RM Project 2018: Cruise Lines…Sailing on the Seas

The George Washington University
DNSC 6254 Risk Management (RM)
October 21, 2018

Prepared for: Dr E. Foreman

Table of Contents

1. Introduction and Overview

The cruise industry has become a very lubricative business but not without risks to both the industry and the passengers. The cruise line industry has made significant recovery after revenue dropped below $25 billion during the 2009 global recession. Research revealed that in 2015, the global cruise industry generated revenue estimated at of $39.6 billion U.S. dollars -- a figure that has grown approximately 15 billion U.S. dollars over the last half decade.

The passenger capacity of the global cruise marked reached 466,000 in 2016 and in 2018 the passenger capacity is expected to reach 521,000. It is reported that the average cruise passenger generates $1,779 in revenue in U.S. dollars, but expenses per passenger are also high, resulting in an average profit of only $226 dollars in 2015. In the United States cruise market is one of the largest in the world. The revenue generated there grew by over seven billion U.S. dollars over the five years leading to 2015, and it was expected to reach approximately 31.5 billion dollars by 2020. In 2016, the world's largest cruise passenger source market was North America, providing 12.41 million guests for the industry - this accounted for more than half of the total number of guests globally.

With revenues almost double that of its closest competitor, Carnival Corporation is by far the largest cruise company. The second largest company worldwide is Royal Caribbean Cruises which had revenues of 8.5 billion U.S. dollars in 2016, a figure which had grown annually since 2009. The success of the cruise industry could result from travelers finding cruise vacations convenient. In 2016, the majority of Americans considered a cruise vacation to be the ideal way to visit many destinations in a short period of time. Other benefits of cruise vacations included that they are ideal for getting pampered and that they are a form of luxury travel.

It is noticeable in cruise line travel with changes in the service provided, negligent in consumer service, conditions of the ships, dangers in customer safety, which present risks for both the consumer, staff, the cruise ship and cruise line management. The intent of this report is to enlighten the consumers of potential risk associated with traveling on cruises so that they can become aware of pitfalls, during the planning phase--in order to make wise and safe choices for their vacations. Cruise lines offer an array of luxuries for everyone of all ages, but with that comes a certain level of risks not only for the cruise lines, but also for its passengers. The service provided to their customers include all-inclusive vacation setting of food, shelter, entertainment and stopover to other venues along the vacation route.

However, with these combined convenient amenities one site also set the tone for potential risks. For the past 20 years, I have been a frequent cruise line passenger, and I have observed changes in that the cruise line industry that created risks for both the cruise line industry and its consumers.

Additionally, numerous incidents and accidents had been reported, that has increased the risk concern for both the cruise line industry and its passengers.

This project will focus on three cruise lines; namely, i.e. Carnival Cruise Lines, Royal Caribbean, and Costa Cruises; and identify actual incidents and accidents that occurred that potential caused risks to both the cruise line ships and the cruise line passengers. Additionally, this project will address the sources (or threats) to the risks.
These threats can also cause a rippling affect, creating other risks to happen in the following three areas:

- Policies: (Cruise line and passengers- liabilities)
- Human risks: (passenger overboard, shipboard illness etc.)
- Environmental risks: (natural disasters- tropical storms/hurricanes, onboard/port crimes.

2. Incident Reports

The following are just a few examples of cruise lines incidences that occurred within the last few years:

1. Carnival Cruise Lines:

- On September 19, 1999, Carnival Tropicale's engine room caught fire coming from Cozumel to Tampa. While disabled in the Gulf of Mexico, the ship was struck by Tropical Storm Harvey. The Carnival Tropicale spent two days without momentum.
- On November 8, 2010, a fire broke out in the generator room of Carnival Splendor and the ship lost power. The ship was adrift off the west coast of Mexico until it was towed to port in San Diego, California.
- On March 14, 2013, *Carnival Dream* experienced an emergency generator failure while docked in port at Philipsburg, Sint Maarten. The ship was scheduled to leave port around 5 p.m. ET the day before. The United States Coast Guard said they were notified by Carnival that *Carnival Dream* was experiencing emergency generator problems. Carnival announced that the *passengers* would be flown back to Florida rather than completing their scheduled voyage.
- On December 27, 2015, an electrician who had been working on the *Carnival Ecstasy* was crushed to death while working in an elevator.
- On May 3, 2018 a pipe burst in the *Carnival Dream's* fire suppression system, flooding 50 staterooms.
- On 14 March 2013 *Carnival Dream* experienced a back-up generator malfunction while performing regular pre-embarkation testing. No power outages occurred but Carnival Cruise Line decided to stay docked in port at Philipsburg, St. Marten until 23 March.
- On 3 May 2018, a pipe, which was part of the ship's fire suppression system, burst and flooded deck 9. About 50 staterooms were affected by the flood.

2. Royal Caribbean Cruise Lines

In January 2014, an outbreak of norovirus aboard the Explorer of the Seas sickened 689 of 4,237 passengers and crew (16.3%), causing the ship to return to port two days early.

The outbreak reportedly marked the greatest number of cases of illness aboard a cruise ship in two decades, barely exceeding a 2006 outbreak aboard the Carnival Cruise Lines' Carnival Liberty that sickened 679 of 3,970 passengers and crew (17.1%). Royal Caribbean offered all passengers aboard that cruise a 50% refund of their cruise fare, an additional 50% (plus 10% for each day sick passengers were quarantined) of their cruise fare as a credit towards another cruise and reimbursed extra travel expenses for guests returning home early.

- Norovirus outbreaks - In January 2014, an outbreak of norovirus aboard the Explorer of the Seas sickened 689 of 4,237 passengers and crew (16.3%), causing the ship to return to port two days early.[128][129] The outbreak reportedly marked the greatest number of cases of illness aboard a cruise ship in two decades, barely exceeding a 2006 outbreak aboard the Carnival Cruise Lines' Liberty that sickened 679 of 3,970 passengers and crew (17.1%). Royal Caribbean offered all passengers aboard that cruise a 50% refund of their cruise fare, an additional 50% (plus 10% for each day sick passengers were quarantined) of their cruise fare as a credit towards another cruise and reimbursed extra travel expenses for guests returning home early.
- Passenger Overboard - On 5 July 2005, passengers on board the Brilliance of the Seas reported what appeared to be blood on a part of the ship below the passenger balconies. After a search, George Allen Smith was discovered to be missing and thought to have fallen overboard. A criminal investigation into possible foul play was conducted, and a brief press release on the company's investor relations website announced the settlement of the case, later revealed to be more than $1 million.

