Research paper on:
How to create Compliance Systems from an Engineering viewpoint

Author:
Mohamed Raghe

Table of Contents

Introduction

Ethics and Compliance programs are organizational policies designed to promote rules and regulations for preventing bribes and other unethical conducts in our business organizations**.** The United States Sentencing Commission defines those programs as mechanisms for preventing and correcting the wrongdoings in our organizations. Today, many organizations adopt ethics and compliance programs integrated in their business but let's look at real history that led ethics & compliance programs effective and existing in most organizations of today.

The concept of having systematic compliance controls in organizations started in 1977 through Foreign Corrupt Practices Act but American businesses didn't collectively show any commitments to establishing the responsibility implementing those systems in their business. Between the years of 1985 and 1990 however, American businesses have experienced a huge and continues misconducts where the cost of essential items is increased due to bribes that were paid to foreign countries, so the U.S government has appointed a commission to study the problem. It was discovered that some government agencies spent ridiculous money in buying highly inflated spare parts from their contractors, but no one was arrested for it but regarded as unethical behaviors. The appointed commission went on and expanded the concept of 1977 to executing internal controls to prevent businesses from illegal conducts and make those involve in it accountable. Years have passed and many companies or high-ranking individuals were taken to court and charged with misconduct scandals. Since the start of those controls after 1990, American businesses have been improving and doing better against corruption and bribery violations. Today, many other sub-systems including money-laundering, conflict of interest, workplace and employee safety are under the Ethics & Compliance systems to protect the reputation, employee wellness, financial and existence of organizations.

Background (material to define the context of the problem)

The United States Department of Justice and regulators expect business organizations to have an Ethics and Compliance programs. Every year, the regulators introduce new updates and expectations to improve the program. There are three basic questions to consider for a company to be deemed to have an effective compliance control. Those questions ask how the compliance program is designed by the company, is it funded, and whether the program is honestly practiced or not. The answer to those questions will help and guide organizations to apply all steps to consider for the program success.

For example, the design section is where regulators look at the policy and procedures established to guide the compliance framework. This includes the priorities of risks and techniques for assessing possible company risks, so companies shall have a risk assessment sub-system to have an awareness of risk types of businesses. This will demands having the right people for designing the program such as board of directors and lawyers who are expert in implementing rules and regulations. The second question is whether the program is fully funded to have all the tools and resources needed to accomplish the necessary tasks. Ethics and Compliance organizations need high skilled lawyers to providing consultation services to the businesses before they make any action or decisions involved in legal system, where business may possibly interact with high-risk partners. There are technology tools including hardware and software for communication and recordings related to historical business transactions for making decisions, so, regulators expect organizations to fully fund those programs to be able to pay employee salaries and tools for daily tasks. The third and last question of regulators investigate the effectiveness of the program. It is possible that organizations design and fund programs well but not effective and working practically, so government expects organizations to have a compliance related data where they analyze trends, monitor and audit unethical activities related to bribery, cyber-attacks, employee concerns, third-party payments, training and more. Having those tools and resources for our project, the Compliance system will be able to identify, detect, protect, and respond to risks of our businesses to be safe and protective from harmful threats.

In this paper, we will be establishing an Ethics and Compliance company by demonstrating the Systems Engineering concepts learned in the program courses. We will be starting with Department of Defense Architecture Framework views to provide an extensive guidance on the developments of our project. This will be followed by some traceability metrices allocated to defining the relationships between system establishment requirements and other artifacts to prove that expected activities have been fulfilled. We will also investigate the RMA of our system given the operational capability, reliability and availability to decrease the logistic costs over the life cycle of the project. The system will be verified and validated to ensure that our design and operations activities are aligned with both allocated requirements and customer approvals. To estimate and plan resources and activities needed to complete the system, we will be providing an overarching insight to capturing project events and milestones from planning to delivering the desired system. This will lead us to provide the program stakeholders a consistent tool for executing those plans and track the underlying technical schedule, cost, detailed tasks, and resources for ensuring successful project completion. Finally, we will provide a risk registration and mitigation plans where potential project risks are described to help stakeholders aware of a possible delay to the project and ways to mitigate them.

AV-1

The AV-1 provides sufficient information detailing assumptions, constraints, purpose, and limitations that may affect the high-level decisions related to the architectural framework of our program. It will be a point reference to the entire specifications of our system and in addition to the architectural development, the AV-1 will be serving as a planning guide to our created system models. Below is a summary of the AV-1.

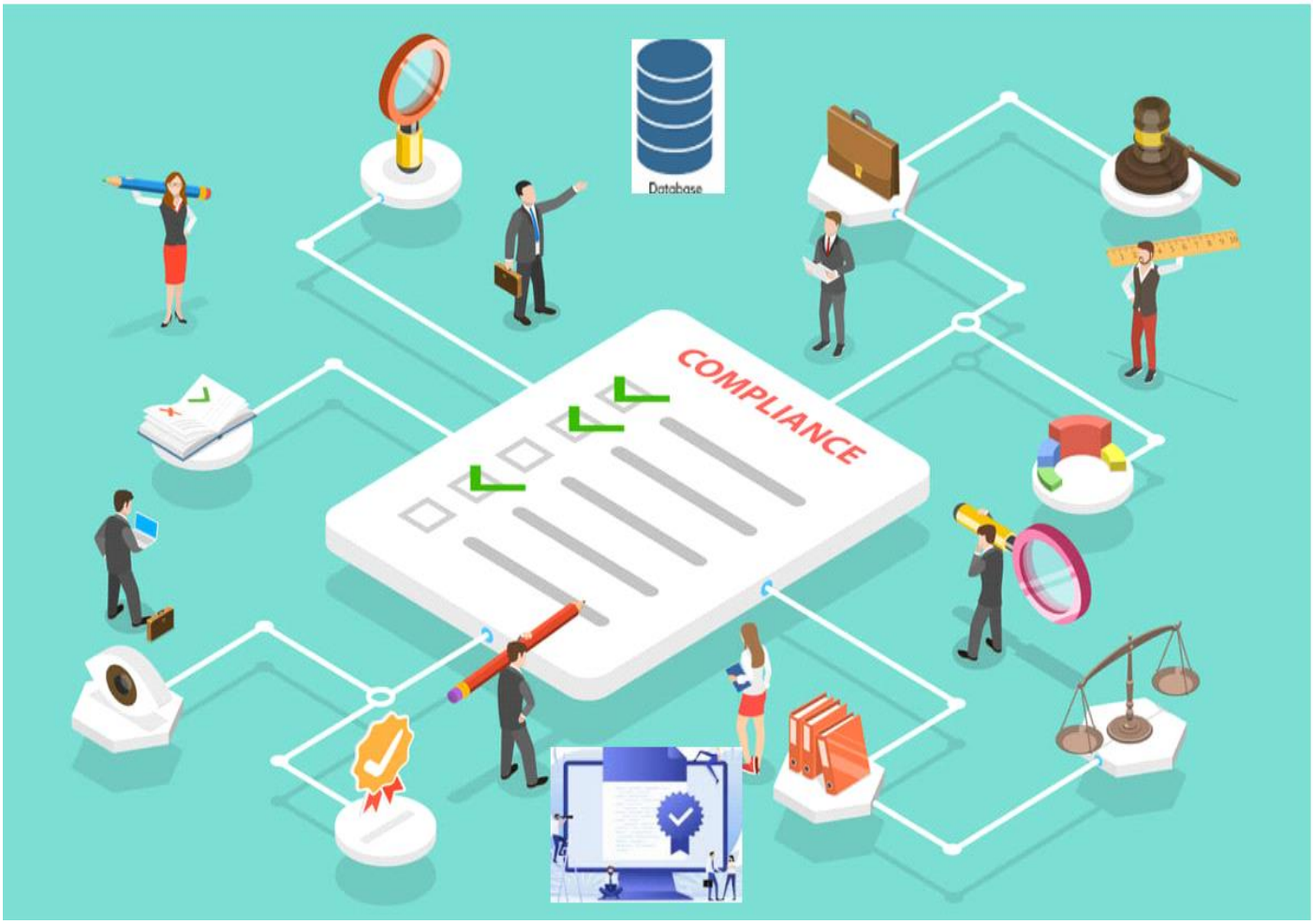
Project Name: Ethics & Compliance Operations (ECOps)
Architect: Mohamed Raghe
Purpose: To identify and avoid possible risk or red flags that can result a costly fines and penalties on our organization.
Scope: To have an internal control systems that adequately measure and manage company risks.
Mission: To promote an organizational culture that encourages ethical conduct and commitment to compliance with the law to make a good faith effort to detect and prevent criminal conduct.
Threat: Budget, safety risk, financial risk, reputational risk, and organizational existence risk.
Geographical Region: United States of America
Rules, Conventions, Criteria:
Government regulations
Cover all required project topics
Clear and on-time delivery
Assumptions and Constraints:
Government or DOJ guidelines
Unethical leadership
Unrealistic and Conflicting Goals
Stake Holders: Government, Corporates, employees, vendors, consumers, and customers
Findings: There are other organizations that have E&C departments to prevent them from risks.
Issues: Funding, SME, unexpected risk, government requirements
Tools: Microsoft Office projects

AV-2 Integrated data dictionary

The AV-2 view will identify elements planned to use as a standalone structure in our system. It will show program data hierarchies as well as some text definition for each element by refencing its source.

