: Risks Facing International Development Projects in Nigeria (11/10/17 6:32 PM)»

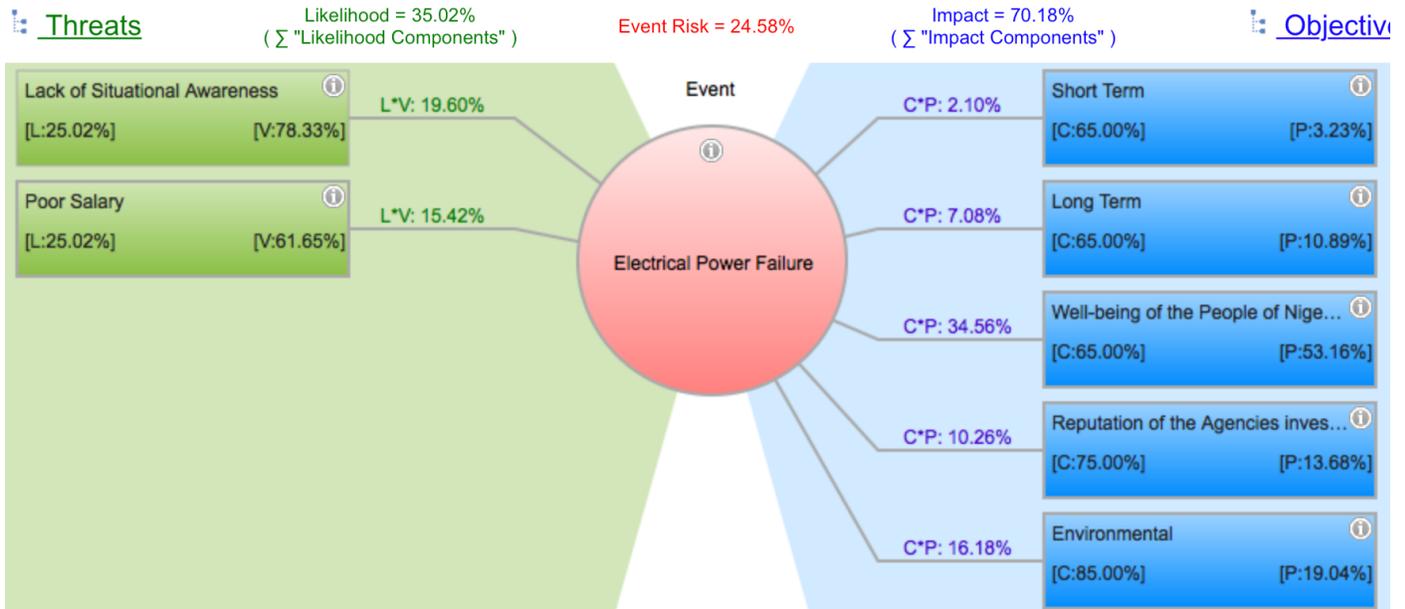


Figure 17: Risk-Bow Tie Diagram

Controls

The proposal team intends to include actions to reduce the threat levels to a tolerable level in the budget proposal. Risk controls should be identified and implemented to reduce the following: a) the likelihood of sources; b) the likelihood of risk events given their sources; and, c) the total impact the risk events have upon the objectives. The ceiling for implementing risk controls has been set to \$100,00, or 10%, of the total project amount.