3. Costa Cruise Lines

- On Sunday October 22, 1961, the Bianca C was off Grenada when an explosion occurred in the engine room causing the deaths of two crew members and the ship to catch fire. Local fishermen helped rescue the passengers and crew but as the local authorities did not have the equipment to extinguish the fire the ship was left to burn until the British frigate HMS Londonderry arrived from Puerto Rico. The burning ship was in the main anchorage and would block the harbor if it sank there, so the Londonderry towed it to a different location where the Bianca C sank.
- On January 13, 2012, Costa Concordia ran aground off Isola del Giglio, Tuscany. The ship capsized and partially sank, killing 32 people. In 2014, the ship was parbuckled and refloated with caissons, and in July 2014 it was towed to its home port of Genoa, where it was dismantled and eventually scrapped.

3. Risk Analysis & Project Structure

The Vessel Crew decided to execute its risk assessment process objectively using Riskion. Risk assessment requires a systematic and objective approach for identifying and analyzing events that can affect the objective achievement. Riskion serves as a process tool to provide a calculated analysis practical view of risk by identifying the likeliness of an event taking place and providing a negative impact to the objectives.

Below is the identification of the Events and their respective descriptions that were identified as potential problems that can result in loss.

Table 1 Risk Events & Descriptions

Events	Event Description
Cancellation of Trip	Any type of severe weather such as a hurricane or major equipment malfunction can threaten the ship from setting sail. The cost of losing lives and send teams in for recovery is far greater.
Engine Failure (of life boats)	Engine failure is a threat to safety and the security of all passengers and crew. Any malfunction not addressed can cause the ship to be stranded or fail which can ultimately cost lives.
Defective Life Jackets	Maintenance and functions checks are required to ensure all personal protective equipment are in working order to ensure passengers can depend on in case of emergency.
Cruise Ship Diversion	
Cruise Ship Flooding	
Cruise Ship Power Outage	Power Outage or failure is critical in passenger safety and security. This impacts systems and can impose schedule delays and security risk
Medical Emergency	A medical emergency could be as extreme as requiring an evacuation of member by helicopter. Medical staff are required to have extensive training and be fully sufficient due to location and response times.
Passenger Assault	Passenger safety and security is paramount. Offenses from other passengers or crew is a security concern. Training is required, and reporting procedures are outlined upon boarding.
Passenger Overboard	A passenger going overboard can take over 48 hours to rescue to include the time it takes to identify the member.

3.1 Identifying Risk Events

Using the Expert Choice Riskion software to structure our risk model, we identified fourteen risk events that outline and address the potential losses that can affect the cruise ship, staff and the passengers. These events can cause financial, and reputational damages.

Unique ID	Events
[10]	Cancellation of trip (hurricanes, illnesses etc.)
[13]	Engine failure of life boats
[12]	Defective life jackets (drowning, broken bones and hypothermia)
[01]	Cruise ship diversion (incumbent weather)
[06]	Cruise ship flooding
[02]	Cruise ship power outage
[08]	Loss of heat/air conditioning
[07]	Loss of water pressure
[05]	Medical emergency
[03]	Passenger assualts -sexual
[09]	Passenger overboard
[11]	Overturned/sunken ships
[14]	Onboard fire
[15]	Mold outbreak

Figure 1: Risk Events

3.2 Identifying Sources

The Figure 2 below depicts the sources (or threats) to the risk events. This is the potential sources that could contribute to the occurrence of the risk events, where we identified three major sources and several sub-sources. These sources (threats) can cause a rippling affect which create can create other events to happen.

Figure 2: Hierarchy of Sources

3.3 Sources to Events Contribution

Risk events and multiple potential risk sources are identified, and the crew associated the event with the sources below.

Figure 3: Vulnerabilities Grid

3.4 Identifying Objectives

There are four objectives that have been categorized for this project they are: Human Factors, Communications, Financial and Ship Performance. Objectives are listed in a hierarchical format in Figure 4 below.

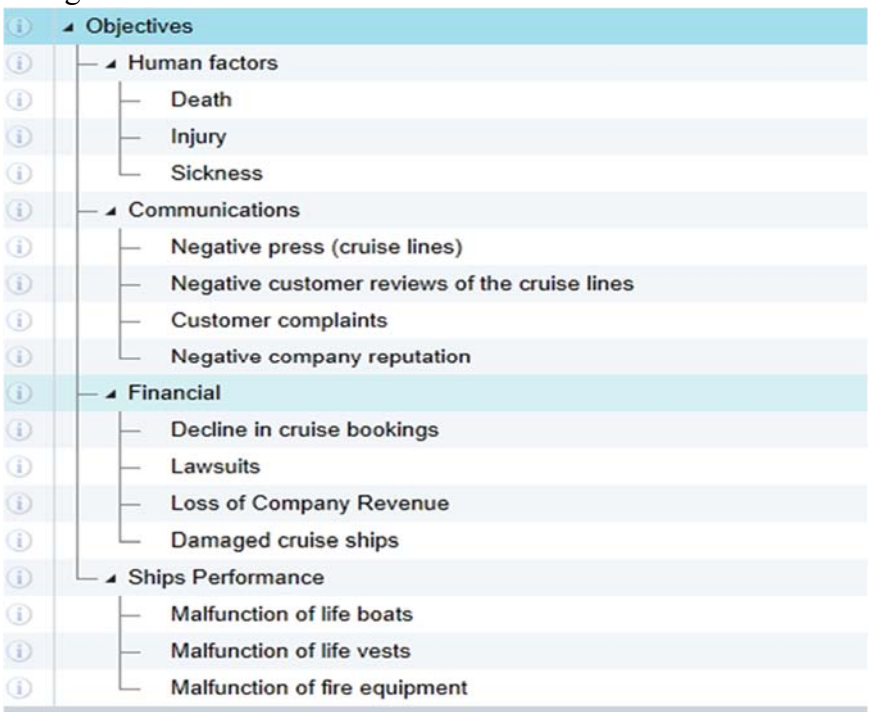


Figure 4: Hierarchy of Objectives

3.5 Risk Measurement & Evaluation

Instead of using a subjective approach to risk measurement and evaluation, we used the Riskion software, the ship's crew can ensure that its assessment is measured using mathematics and presents an outcome based on facts and priorities of judgements made by the people that are organizationally in line with the structure and are key personnel in the decision-making process. It was imperative to assign evaluating roles of the sources and events based on the participant's position and level of involvement in the project. The participants are displayed in the Figure 5, Figure 6 and Figure 7 below.