Object	Type	Description
ECOPs	Acronym	Ethics & Compliance operations
DOJ	Acronym	Department of Justice
Corporate/business/company	Expanded form	The corporate adopting ECOPs program
OQE	Acronym	Objective Quality Evidence
NAVEX	Acronym	Navigation experiments
DBMS	acronym	Database management systems

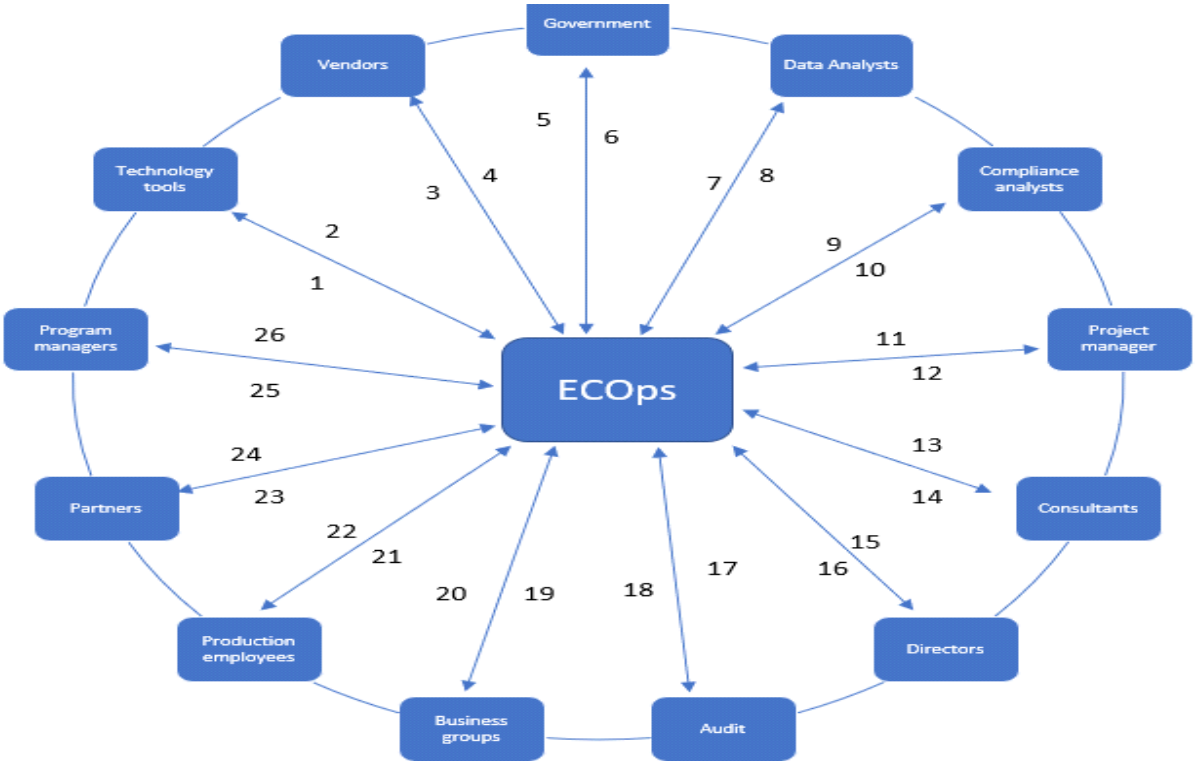
OV-1 High-Level Operational Concept Graphic



This is the graphical representation of our project and the systems you see in this figure are the players involved in our system operations. We are using it to position for our detailed discussions and communications used to lead the paper discussion. For example, we used the policy system as the primary guidance when it comes to controlling the actions of employees and customers.

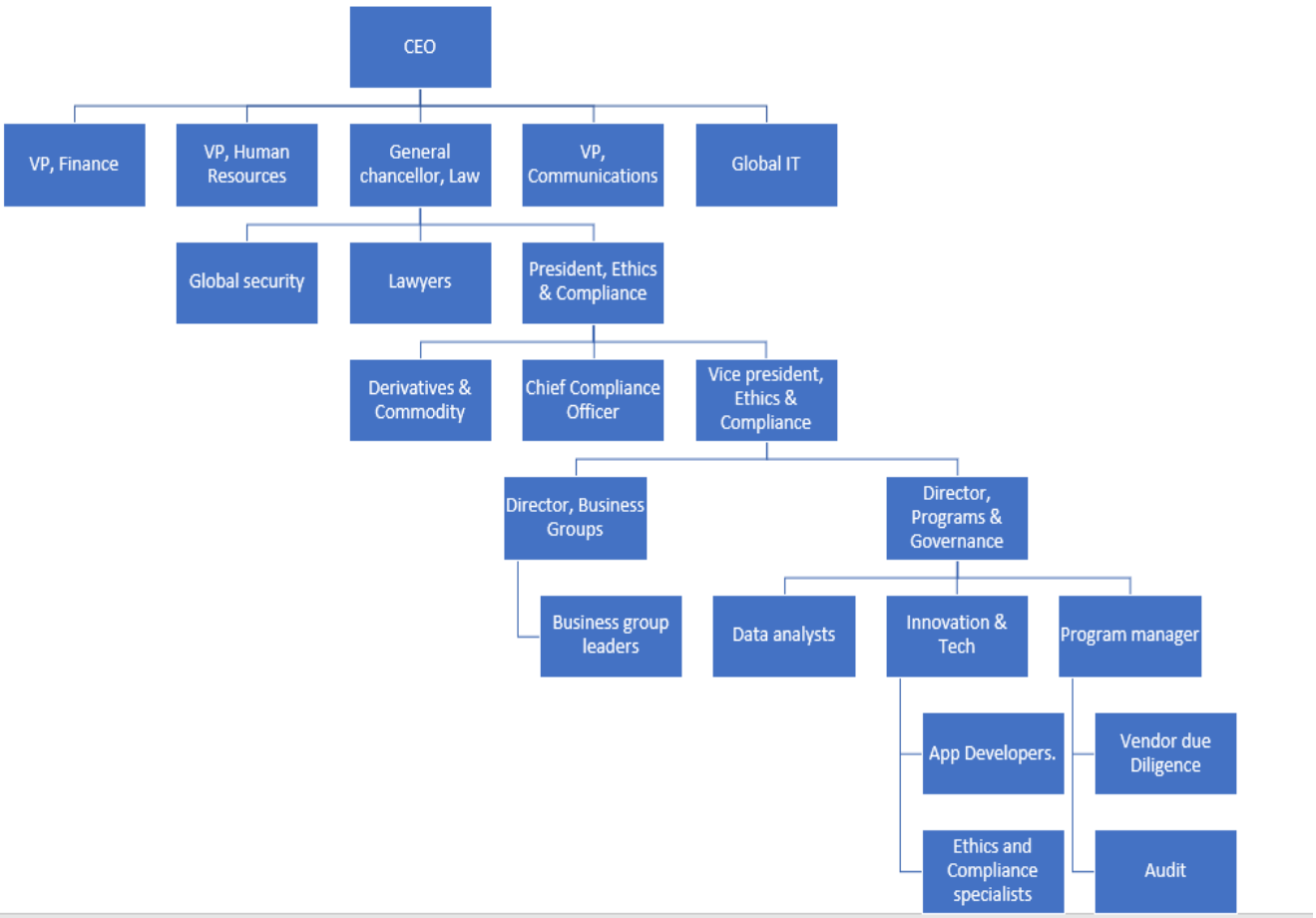
The policy system includes both company and regulator policy, mainly the U.S government's department of justice. There are expectations from those policies, so there will be internal subject matter experts dedicated to adopting and integrating those regulations in corporate cultures where compliance systems exist. The second important system is the technology systems which contains hardware and software systems, like computers, printers, networks, databases, and other applications like NAVEX. Those systems will help the program to communicate, train employees, record and analyze the daily necessary information for decision makings. Compliance programs use data analysis for tracking the overall program effectiveness and decision makings and given that we have adopted data storage systems like DBMS, we have also adopted NAVEX system which is an external vendor's risk management application used to record vendor information, employee concerns and trainings to ingest those records in our main database systems for analysis. The resulted information from the analysis will be handed to the audit and monitoring system team for further evaluations and then it will be communicated with compliance leaders for decision makings, so the high-level operational concept graph shows the most important components of our system where we need to invest most of our efforts in terms of testing and validating the requirements and the reliabilities of those systems given the project life cycle. So, you will be able to see every one of those systems tested separately considering the relevant MOE, MOP and TPM that's expected for every system requirement as well as the key performance parameters for the critical performance goals of our system.