In order to mitigate the risks this project is exposed to, I reviewed the vulnerabilities and impacts of each source and risk event, searched for and discovered several areas that could either be managed or prevented through proper action and safeguards. The following are the identified

controls:

Index ▲	<input type="checkbox"/>	Control Name		Control for
01	<input type="checkbox"/>	Hot weather gear	☰	Threat ▾
02	<input type="checkbox"/>	External Audit Check	☰	Threat ▾
03	<input type="checkbox"/>	Background Check	☰	Threat ▾
04	<input type="checkbox"/>	Replacement of Equipments	☰	Threat ▾
05	<input type="checkbox"/>	Back-up Sources	☰	Threat ▾
06	<input type="checkbox"/>	blast proof material	☰	Vulnerability ▾
07	<input type="checkbox"/>	Installation of bomb detectors	☰	Vulnerability ▾
08	<input type="checkbox"/>	purchase of bomb sniffing dogs	☰	Vulnerability ▾
09	<input type="checkbox"/>	purchase of back-up generators	☰	Vulnerability ▾
10	<input type="checkbox"/>	Provision of solar power	☰	Vulnerability ▾
11	<input type="checkbox"/>	supply of battery packs	☰	Vulnerability ▾

12	<input type="checkbox"/>	Currency swap in other country	☰	Vulnerability	⏷
13	<input type="checkbox"/>	favourable government policy	☰	Vulnerability	⏷
14	<input type="checkbox"/>	fund raising from other sources	☰	Vulnerability	⏷
15	<input type="checkbox"/>	spread out budget for years	☰	Vulnerability	⏷
16	<input type="checkbox"/>	lobbying fund	☰	Consequence	⏷
17	<input type="checkbox"/>	Government liason council	☰	Consequence	⏷
18	<input type="checkbox"/>	mobile equipments	☰	Consequence	⏷
19	<input type="checkbox"/>	Safety Training for Staff	☰	Consequence	⏷
20	<input type="checkbox"/>	Provision of life insurance for Staff	☰	Consequence	⏷

Figure 18: Potential Controls for the Project.

The controls identified are majorly for this type of project. I received price quotes and information on the effectiveness of each control, and used their judgements to enter them into Riskion. They are divided by what and how they work into the following categories: Controls for Threats (Sources), Controls for Vulnerabilities (Events), and Controls for Consequences (Impacts).

Controls for Threats

Five controls for sources were identified for threats which includes: Hot weather gear for expatriates, eternal audit check, background check on employees, replacement of equipment and Back-up sources like purchase generators, solar power supply and purchase of battry packs incase of power failure.

Controls for Vulnerability

Ten controls were identified to mitigate vulnerabilities, or the likelihood of an event from taking place with regards to a specific source. Blast proof materials, installation of bomb detectors, purchase of bomb sniffing dogs are needed for bomb detonation, Currency swap in other countries, favorable government policies are also controls identified.

Controls for Threat Likelihoods

Control Name	sources						
	Human Factor				Economic and Financial		
	<input type="checkbox"/> Inadequate Trained Staff	<input type="checkbox"/> Lack of Situational Awareness	<input checked="" type="checkbox"/> Nepotism	<input checked="" type="checkbox"/> Dishonesty	<input type="checkbox"/> Poor Salary	<input checked="" type="checkbox"/> Funding	<input type="checkbox"/> Foreign Currency Exchange Rate
1. Hot weather gear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. External Audit Check	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Background Check	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Replacement of Equipments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Back-up Sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 19: Example of Controls for sources.

Controls optimization for "Project: Risks Facing International Development Projects in Nigeria (11/10/17 6:32..."

Budget
 Risk
 Risk Reduction

Budget Limit: \$

Total Risk: 282.60%
 Risk With Selected Controls: 122.38% (Δ: 160.22%)
 Risk With All Controls: 115.80% (Δ: 166.80%)
 Total Risk Reduction: 56.70%

Selected controls: 15
 Cost Of Selected Controls: \$100 (unfunded: \$54)
 Total Cost Of All Controls: \$154

Ignore: Musts Must Not Dependencies Groups

Previous **1** 2 Next Search:

Index	Control Name	Control for	Selected	Cost	Applications	Categories	Must	Must Not
01	Hot weather gear	Threat		5	1		<input type="checkbox"/>	<input type="checkbox"/>
02	External Audit Check	Threat	Yes	20	3		<input type="checkbox"/>	<input type="checkbox"/>
03	Background Check	Threat	Yes	3	3		<input type="checkbox"/>	<input type="checkbox"/>
04	Replacement of Equipments	Threat		10	2		<input type="checkbox"/>	<input type="checkbox"/>
05	Back-up Sources	Threat		15	1		<input type="checkbox"/>	<input type="checkbox"/>
06	blast proof material	Vulnerability		7	1		<input type="checkbox"/>	<input type="checkbox"/>
07	Installation of bomb detectors	Vulnerability	Yes	5	1		<input type="checkbox"/>	<input type="checkbox"/>
08	purchase of bomb sniffing dogs	Vulnerability	Yes	1	1		<input type="checkbox"/>	<input type="checkbox"/>
09	purchase of back-up generators	Vulnerability	Yes	10	2		<input type="checkbox"/>	<input type="checkbox"/>
10	Provision of solar power	Vulnerability	Yes	7	9		<input type="checkbox"/>	<input type="checkbox"/>
11	supply of battery packs	Vulnerability	Yes	3	6		<input type="checkbox"/>	<input type="checkbox"/>
12	Currency swap in other country	Vulnerability	Yes	8	7		<input type="checkbox"/>	<input type="checkbox"/>
13	favourable government policy	Vulnerability	Yes	5	7		<input type="checkbox"/>	<input type="checkbox"/>
14	fund raising from other sources	Vulnerability	Yes	2	6		<input type="checkbox"/>	<input type="checkbox"/>
15	spread out budget for years	Vulnerability	Yes	5	6		<input type="checkbox"/>	<input type="checkbox"/>
16	lobbying fund	Consequence	Yes	12	10		<input type="checkbox"/>	<input type="checkbox"/>
17	Government liason council	Consequence	Yes	10	5		<input type="checkbox"/>	<input type="checkbox"/>
18	mobile equipments	Consequence		6	5		<input type="checkbox"/>	<input type="checkbox"/>
19	Safety Training for Staff	Consequence	Yes	9	5		<input type="checkbox"/>	<input type="checkbox"/>
20	Provision of life insurance for Staff	Consequence		11	5		<input type="checkbox"/>	<input type="checkbox"/>

Controls were optimized through Riskion using a budget of \$100 with an Enterprise valuation of \$10,000 . In the optimization below, the controls are selected for the greatest risk reduction given the budget. Total Risk is reduced from \$282.60 to \$122.38 which still has double counting. Total Selected controls were 15 which did not include all the controls by Stand Alone Reduction from largest to smallest as combinations of controls can have a higher reduction than selecting them alone.

Efficient Frontier for "Project: Risks Facing International Development Projects in Nigeria (11/10/17 6:32..."**

Options: <input type="checkbox"/> Ensure funded controls remain funded as budget increases <input type="checkbox"/> Grid View Mode <input type="checkbox"/> Detailed tooltips	Delta when optimizing for Increasing Budgets: <input type="radio"/> Specified Amount: <input type="text" value="6"/> <input checked="" type="radio"/> Approx. # of Increments: <input type="text" value="26"/> <input type="radio"/> All Solutions, Δ: <input type="text" value="1"/>	X-axis range: From: <input type="text"/> To: <input type="text"/>	Ignore: <input type="checkbox"/> Musts <input type="checkbox"/> Must Notes <input checked="" type="checkbox"/> Dependencies <input checked="" type="checkbox"/> Groups	Base Case includes: <input type="checkbox"/> Groups
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Figure 20: Efficient Frontier

CONCLUSION

Using Riskion by Expert Choice, International development projects in Nigeria have a very high loss of \$898,900 without Controls. With a budget of \$1million, Controls reduced the risk of the project to \$101,100. The project still has a chance of losing more with a 5% probability. Recommendations for this project would be to add additional controls and budget a higher amount for controls. If the losses cannot be reduced by controls, then the likelihood and impact of events may need to be reassessed otherwise the risk facing the project are too high for the project to be viable.

References

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