3.5.1 Participants and their Roles

- CEO – as the responsible person for all day-to-day management decisions and plan implementation, the CEO is the direct liaison between the Board and management of the Company and communicates to the Board on behalf of management any issues and risk.
- Project Managers (4) - manages policy and provides project oversight
- Director of Public Relations – Speaks on the behalf the company and controls media input and output
- Director of Security - Responsible for implementing, managing and directing the day to day safety and security operation
- Ship Doctor – Trains staff and provides 24-hour availability for care and preventative measures for the ships crew and manifest. Inspects quarters, kitchens and common areas for health and safety hazards.
- Ship Captain – responsible for the movement of passengers and cargo, certifications and documentation ensuring the ship is in compliance with immigration, port and customs laws.
- Ship Engineer – responsible for repair and maintenance of machinery and ship systems and technical maintenance documents.

All participants are asked to evaluate each threat event, occurrence, and impact on objectives.

Email Address	Participant Name	Permission
CEO@cruiselines.org	CEO (cruise line organization head)	Evaluator
darlaynbryant@gwu.edu	Daralyn Bryant	Project Manager
mediapr@cruiselines.org	Director of Public Relations	Evaluator
shipsecurity@cruiselines.org	Director of Security	Evaluator
nstavrakakis@gwu.edu	Nicholas Stavrakakis	Project Manager
forman@gwu.edu	Professor Forman	Project Manager
shipcaptain@cruiselines.org	Ship Captain	Evaluator
shipdoctor@cruiselines.org	Ship Doctor	Evaluator
shipengineer@cruiselines.org	Ship Engineer	Evaluator
tmturner28@gwu.edu	Tara Turner	Project Manager

Figure 5: Participants List

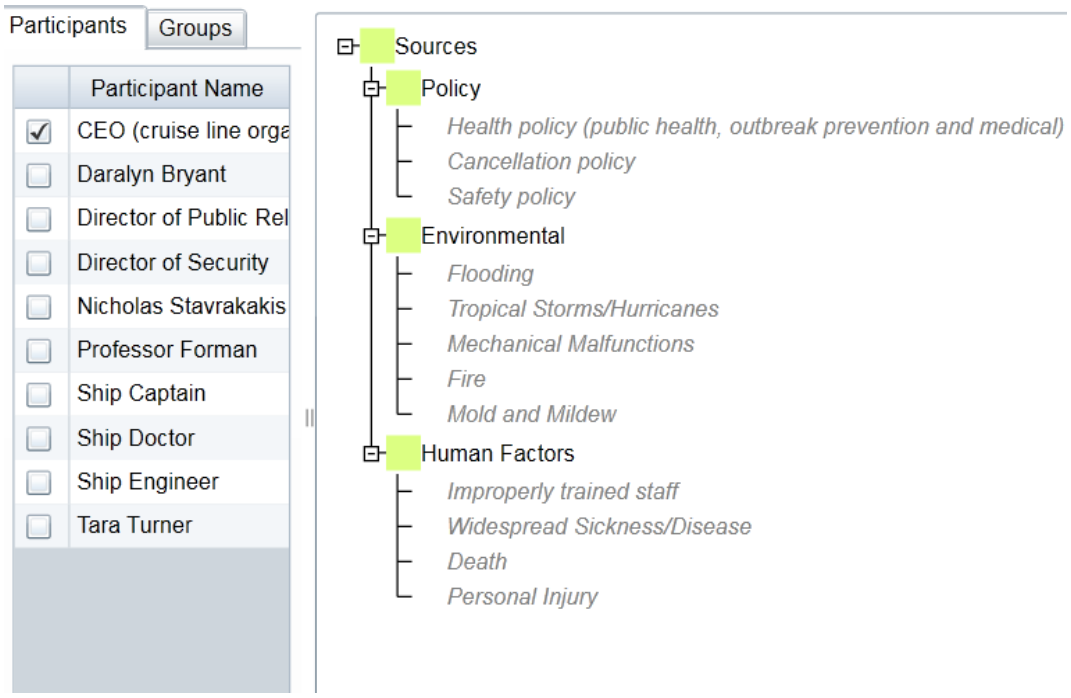


Figure 6: Participant Roles for Sources

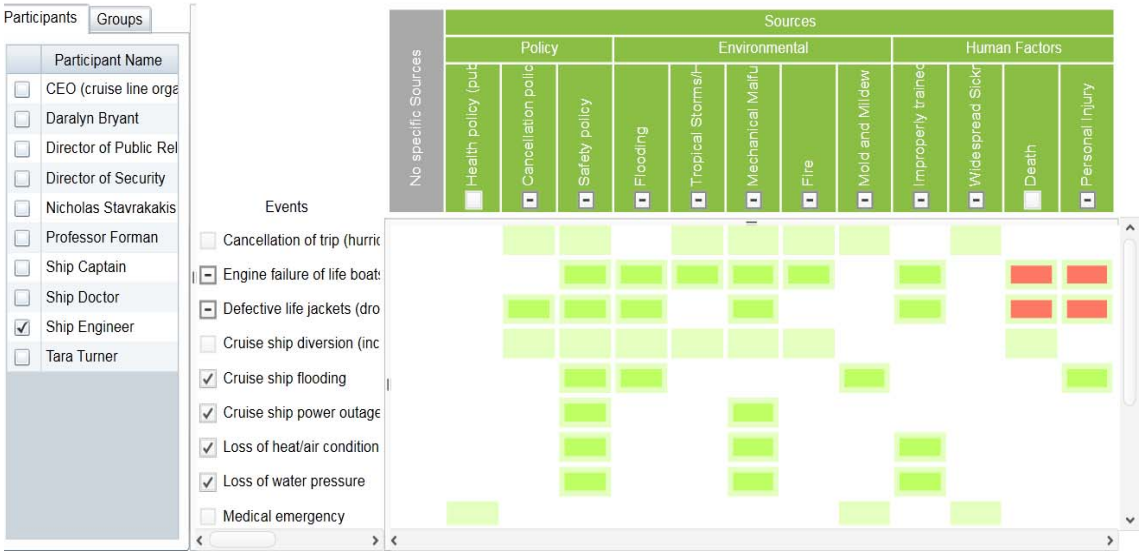


Figure 7: Sample of Participant Roles for Events

3.5.2 Measurement Methods

Riskion software was used to determine the relationships between the risk events, sources and objectives. The purpose of using this software is to eliminate personal judgement and bias and provide scientific and mathematical basis for conclusion. We used the following measurement methods were employed:

Rating scale measurement is used for the sources and by using this scale a total of 12 judgements were made.