OV-2 Operational Node Interconnectivity View



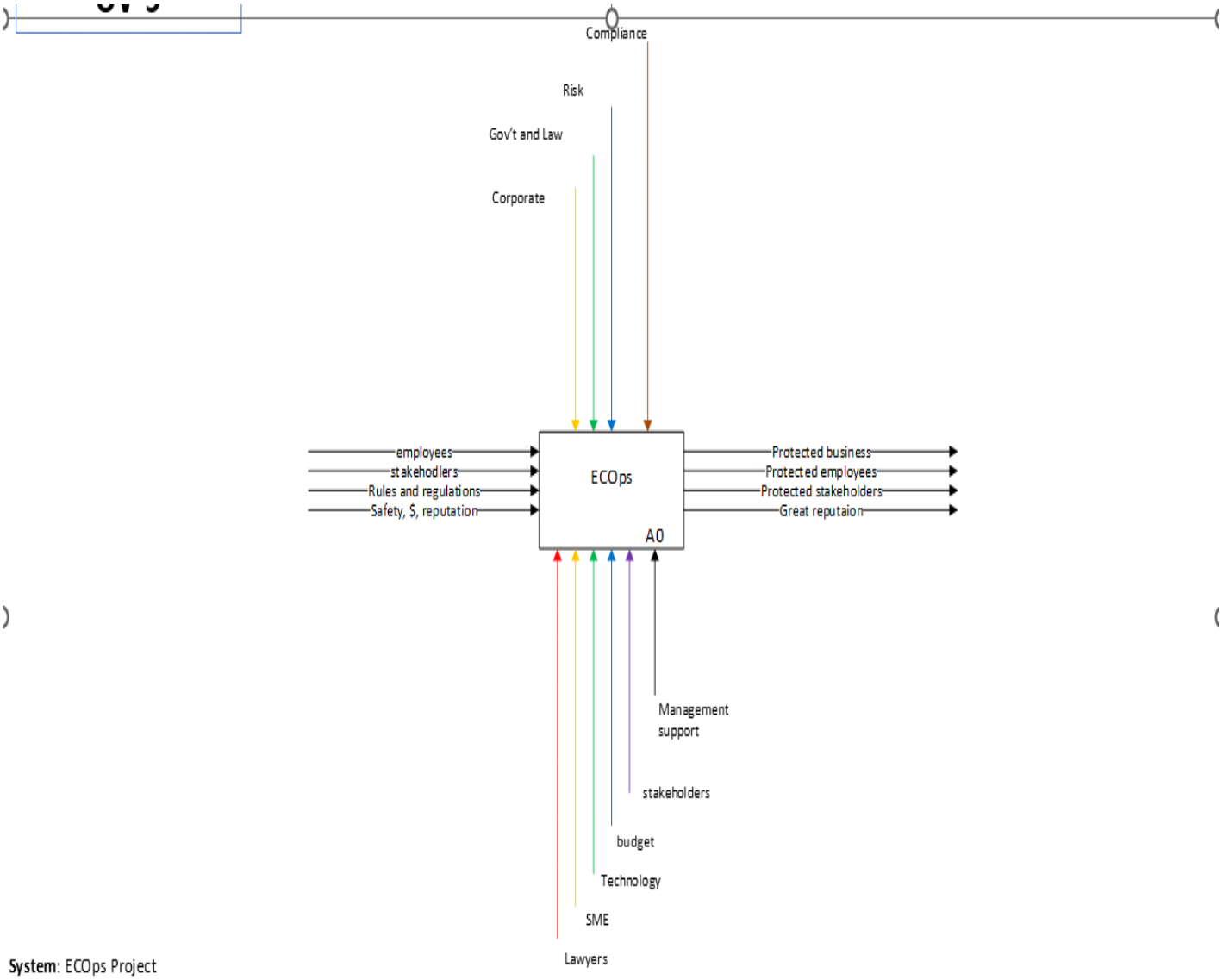
The operational node connectivity description is one of the main Dodaf views and it describes the components of the ECOps system mainly the stakeholders. This is where stakeholder communications will be derived from to make decisions related to fundings, defining capability boundaries and requirements given the high-level operations of our system. In the center of the view is our system and attached numbered arrows connecting the system and stakeholders represent a need line. Those need lines are normally documented in the ov-2 information exchange showing the type of needs between the system and the stakeholders. We will use those need lines to identify some of the system requirements but instead of documenting the information exchange, we will be able to keep them in mind during the project development considering the flow of information, so during development, this view will be utilized as a context model for our project operations by defining the capability of requirements given the user and all stakeholder needs.

OV-4 Organizational Relationships Chart



Organizational Relationships Chart shows the structure of our Ethics and Compliance system and the interactions whether it is an actual or role-based interaction. It will also be used to clarify relationships in both internal and external organizations within the architectural design, and from the top chain of the chart, we have the president of the organization followed by some vice presidents from different business groups reporting to the CEO. In general, some of those departmental leaders my have some direct relationship with our ethics and compliance department, but all of ethics and compliance operation activities are reported to the general chancellor of law who will directly report to the chief executive officer. The general chancellor manages operations related to legal and regulations as they will differ into some branches, but all come under the law department. Amongst those branches are the ethics and compliance where we have a president who is responsible for directing the overall operations including budget and other resource allocations for the department. Under the vice president, we have director of programs and governance who is responsible for hiring, assessing needs as well as reporting the overall project activities to the vice president. We also have the director of business groups. Those business groups manage the global plants to assess and keep track of the overall plant safety given company expectations on employee satisfaction. The business group leaders use technology and data driven decisions to assess and correct the likelihood of plant risks and the data comes through adopted technology systems where employees disclose concerns from managers, human resources, and other employees. Those concerns may either be harassment, discrimination, pay and benefit and more and they will be addressed given appropriate procedures. In addition, there will be multiple program managers including training deployment, data and strategy, audit and monitoring, risk management, and vendor due diligence managers. Each one of those program managers will manage the self-explanatory programs named under them and they will all report to the governance and programs director, but majority of the compliance team who are analysts will be reporting to either supervisor or designated program managers to facilitate program activities.

OV-5 Operational Activity View

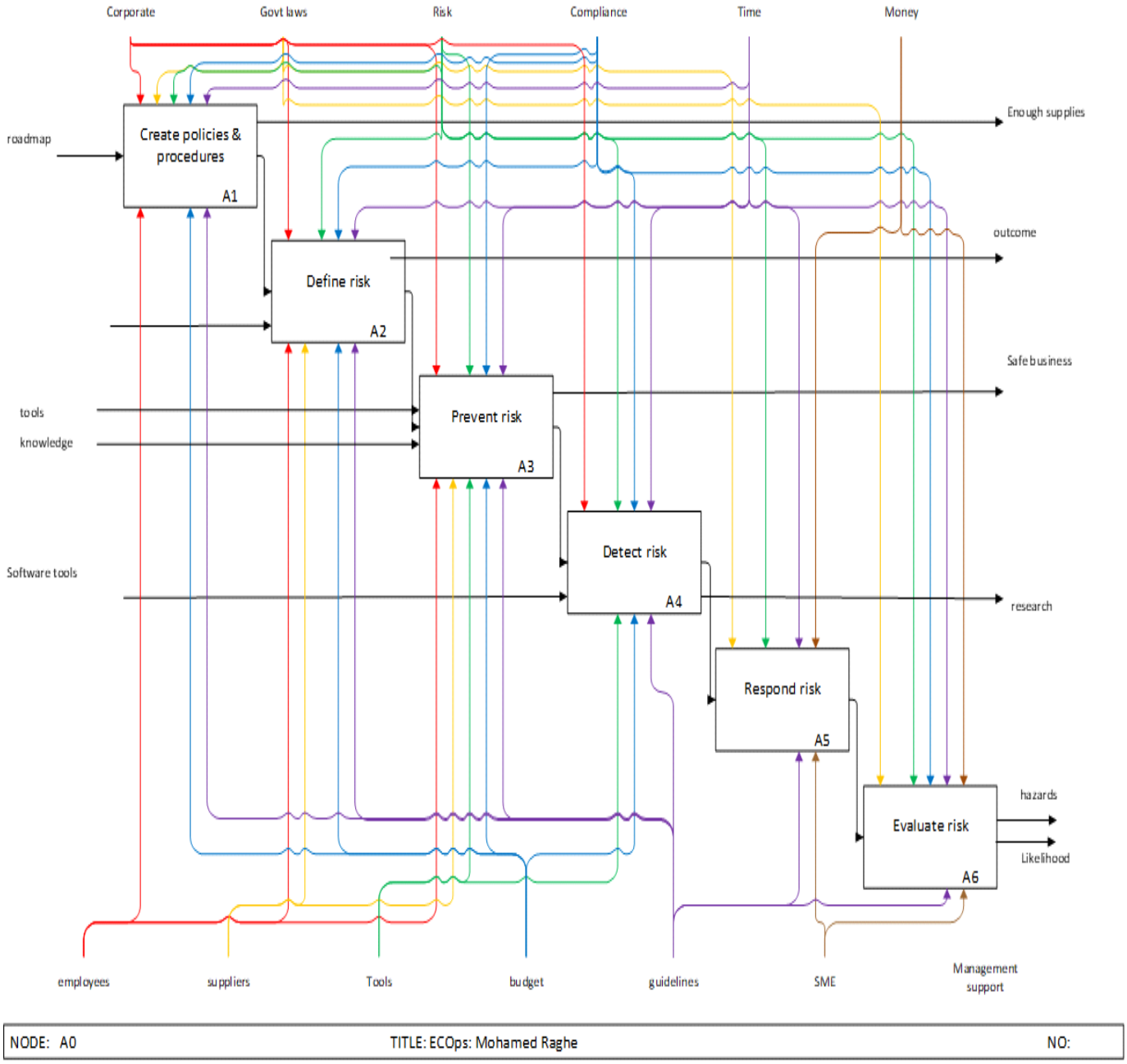


System: ECOps Project
Mission: To promote an organizational culture that encourages ethical conduct and commitment to compliance with the law to make a good faith effort to detect and prevent criminal conduct.
Purpose: To identify and avoid possible risk or red flags that can result a costly fines and penalties on our organizations
Scope: To have an internal control that adequately measure and manage company risks.

NODE: A0 TITLE: ECOps: Mohamed Raghe NO:

While achieving the desired goals of our compliance system development, there are high level operation activities that need to be conducted.

Our operational activity diagram will describe input and output flows between those high-level activities and will explain what happens with in specific activity. Decomposition tree will show those activities as tree structure to help us uncover unnecessary activities in our listings and identify lines of responsibilities as well.



The Operational Activity Model shows that our project activities were broken into six operations. The first operational activity details focus on creating policies and procedures for the ECOPs system. This will include both company and regulator policies that need to be adopted for the success of the program. The budget and resource section will also fall under the policy and procedure section since the program will not function without fund to facilitate program needs. The second section of our operational activity model focuses on risk and how to prevent it from our business, and that is what the Ethics and Compliance program stands for. We will also need couple resources including tools, employees, and appropriate software applications that will help technical team to identify risk by analyzing compliance data. Those main activities will be further decomposed and here are details for description purposes.

A1 - Policy and procedure is where we identify needs of our program. This will be assessing business risks, policies and requirements that can help us reduce those risks. This will demand budget so we shall be able to obtain the desired fund to establish the overall structure of the compliance program.

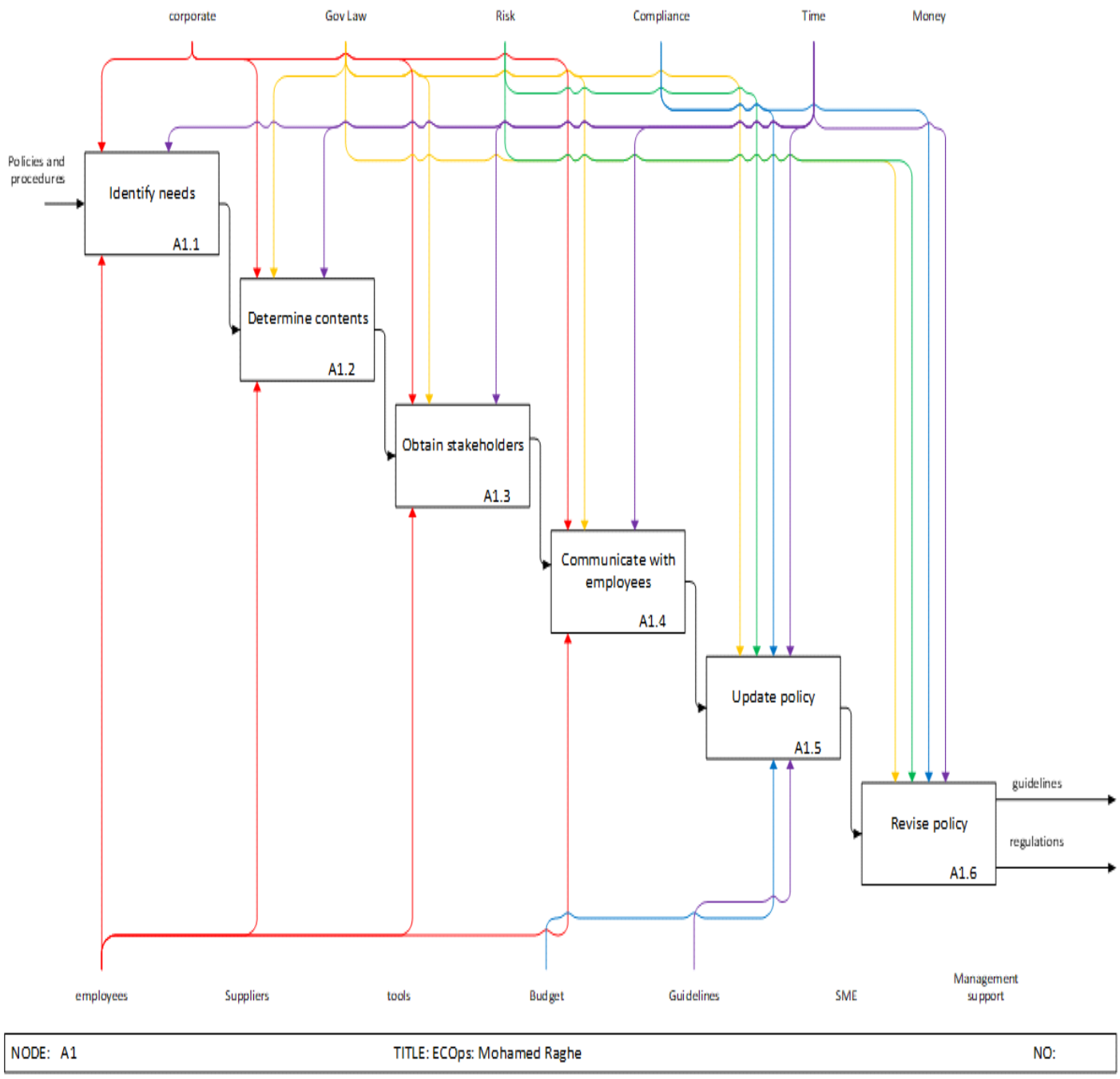
A2 - The define risk is where we need to create our risk profile by assessing it, prioritizing it, and aligning with our business policies.

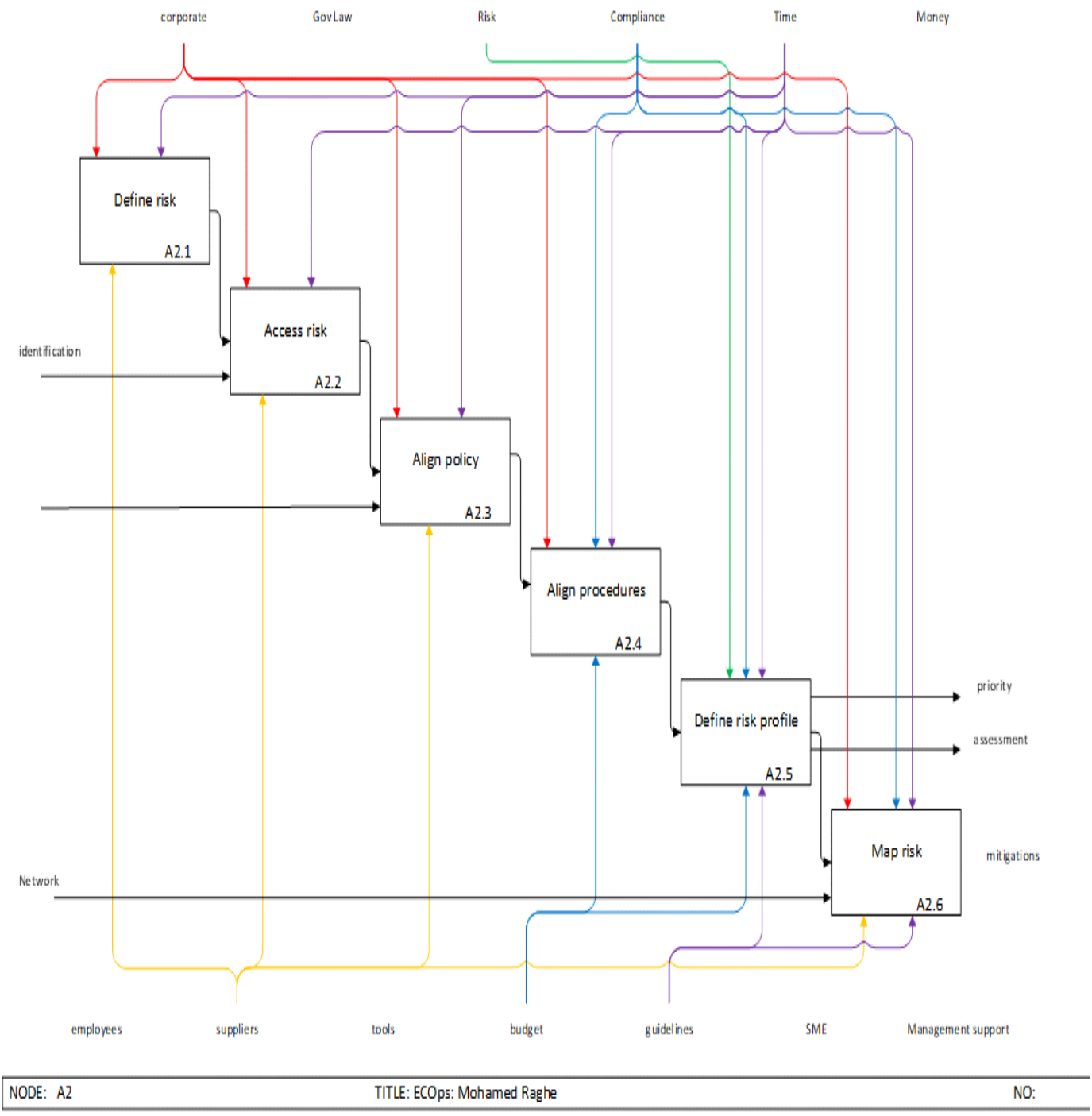
A3 - The prevent risk activity will facilitate some communication activities where stakeholders will be trained and educated. The training package will be socialized through technology systems and employees will have couple attempts to get the desired completion score. In addition, vendors will be screened through due diligence process and that is where they will be defined to be either high risk or not high-risk vendor. The data result for both activities will be recorded to evaluate vendors and the overall understanding of employees in the risk domain areas that the training was deployed for.