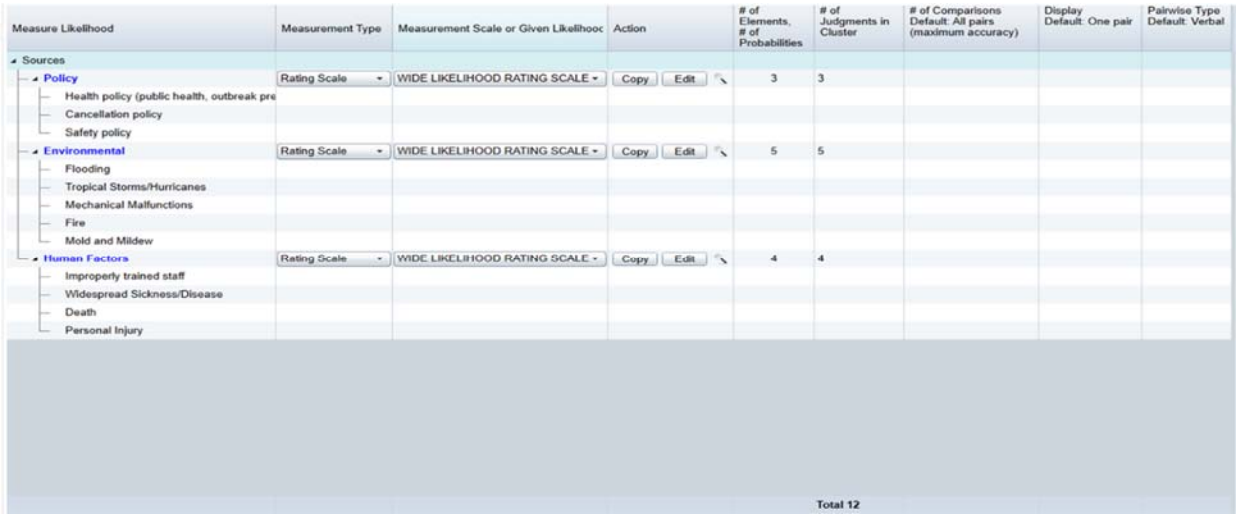


Figure 8: Measurements for Likelihood of Events

Pairwise Comparison method is used to measure the impact on events with respect to the objectives where a total of 24 judgments are made. The pairwise comparison function allows the participants to compare an objective or an event with one another to determine the probability of likelihood.

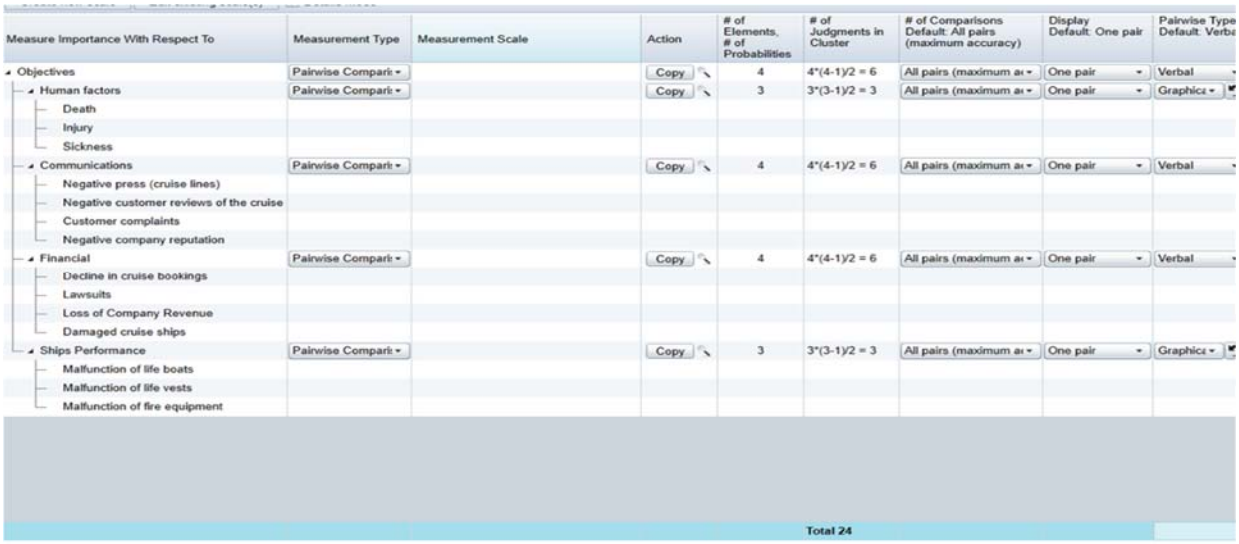


Figure 9: Measurements of Impacts of Objectives

Based on the input provided by the participants combined with the measurements used, the judgements are synthesized for further analysis.

4. Project Risk Synthesis

4.1 Synthesis of Likelihood

Project synthesis is simply the computation of the likelihood and impact of the events. This computation is done in the Riskion software, where we can make meaningful conclusions of the likelihood of the events on a percentage scale. The Figures 10 and 11 below represent the sensitivities of the hierarchy of sources and objectives and analysis of the events. Figure 10 below shows the computation of the likelihood of all events. The data for the likelihood of events indicates that the highest likelihood is passenger sexual assaults at 3.05% and the event with the lowest percentage likelihood of happening is mold outbreak at 0.82%. These measurements all came from data collected in the surveys. The sources that have the likelihood of happening is the safety policy at 16.46% and the lowest is cancellation policy at 5.50%. As you can see the highest impact would be overturned/sunken ships at 23.26% and the lowest would be the medical emergencies at 14.23%. While Human factors is listed as the highest of the impacts of objectives at the rate of 32.08 % with financial factors as being the lowest at 16.95%. See Figures 10 – 13 below.

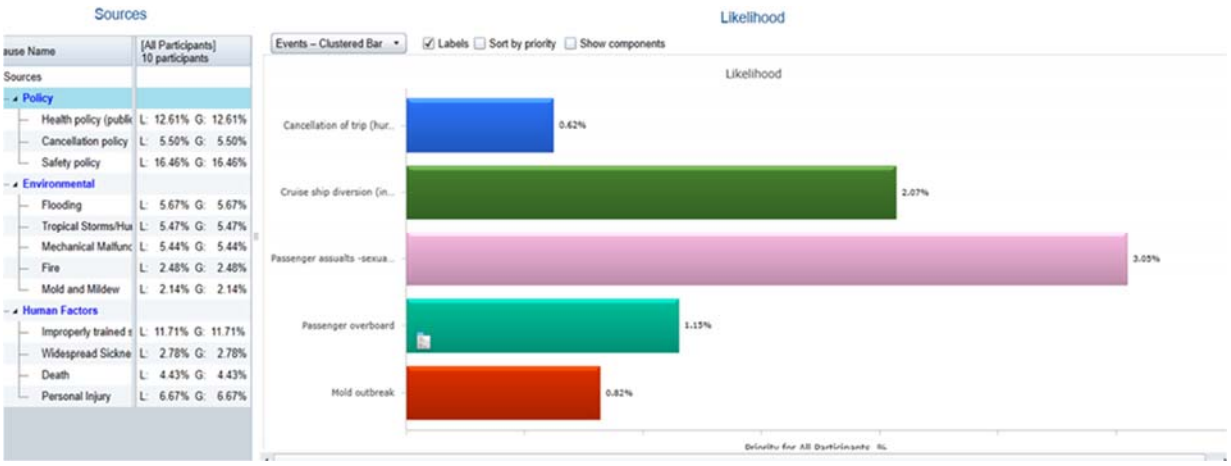


Figure 10: Synthesis of Likelihood of Events

Figure 11: Synthesis of Likelihood of Sources

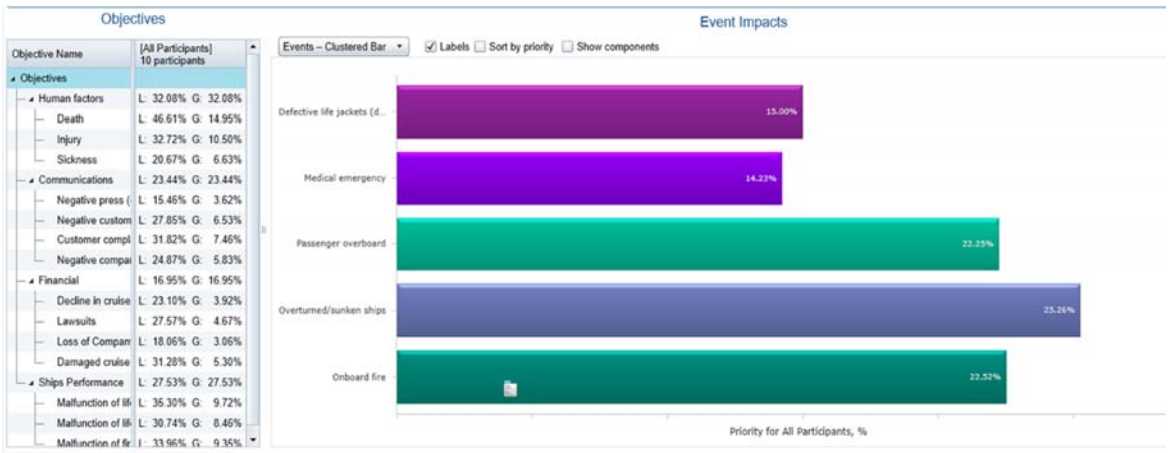


Figure 12: Synthesis of Impacts of Events

Figure 13: Synthesis of Impacts of Objectives

5. Risk Mapping

The risk analysis results from the overall risk map depicts a picture that Passenger Overboard and Overturned Sunken Ships are above the Risk Appetite by being in the red zone above 10%. The risk map is set to provide the crew with information on where critical control methods should be applied and budget cost allocated. Controls need to be implemented to prevent a total loss.

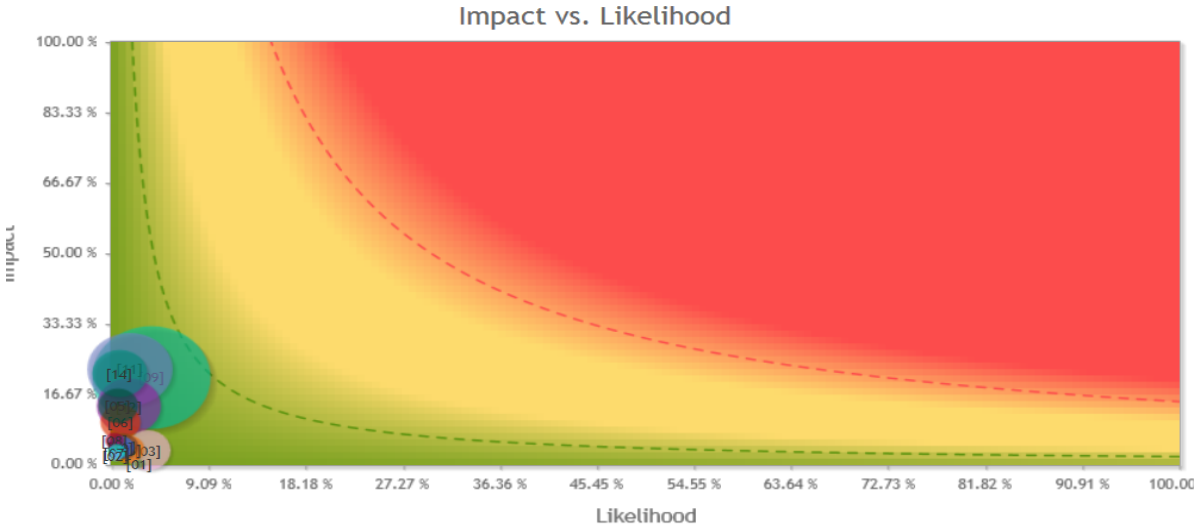


Figure 14: Risk Map with All Controls

5.1 Identifying Controls

Once the controls were identified and selected, the participants were asked to provide their judgement on how effective each control is. We selected the 'Direct' measurement method to measure the effectiveness of each cause, vulnerability, and consequence control.

Measurement Methods for Controls for Causes

Control Name	Sources											
	Policy			Environmental					Human Factors			
	Health policy (public health, outbreak prevention and medical)	Cancellation policy	Safety policy	Flooding	Tropical Storms/Hurricanes	Mechanical Malfunctions	Fire	Mold and Mildew	Improperly trained staff	Widespread Sickness/Disease	Death	Per
01. Staff training			Direct	Direct			Direct		Direct			
02. Periodic ship engine checks			Direct			Direct						
03. Review fire emergency procedures with staff			Direct				Direct		Direct			
04. Check ships water pressure				Direct								
05. Check ship's pipes for leakage				Direct		Direct						
06. Review ships safety policy for accuracy			Direct	Direct		Direct	Direct					
07. Santize ships interior walls and carpets				Direct				Direct				
08. Add sealiant to all leaking pips				Direct								
09. Hire a health inspector consultant				Direct				Direct		Direct		
10. Review ships cancellation policy for accuracy		Direct										

Figure 15: Measurement of Controls

5.2 Overall Risk (without Controls)

We define risk as "an unexpected event or uncertainty that results in a loss." Since we have identified and measured the likelihood of the events as well as the impact of these events, we can now determine what the greatest risks facing the cruise line project is the passengers going over board and passenger sexual assaults.