A4 - Detect risk section will be performed by our audit and monitoring team to review the level of risk and follow up with the right individuals to audit and control accordingly.

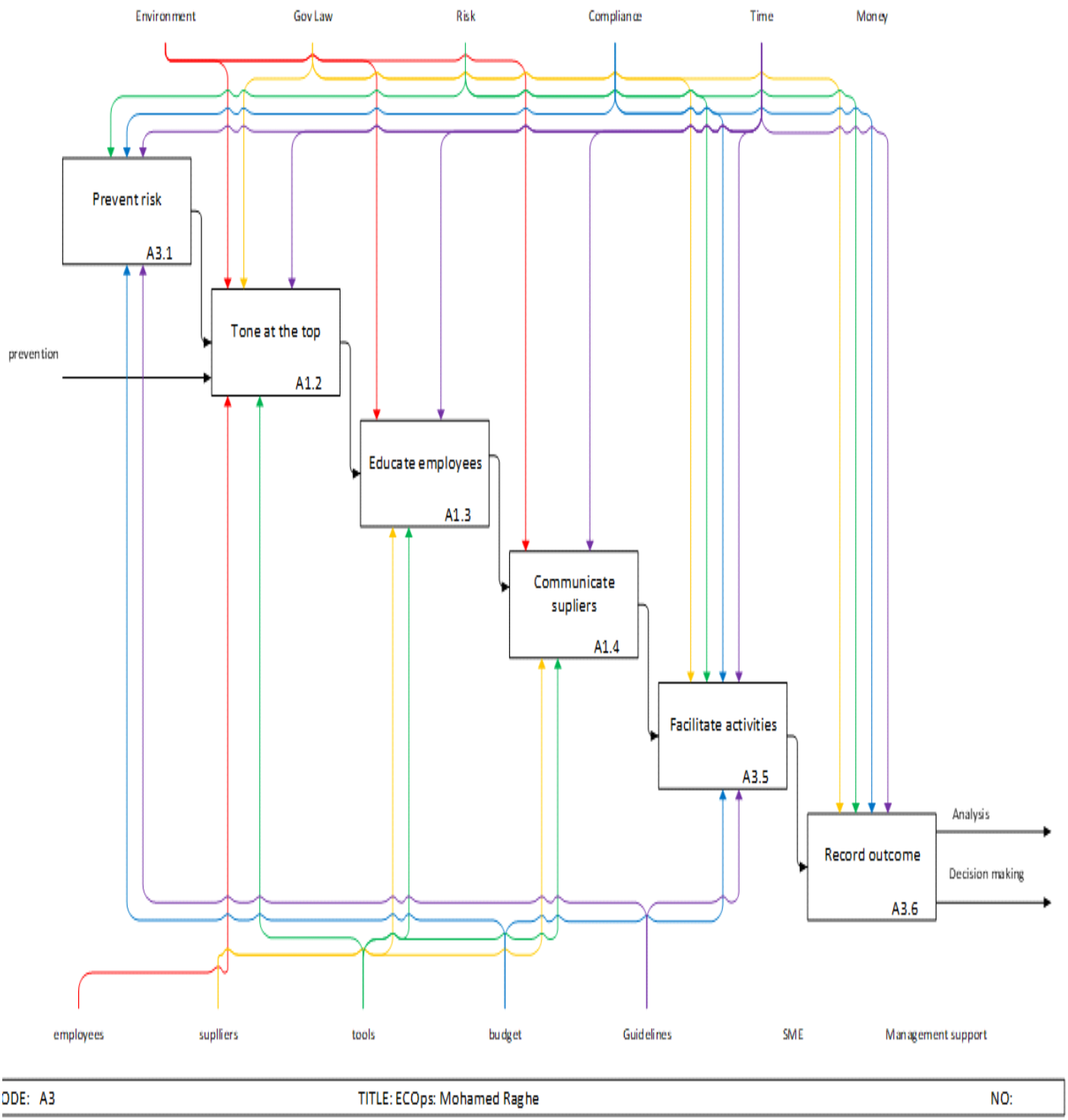
A5 - Respond risk activity will utilize the root cause of the risk to propose corrective actions.

A6 - The evaluate risk will assess whether compliance activities are aligned with the program goals. Those assessments will reevaluate metrics against standard policies to see if the program is effective and representative.

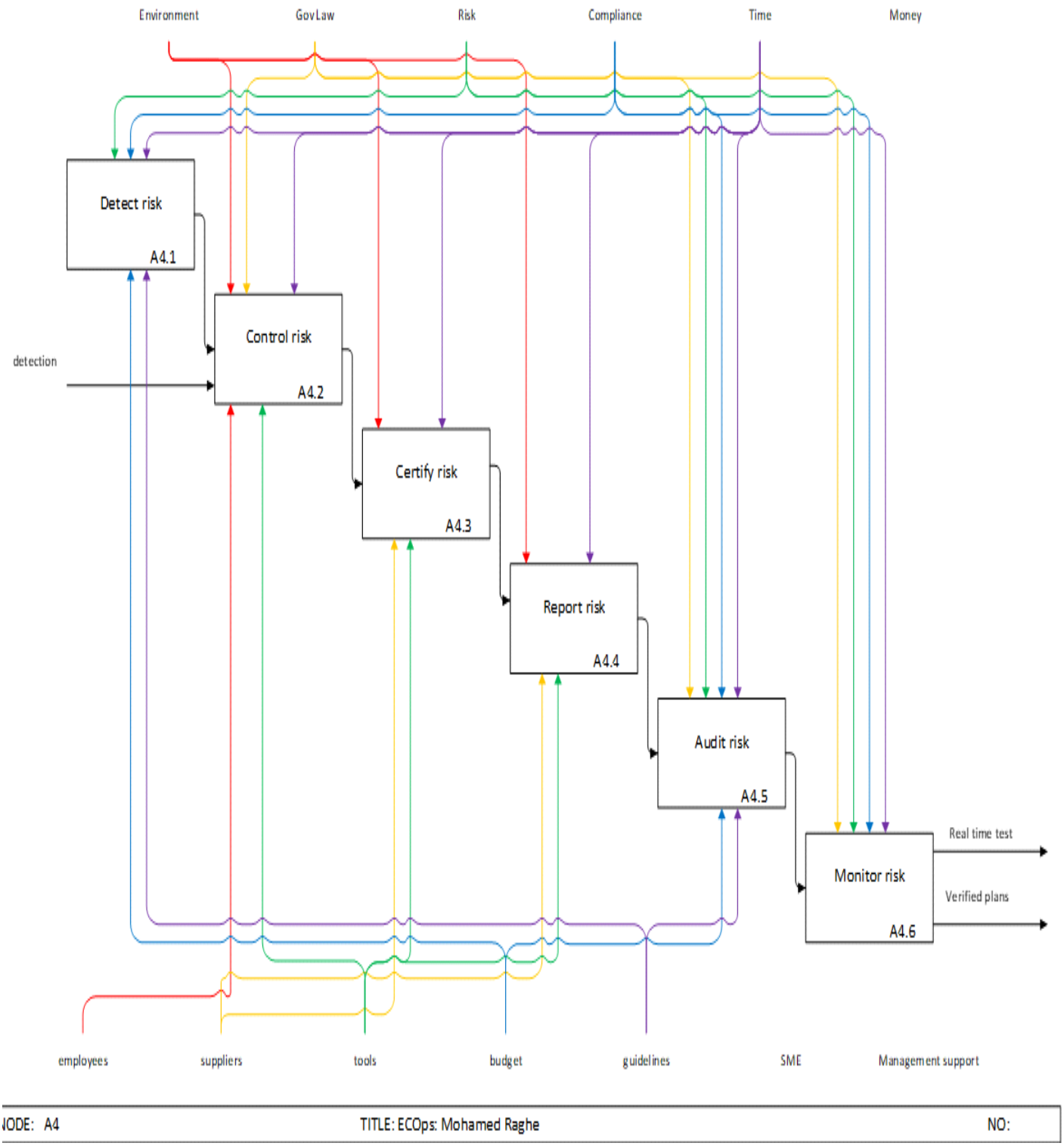

corporate
Gov Law
Risk
Compliance
Time
Money
Policies and procedures
Identify needs
A1.1
Determine contents
A1.2
Obtain stakeholders
A1.3
Communicate with employees
A1.4
Update policy
A1.5
Revise policy
A1.6
guidelines
regulations
employees
Suppliers
tools
Budget
Guidelines
SME
Management support
NODE: A1
TITLE: ECOps: Mohamed Raghe
NO:



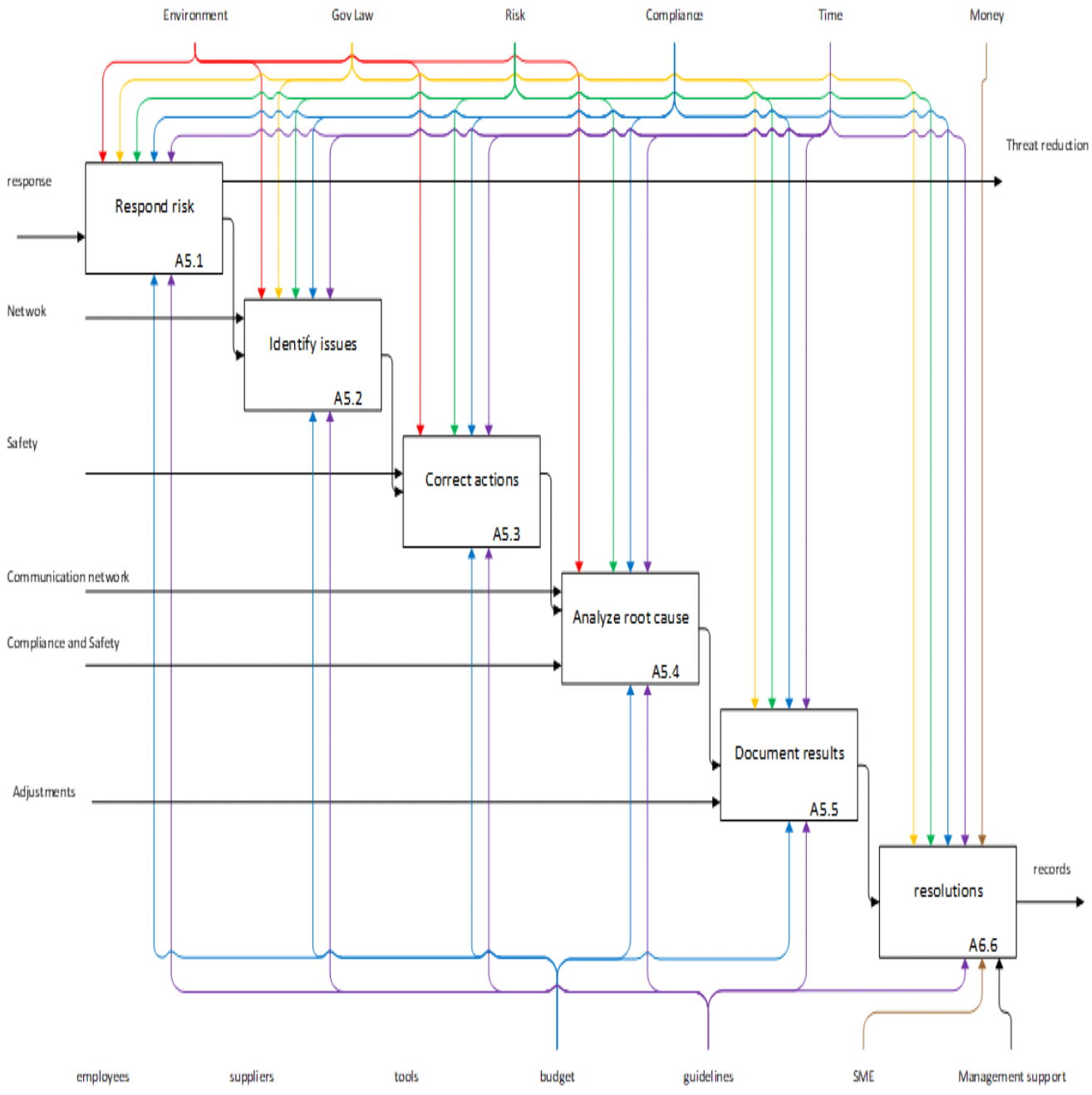
NODE: A2	TITLE: ECOps: Mohamed Raghe	NO:



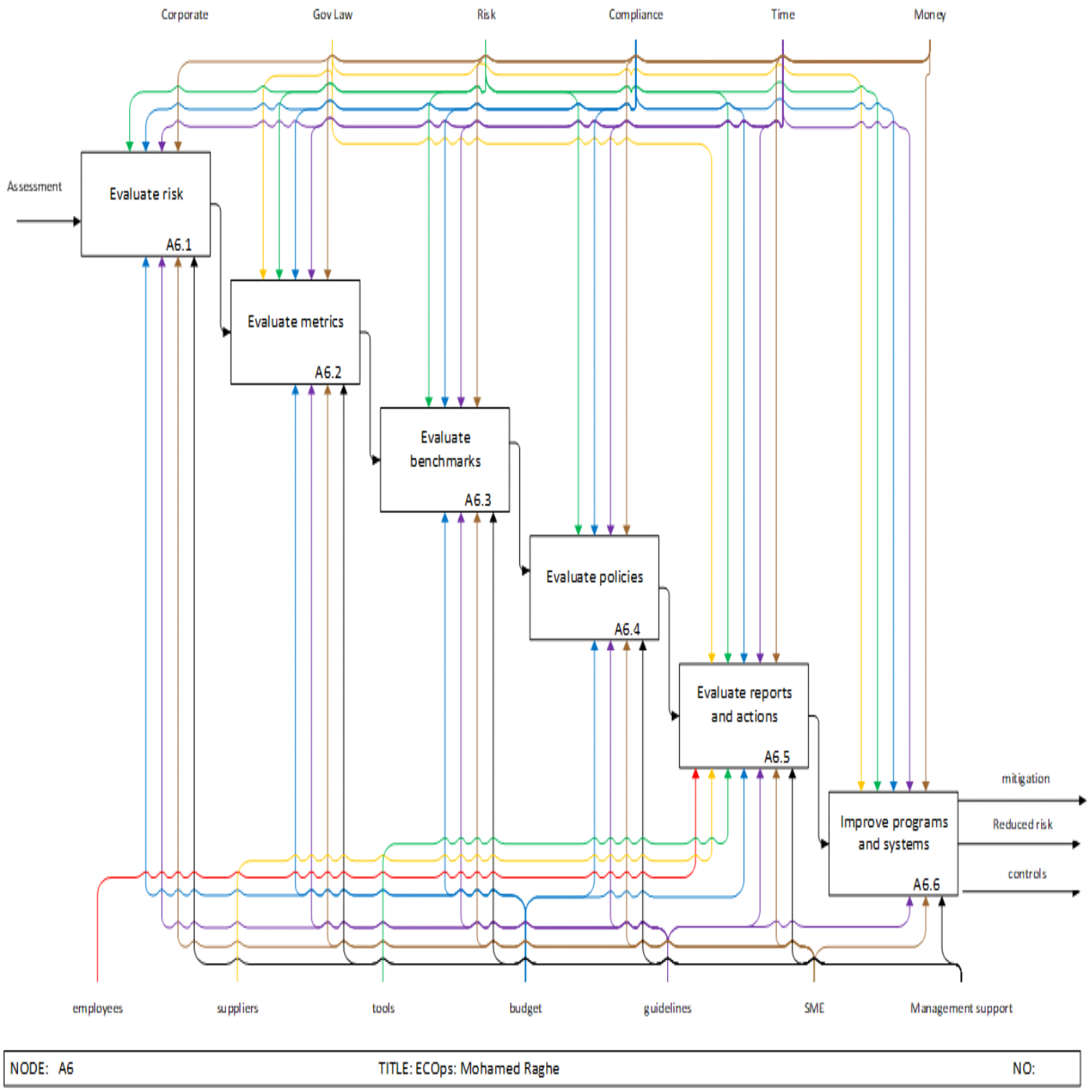
ODE: A3	TITLE: ECOps: Mohamed Raghe	NO:



NODE: A4	TITLE: ECOps: Mohamed Raghe	NO:



NODE: A5	TITLE: ECOps: Mohamed Raghe	NO:



NODE: A6	TITLE: ECOps: Mohamed Raghe	NO:

Requirements Verification Traceability Matrix (RVTM)