The following figure shows the overall likelihood, impact and risk with a total risk cost of $18M.

Overall Likelihoods, Impacts, and Risks for *RM Project 2018: Risk: Cruise lines…Sailing on the Seas

No. ▲	Event	All Participants Likelihood Simulated	Impact, $ Simulated	Risk, $ Simulated
[01]	Cruise ship diversion (incumbent weather)	2.67%	1,604,355	42,900
[02]	Cruise ship power outage	0.46%	17,654,722	81,917
[03]	Passenger assualts -sexual	3.60%	30,113,621	1,082,885
[05]	Medical emergency	0.66%	123,770,765	811,936
[06]	Cruise ship flooding	0.92%	88,475,263	810,433
[07]	Loss of water pressure	0.58%	26,362,894	153,432
[08]	Loss of heat/air conditioning	0.33%	51,442,850	168,732
[09]	Passenger overboard	3.83%	182,586,212	6,985,748
[10]	Cancellation of trip (hurricanes, illnesses etc.)	0.88%	36,072,914	318,884
[11]	Overturned/sunken ships	1.75%	201,143,570	3,511,966
[12]	Defective life jackets (drowning, broken bones and hypothermia)	1.62%	120,977,293	1,957,412
[13]	Engine failure of life boats	1.62%	32,407,211	524,348
[14]	Onboard fire	0.68%	192,002,586	1,305,617
[15]	Mold outbreak	1.14%	38,489,405	439,549
			Total Risk	Simulated $18,253,127

Figure 16: Overall Likelihood, Impact, and Risk

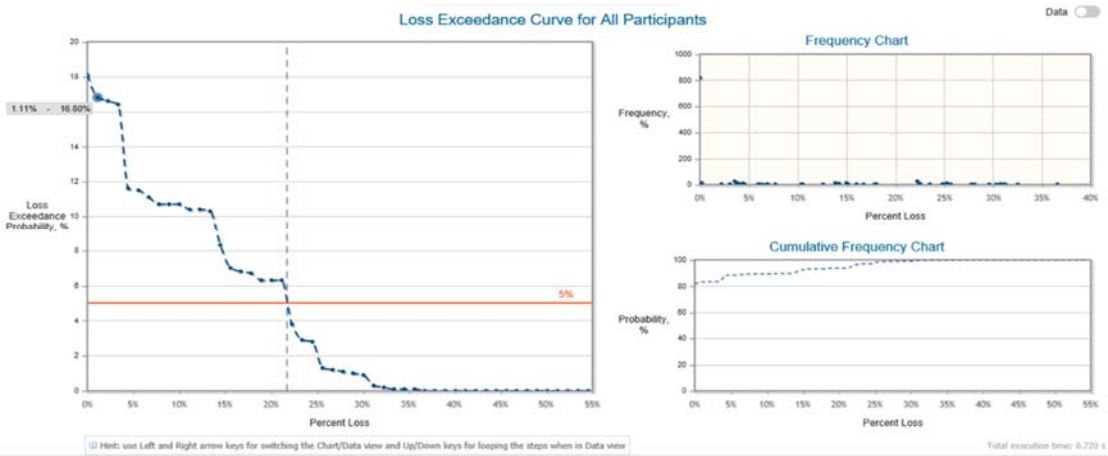


Figure 17: Loss Exceedance Curve

Figure 18: Loss Exceedance Curve for Participants

The next step in analyzing was to present the bowtie diagram which breaks down the number of threats contributed toward each event and the impact on objectives. Figure 16 is a bowtie diagram for Loss of Heat/Air Conditioning. The risk analysis without controls shows the relationship between the causes and objectives. The chart shows if cruise ship loses its heat or air conditioning, it will lead to a loss event of $154,971.

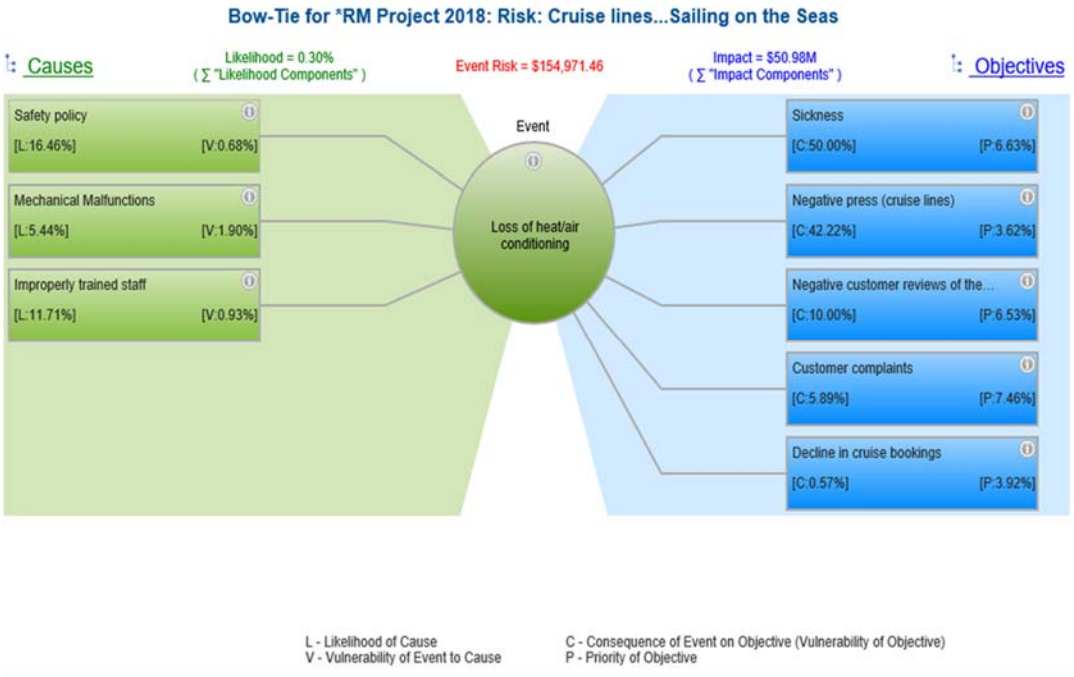


Figure 19: Risk Analysis without Controls

6. Implementing Risk Controls

To implement risk control, we identified the potential risk events and determined a series of controls that when applied to the threat or vulnerability, helped to mitigate, reduce, avoid or sometimes transfer the anticipated loss. Control can be viewed as preventative maintenance. A system should always be maintained by checking the system frequently we apply a control that prevents and

unexpected total failure. This may not be completely avoidable but reduces the chances significantly. Here we want to ensure we have viewed all aspects and controls whether it be staff and passenger safety training or performing preventative maintenance on life boats.