	OV-1	OV-5	Requirements	sub-systems	analyze	test	demo	inspect
2		x	The department shall comply with all applicable compliance Policies and Standards of business Conduct	Policy		x	x	
3			The program shall be able to integrate codes into businesses to increase overall confidence.	policy		x	x	
4		x	government shall provide instructions to measure the adequacy and effectiveness of ethics and compliance program.	Communication systems			x	
5			Government shall make all procedures and due diligences clear for the organizations to thrive safety environment.	Communication systems		x		
6			The expectation of the regulators shall be clear and understandable for business stakeholders.	Communication systems	x		x	
7	x		The corporate must obey the government rules and guidance designed for ethics and compliance departments.	policy	x			
8		x	vendors shall be a government certified to work with our company.	policy	x			x
9			Vendors shall go through the due diligence screening process to determine their risk status	policy	x			
10			Vendors shall never be employees at the same time as this is against the company law.	policy	x			
11	x		Employees shall be able to speak up against unethical behaviors.	Communication systems	x			
12	x		There shall be a reporting line or system for the employees to disclose unethical events.	Technology systems	x		x	
13		x	The main corporate shall allocate budget for the ethics and compliance department.	policy			x	
14			There shall be experts and knowledgeable team for the department to accomplish its duty.	Communication systems			x	
15	x		All employees shall have the necessary support, tools, and resources to perform their job.	Technology systems			x	
16		x	There shall be training programs for the employees to be educated the company culture.	Training systems				x
17		x	All employees shall take and complete the provided trainings with passing grades.	Training systems	x			
18			The department shall Conduct routine monitoring and auditing to identify and evaluate possible risks.	Communication systems	x			
19		x	There shall be a written and an equal consequence for every event from employees and vendors.	Audit and monitoring system			x	
20			Program shall disclose the list of risk domains that they plan to prevent from businesses.	policy	x			
21		x	There shall be a reporting line where travel expenses and gifts are shared with businesses.	Communication systems		x		
22	x		Program shall disclose data insight and analysis collected for improving business violation.	Technology systems	x			
23			Audit team shall ensure that financial information is represented fairly and accurately.	Communication systems	x			
24		x	Officers shall consult with lawyers before taking any action against compliance issue.	Audit and monitoring system	x			
25			The program shall Develop an effective line of communication for all stakeholders	policy			x	
26			The program shall be able to respond promptly to detected problems to undertake corrective action	Communication systems	x			
27			The program shall carry out surveys for benchmarking internal standards against external companies.	Audit and monitoring system	x		x	
28			Designated compliance officers shall Stay on track with changing laws and regulations from government and regulators.	Technology systems		x		
29			The adopted tools and software applications shall be able to record and analyze information accurately.	Communication systems		x		
30			There shall be designated members in the team to identify, detect, prevent, and respond to business risks.	Technology systems			x	
31			All vendors shall be screened to prevent corruption and conflict of interests	Communication systems	x			
32			Program policies shall be shared internally and with external stakeholders as well.	policy			x	
33			Program shall provide weekly memos and hints to update and create awareness for stakeholders.	Training systems			x	
34			The employee and stakeholder training shall be organic and never ending if the business exists.	Communication systems	x			
35			The program shall implement behaviors that benefit everyone involved in the business.	Training systems			x	
36			The program shall conduct risk assessment to identify potential risks in the business.	policy		x		
37			The results of risk assessment and other data collection results shall be socialized with all stakeholders.	Training systems			x	
38			The overall program shall be designed, functioning and visible in the business culture.	Audit and monitoring system	x	x		
39			The collected data shall only be used for investigating illegal activities and improving the program effectiveness.	Communication systems	x			
40			The business employees shall be encouraged to speak up and share concerns related to inappropriate activities.	policy	x	x		
41			There shall be a good balance of culture, skill, and experiences to entrench the best practices of compliance program.	Audit and monitoring system			x	
42			There shall be a risk management plan to help mitigate potential project delays that could arise.	Communication systems		x		
43			The overall purpose of compliance shall be protecting businesses from harms by treating everyone with fairness and respect.	Communication systems	x			
44			The compliance program officers shall ensure suppliers and employees follow procedures.	Communication systems			x	
45			The employee salary shall be paid from the budget allocated for the compliance program.	policy	x			
46			Tools and technology applications will be paid from the budget allocated for the compliance program.	policy	x			
47			The program shall be able to partner with business groups and functions for data exchange and risk management	policy		x		
48			computer and printing systems shall perform accurately as expected	Technology systems		x		
49			power systems shall provide the expected temperature for human and work tools	Communication systems		x		
50			hardware tools shall be always reliable	Technology systems		x		
51			software tools shall be accurate and reliable at all times	Technology systems		x		

Program requirements will be user requirements whether they are functional or nonfunctional, so we will discuss how those requirements cascade from the program level to the lowest level of the system architecture. We will begin considering some important components that are necessary for creating an ethics and compliance system within business organization. When developing such system, there are many requirements designed to define program needs based customer expectations. From user standpoint, which in this case is any business company considering adopting and integrate compliance system in their business culture, basic needs may include policies for safe work environment, controls on risks and unethical behaviors as well as job satisfaction that may lead to high quality and performance. In addition, the system will need appropriate tools including hardware and software and other system needs like power, network, and employees to help the overall activities and decisions. Throughout the development of these different systems, we will need to have set of documented requirements demonstrating the relationship between the system artifacts and every requirement that shall be fulfilled through testing in the appropriate verification methods.

RMA Analysis

The purpose of RMA analysis is to test the capability of our system given reliability, availability, and maintainability of its critical components. The outcome of RMA analysis will be used to establish the ongoing management plans for solving the system's life-time problems including performance, safety and durability for a given cost.

Reliability

We have assessed the reliability of our critical systems including hardware, software, and policy. All of them were reliable for at least 12 months or approximately 8760 hours we have tested for. We have considered the block of every system but finally used the individual system, its failure rate, and the mean time between failure (MTBF) values to quantify that desired reliabilities of those systems were met. Reliability values were found using the equation of $R=e^{-\lambda t}$, where λ is failure rate which is the inverse of Mean Time Between Failure and t is the minimum time for reliability testing, which is the 8760 hours. As below matrix result shows, we found that all our systems have at least 95% reliability, so we will be offering no adjustment or recommendations to improve those systems other than having consistent plans for our maintainability analysis.

sub-system	MTBF (hours)	Failure Rate	Reliability
Policy system	295000	3.38983E-06	0.970741647
Software System	175000	5.71429E-06	0.95117507
Hardware System	215000	4.65116E-06	0.960074699

Availability

We have also assessed our system's availability using the predicted reliability. The inherent availability was calculated using MTBF and Mean Time to Repair (MTTR). MTTR number will be an assumption, meaning 10 hours will be our average possible time to repair something. Some preliminary availabilities were calculated for the systems, but after we perform the test, an actual availability was obtained using the actual maintenance time. As shown in the figure, our systems have a high availability that meet our desired expectations.

sub-system	MTBF (hours)	A0
Policy system	295000	0.999966
Software System	175000	0.999943
Hardware System	215000	0.999953

Maintainability

Our systems need to be maintained to improve the overall reliability and that demands fixing product defects, repairing or replace items so considerations for the maintenance of this system would be how much time the ECOps technical team would need to dedicate maintain a system, and how long the systems would be down during maintenance time. The goal was to have reliable systems that only require minimal preventative Maintenance and have as little unscheduled maintenance as possible. Our Mean time to repair (MTTR) described in our availability section is the most common measure of our maintainability. It is the average time required to perform corrective maintenance on all the removable items so that will be the 10 hours that we have estimated earlier.

Verification and Validation

In our verification, we have evaluated whether our system complies with requirements and specifications of the user or not. More importantly we are verifying if we are doing the things right and what this will encompass is ensuring the quality control process that determines if our system meets its intention of use, so to obtain the measurements that will help us quantify the validity of our expectation, we will either be using Inspection, demonstration, testing or analysis methods. You will also see the appropriate measures used to quantify that our compliance system meets requirements and specifications.

Requirements	analyze	test	demo	inspect	Verification
The department shall comply with all applicable compliance Policies and Standards of business Conduct		x	x		verify # of risks or incidents are comparable with same size companies through modeling analysis
The program shall be able to integrate codes into businesses to increase overall confidence.		x	x		Verify performance and % of training score per business group through modeling
Regulators shall provide instructions to measure the adequacy and effectiveness of ethics and compliance program.			x		Verify provided guidelines help company reach desired goals of effectiveness through performance evaluation when instructions are fulfilled
Regulators shall make all procedures and due diligence processes available for the organization to thrive safety environment.		x			verify regulations whether procedures and regulator expectations are aligned
The expectation of the regulators shall be clear and understandable for business stakeholders.	x		x		Verify through benchmarking against similar corporates in performing under expectations
The corporate must obey the regulator rules and guidance designed for ethics and compliance departments.	x				data analysis of turnouts, safety, and company culture

vendors shall be a government certified to work with our company.	x			x	Ensure vendor is on the certified lists through inspecting certification status or data analysis
Vendors shall go through the due diligence screening process to determine their risk status	x				Verify this through Due diligence screening data analysis
Vendors shall never be employees at the same time as this is against the company law.	x				Verify if employee id is the same as vendor ID though analysis
Employees shall be able to speak up against unethical behaviors.	x				Analyze % of anonymous reporting from a given reports.
There shall be a reporting line or system for the employees to disclose unethical events.	x		x		Ensure system accuracy and how friendly it's for users through analysis on engagement surveys
The main corporate shall allocate budget for the ethics and compliance department.			x		Modeling on the efficiency of budget given project needs/activity
There shall be experts and knowledgeable team for the department to accomplish its duty.			x		Verify overall team performance is meeting desired expectations
All employees shall have the necessary support, tools, and resources to perform their job.			x		Verify % of team have/have no tools they need through modeling simulation analysis
There shall be training programs for the employees to be educated the company culture.				x	Ensure the component of the training are aligned with program expectations through inspection
All employees shall take and complete the provided trainings with passing grades.	x				Verify that individual result >= %80 pass grade through data analysis

The department shall Conduct routine monitoring and auditing to identify and evaluate possible risks.	x				Verify systems can provide Calculated metrics depicting risk profiles and recommendations for mitigation
There shall be a written and an equal consequence for every event from employees and vendors.			x		Verify system is fair through modeling and simulation
Program shall disclose the list of risk domains that they plan to prevent from businesses.	x				Verify this requirement by prioritizing possible risks through data analysis
There shall be a reporting line where travel expenses and gifts are shared with businesses.		x			Ensure system accuracy and reliability through modeling simulation
Program shall disclose data insight and analysis collected for improving business violation.	x				Historical information available for decision making
Audit team shall ensure that financial information is represented fairly and accurately.	x				Verify by comparing the audit results against raw data
Compliance Officers shall consult with lawyers before taking any action against compliance issue.	x				Verify process sequences using information related to action
The program shall Develop an effective line of communication for all stakeholders			x		Observations related to overall communication performances
The program shall be able to respond promptly to detected problems to undertake corrective action	x				Verify % of case closure and substantiation analyzing relevant data
The program shall carry out surveys for benchmarking internal standards against external companies.	x		x		Compare similar and external companies' compliance program effectiveness against ours