The risk analysis with controls shows the relationship between the causes and objectives. The chart shows if the cruise ship overturns or sinks the event risk is $2.91 million dollars with an impact loss of $201.98 million dollars

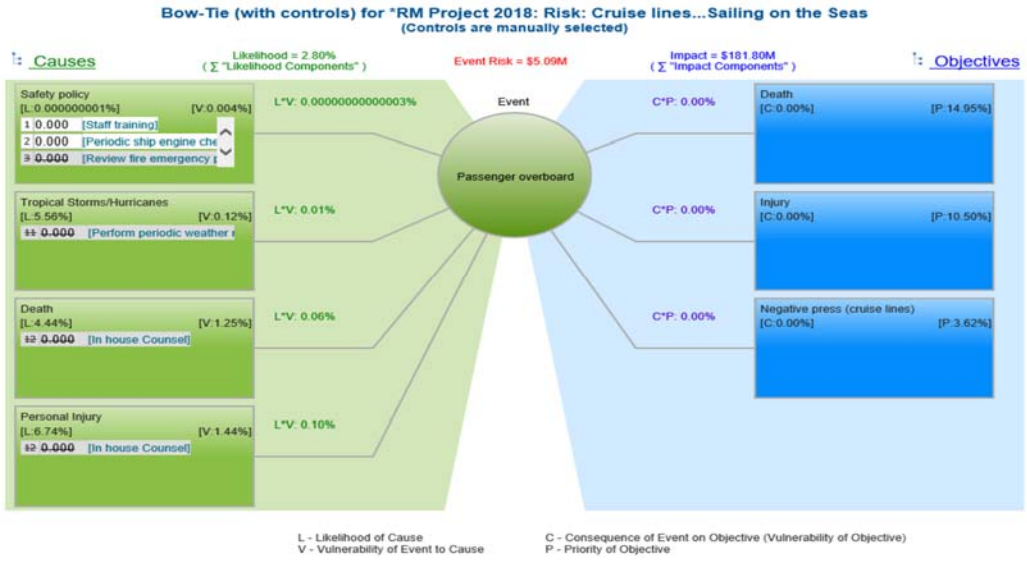


Figure 20: Bow-Tie Analysis with Controls

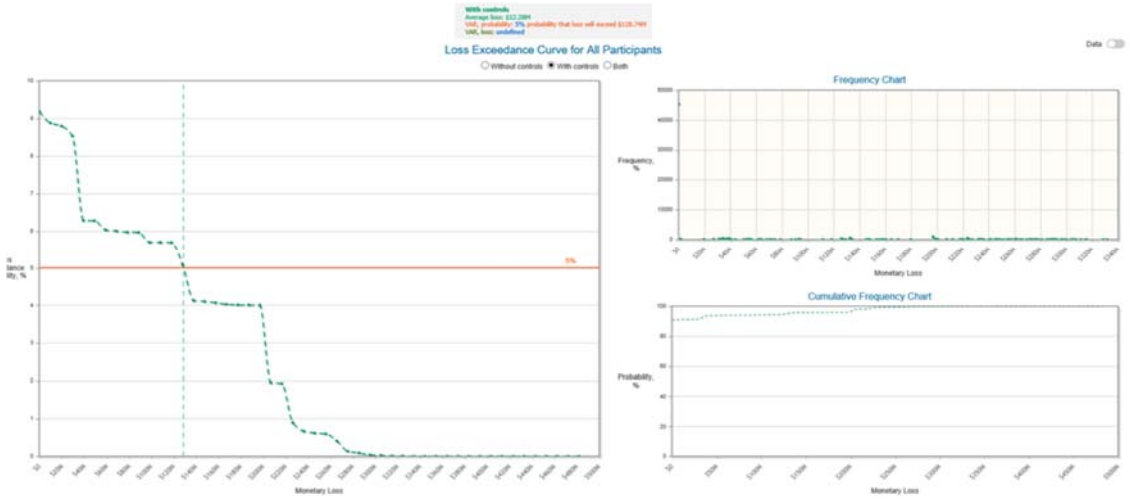


Figure 21: Loss Exceedance Curve with Manually Selected Controls

6.1 Overall Risk (with Controls)

The risk analysis with controls shows the relationship between the likelihood, impact and risks. The chart shows that if the cruise ship overturns or sinks the impacted cost would be $184,555,115 with a risk cost of $6,839,612 million and a total risk of $18,352,278.

Overall Likelihoods, Impacts, and Risks for *RM Project 2018: Risk: Cruise lines...Sailing on the Seas
(Controls are optimized based on simulated input and output)

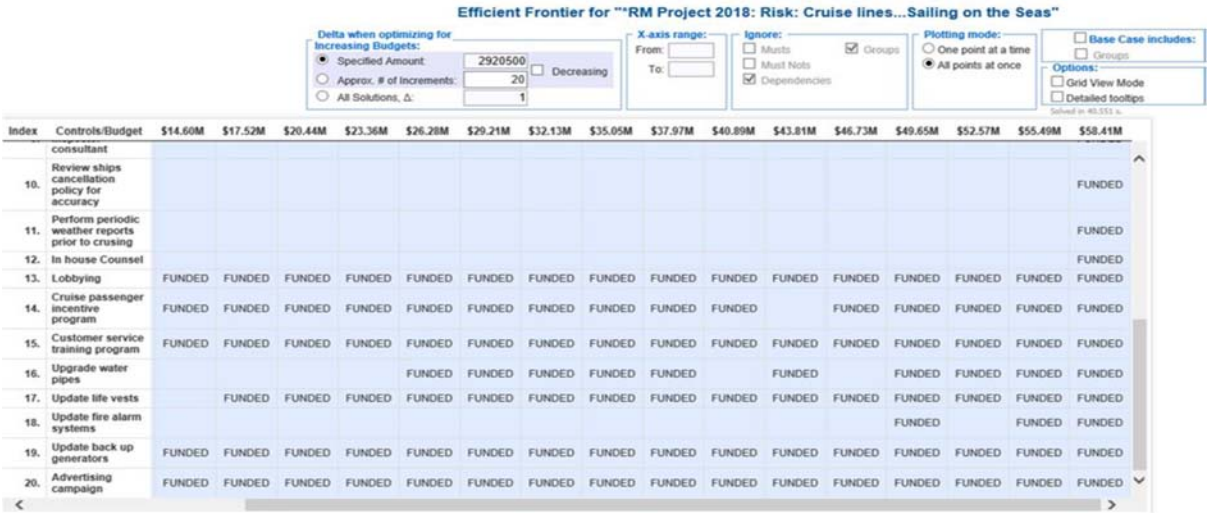
No. ▲	Event	All Participants Likelihood Simulated	Impact, $ Simulated	Risk, $ Simulated
[01]	Cruise ship diversion (incumbent weather)	2.61%	1,604,256	41,806
[02]	Cruise ship power outage	0.43%	17,806,738	76,568
[03]	Passenger assualts -sexual	3.42%	30,091,695	1,029,737
[05]	Medical emergency	0.65%	123,340,451	806,646
[06]	Cruise ship flooding	0.90%	88,779,538	799,015
[07]	Loss of water pressure	0.60%	26,499,409	157,936
[08]	Loss of heat/air conditioning	0.32%	51,625,470	165,201
[09]	Passenger overboard	3.71%	184,555,115	6,839,612
[10]	Cancellation of trip (hurricanes, illnesses etc.)	0.89%	36,120,246	321,470
[11]	Overturned/sunken ships	1.71%	202,670,045	3,469,711
[12]	Defective life jackets (drowning, broken bones and hypothermia)	1.60%	123,239,736	1,974,300
[13]	Engine failure of life boats	1.67%	32,352,204	541,575
[14]	Onboard fire	0.64%	189,981,698	1,219,682
[15]	Mold outbreak	1.20%	38,437,612	461,251

# Controls	Cost of Controls	How Selected		Simulated
0	$0	Optimized based on simulated input and output with budget of $0	Total Risk	$18,352,278

Figure 22: Controls Selected with a Budget Scenario of $10 Million for Controls

6.2 Optimizing Controls

A control will not apply in every situation. At some points the control cost can outweigh the total. At times a control will be implanted because it is mandated even though not cost effective. Riskion's efficient frontier provides a visual aid when diminished value sets in. Figure below shows the optimization at various budget points. For example, if our budget is $99.04 million, we are able to apply $98.60 million on controls bringing our risk value to $838 million. The grid shows us exactly which controls are applied for each budget points. At the $99.04 million budget, we apply the following 17 controls.



Index	Controls/Budget	$14.60M	$17.52M	$20.44M	$23.36M	$26.28M	$29.21M	$32.13M	$35.05M	$37.97M	$40.89M	$43.81M	$46.73M	$49.65M	$52.57M	$55.49M	$58.41M
	consultant																
10.	Review ships cancellation policy for accuracy																FUNDED
11.	Perform periodic weather reports prior to crusing																FUNDED
12.	In house Counsel																FUNDED
13.	Lobbying	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED
14.	Cruise passenger incentive program	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED		FUNDED	FUNDED	FUNDED	FUNDED	FUNDED
15.	Customer service training program	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED
16.	Upgrade water pipes					FUNDED	FUNDED	FUNDED	FUNDED	FUNDED		FUNDED		FUNDED	FUNDED	FUNDED	FUNDED
17.	Update life vests		FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED
18.	Update fire alarm systems													FUNDED		FUNDED	FUNDED
19.	Update back up generators	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED
20.	Advertising campaign	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED	FUNDED

Figure 23: Efficient Frontier

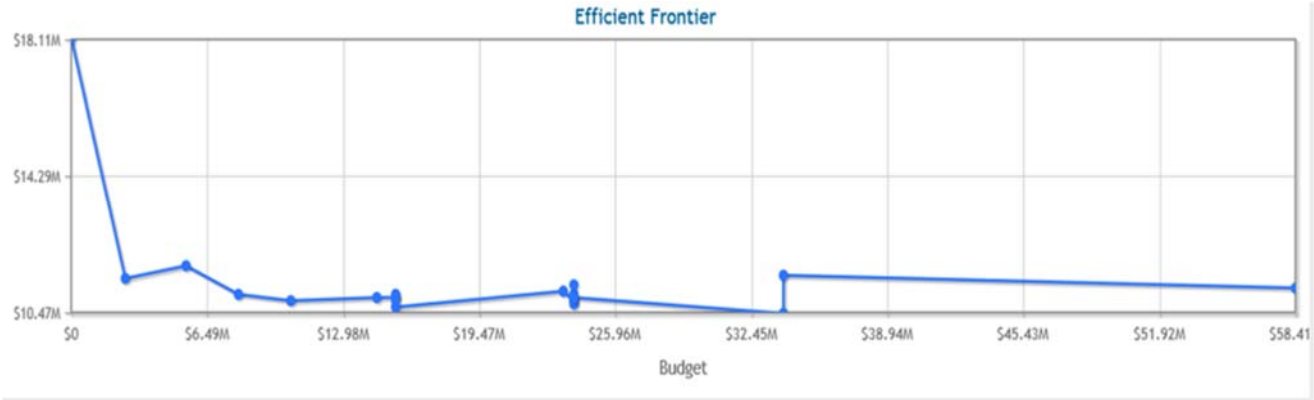


Figure 24: Efficient Frontier

7. Conclusion

Riskion data identified fourteen (14) events that is likely to occur, with associated simulated impact and risk costs.

The data revealed that the likelihoods, impacts, and risks for that the event will occur. The 3 events with the highest likelihood of occurrence are (1) passenger overboard has a likelihood rate of 3.83%; has an impact dollar value of $182,586,212 and the highest risk value of $6,985,748. The second highest event that's likely to occur was passenger assaults-sexual at a rate of 3.60%; simulated impact cost of $30,113,621 with a simulated risk cost of $1,082,885. The third event likelihood of occurring was cruise ship diversion (in climate weather) at the rate of 2.61, with an impact cost of but the impact cost is the lowest value of $1,604,355, and only $41,806 for risk cost. The total risks are $18,153,127. This data indicates that the passenger overboard and passenger assaults-sexual are risks that directly impacts bodily harm to cruise line travelers harm; while the cruise ship diversion impacts both the ship and travelers.

The intent of this report is to provide awareness for passengers of the potential risk associated with cruise traveling in hopes they will be alerted to the possible pitfalls early in the vacation planning phase--in order, to make wise and safe choices in their vacations. Additionally, numerous incidents and accidents had been reported, that have increased the risk concern for both the cruise line and passengers.

8. References

Riskion® Software. (n.d.). Retrieved October 2018, https://gwcomparion.expertchoice.com
Travel, Tourism & Hospitality, Leisure Travel Cruise industry and Cruise Ships -- Statistics & Facts: www.*statista.com*2. https://en.wikipedia.org/wiki/Carnival_Dream
https://en.wikipedia.org/wiki/Royal_Caribbean_International
https://en.wikipedia.org/wiki/Costa_Cruises