Designated compliance officers shall Stay on track with changing laws and regulations from government and regulators.		x			Test flexibility of change adaptations using modeling
The adopted tools and software applications shall be able to record and analyze information accurately.		x			Verify efficiency and calculations accuracies using Modeling and simulation
There shall be designated members in the team to identify, detect, prevent, and respond to business risks.			x		Evaluate accuracy of disclosed risk info through research analysis to rely on team knowledge
All vendors shall be screened to prevent corruption and conflict of interests	x				Vendor due diligence screening process analysis
Program policies shall be shared internally and with external stakeholders as well.			x		Ensure overall performance on information exchange through demonstrations
Program shall provide weekly memos and hints to update and create awareness for stakeholders.			x		Ensure overall performance on memo exchange through demonstrations
The employee and stakeholder training shall be organic and never ending if the business exists.	x				Historical data analysis
The program shall implement behaviors that benefit everyone involved in the business.			x		Verify this requirement by research analyzing overall program effectiveness using data
The program shall conduct risk assessment to identify potential risks in the business.		x			Verify the availability of prioritized risk profiles by modeling and simulation
The results of risk assessment and other data collection results shall be socialized with all stakeholders.			x		List accuracy of socialized information
The overall program shall be designed, functioning and visible in the business culture.	x	x			Verify effectiveness with modeling and engagement Survey data analysis

The collected data shall only be used for investigating illegal activities and improving the program effectiveness.	x				Ensure the accuracy of business cases used to obtain the data
The business employees shall be encouraged to speak up and share concerns related to inappropriate activities.	x	x			Modeling analysis to capture the % of employee reporting confidence using data
There shall be a good balance of culture, skill, and experiences to entrench the best practices of compliance program.			x		Demo depicting employee culture and capability regarding meeting expected performance goals
There shall be a risk management plan to help mitigate potential project delays that could arise.		x			Verify the capability of proposed plans for reduction risk through modeling and simulation test
The overall purpose of compliance shall be protecting businesses from harms by treating everyone with fairness and respect.	x				Analyze the accuracy and fairness of information through analysis
The compliance program officers shall ensure suppliers and employees follow procedures.			x		Behavioral evaluations through demo
The employee salary shall be paid from the budget allocated for the compliance program.	x				Verify the source of the salary by analyzing the expenses deducted from the budget
Tools and technology applications will be paid from the budget allocated for the compliance program.	x				Verify the source of the salary by analyzing the expenses deducted from the budget
The program shall be able to partner with business groups and functions for data exchange and risk management		x			test Partnership performance overview
computer and printing systems shall perform accurately as expected		x			Verify the efficiency through Modeling and simulation analysis
power systems shall provide the expected temperature for human and work tools		x			Verify the efficiency through Modeling and simulation analysis
hardware tools shall be always reliable		x			Verify the efficiency through Modeling and simulation analysis
software tools shall be accurate and reliable at all times		x			Verify the efficiency through Modeling and simulation analysis

Validation

Validation process came after the verification, meaning that we need to ensure the system performs given functional expectations and customer requirements. We have tested the individual systems and the entire system as well, considering each related requirement.

The validity of the system was quantified by the measures of effectiveness and the measures of performance for every requirement, so achieving those two measures given requirements and results, the system become valid and will be able to fulfil the intended use. We were able to validate the system through 17 MOEs and 18 MOPs and considering the criteria of the requirements and the measurement scores, the system is going to perform as expected.

Measures of Effectiveness (MOEs)

Measures of Effectiveness (MOEs) are measures intended to depict the accomplishment of our Ethics and Compliance program mission to achieve the desired results. These measures are from the customer need analysis and will often capture the high-level functions of our system, so meeting the measures of effectiveness will correspond the system state and that it can perform the intended tasks. Given that we will be evaluating our MOEs in our verification and validation section, we will also be testing them in a realistic environment and with simulation and modeling as well. After those measures, we will be able to predict the operational effectiveness and the customer satisfaction for the system. On the other hand, the measures of performance or MOPs will be used to quantify the numerical results of our MOEs actions so this metric will used to determine whether the executed actions meet the desired plans of our system or not.

MOEs	Quantitative Measurement	Measurement Method
1. Establish an organization with efficient and reliable compliance services for businesses.	Integrate company policies and compliance code into the business culture and make every person accountable on all they do	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
2. Create policy and procedures that contain all important elements for the business to be	promote a consistent fair system to all employees and suppliers	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved

MOEs	Quantitative Measurement	Measurement Method
safe from all risk.		
3. Obtain the desired budget for the organization to thrive	Provide enough budget that can support the whole project mission.	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
4. Create all communication channels for the organization	Provide 100% resources and tools for communication	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
5. Allocate the appropriate employees for the organization	Hire 95% skilled employees for all program domains	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
6. Provide employees with all tools they need to do the desired task	Setup Computers, printers, network, electricity, and software applications for the program 100%	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
7. Provide tools with high quality and reliability to perform the expected task. ----------	Obtain tools with at least 95% reliable performance	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
8. Availability of electricity power at all work hours.	24/h electrical power availability	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
9. Relevant and reliable software applications always	95% reliable software applications	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
10. Created techniques and algorithms that can identify, detect, and respond to risks for program team.	95% accurate analysis to identify, detect and respond to risk	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved

MOEs	Quantitative Measurement	Measurement Method
11. Technology tools were able to alert all types of risks based as prompted	99% reliable to alert risk types prompted	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
12. Training tools and sources will be provided to employees and vendors	100% in providing necessary tools for employees	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
13. Training knowledge shall be understood by employees and stakeholders	80% passing grades score proposed	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
14. The system provides safe and respectful work environment to all employees	99% safe work environment	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
15. The system provides possible risk prevention programs to businesses	95% risk prevention technology systems adopted	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
16. Provide updated government guidelines and expectations to all employees	100% of regulator guidelines adopted	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved
17. Risk priorities and mitigation plans were provided	Quantitative and qualitative measurements given risk chance and impact scores	**Green**- All MOPs will be achieved. **Yellow**- Some MOPs have risks to achieve **Red**- Some MOPs will not be achieved

Measures of Performance (MOPs)

MOP Parameter	Threshold Value	Objective Value	Quantitative Measurement	Measurement method
1. The program shall always have enough resources to continue the work	All times	All times	Reliability of daily tools and resources	Modelling the Reliability of daily tools and resources
2. There shall be policy and procedures that contain all important elements for the business to be safe from all risk.	All times	All times	Types of policies and procedures for every domain	Demonstrate types of policy & procedures for every domain
3. The program shall obtain the desired budget for the organization to thrive ---------- 4. Program shall create all communication channels for the organization ---------- 5. The program shall allocate the appropriate employees for the organization	$3M annually	$2.7M annually	% of reliability of continues budget resources for the program	Modeling % of reliability of continues budget resources for the program
	99%	99%/99 %	Communication system % of reliability and availability	Modeling % of reliability and availability of communication systems
	At least relevant bachelor's degree with 1 year experience	3-year hands on experience	Reliability of employee skill and availability	Modeling % reliability of employee skill and availability

MOP Parameter	Threshold Value	Objective Value	Quantitative Measurement	Measurement method
6. Program shall provide employees with all tools they need to do the desired task	99% tools and resources	100%	Reliability of provided tools	Test reliability of the provided Tools
7. Provide tools with high quality and reliability to perform the expected task.	95% or above	99%/99 %	Reliable beyond or at 99% of the time	Modeling % reliability of tools
8. Availability of electricity power at all work hours.	99%	100%	% of electricity reliability	Test modeling % of electricity reliability
9. Relevant and reliable software applications always	95% or above	99.9%	Information accuracy of software applications	Data analysis on Information accuracy of software applications
10. The working team shall be able to create technology techniques and algorithms that can detect risks	95%	99.9%	Accuracy of extracted insights through skill utilization	Data analysis on accuracy of extracted insights through skill utilization
11. Technology tools shall be able to alert all types of risks based as prompted	99%	99.9%	% Of alerts given detected risks	Test on % Of alerts given detected risks
12. Training tools and sources will be provided to employees and	99%	99.9%	Efficiency of provided tools	Modeling on efficiency of provided tools

MOP Parameter	Threshold Value	Objective Value	Quantitative Measurement	Measurement method
vendors				
13. Training knowledge shall be understood by employees and stakeholders	80% or better	100%	% Scored by employees	Data analysis modeling on % scored by employees
14. The system provides safe and respectful work environment to all employees	All times	24/7	% Of positive feedback from engagement survey	Data analysis on % of positive feedback from engagement survey
15. The system provides possible risk prevention programs to businesses	95%	99%	Quality of tool and tech systems adopted	Inspect and model the Quality of tool and tech systems adopted
16. Provide updated government guidelines and expectations to all employees	99%	99%	% Of socialized expectation guidelines	Demonstrate and analyze % Of socialized expectation guidelines
17. Risk priorities and mitigation plans were provided	99%	99.9%	Residual risk probability and cost after mitigation	Analyze % of reduced cost and risk impact given inherited risk
18. Reliability of network system was promising	99%	99.5%	network system operates for the entire mission	network test for operational reliability through demonstration and modeling

Technical Performance Measures (TPMs)

Technical performance measures (TPM) were used to review the overall development of the system. It comes with techniques that measure the reliability of major system components to determine how well our system is satisfying specified requirements given allocated requirements, so in it, we have carried out assessments on our components and the processes through design, testing and implementation. As part of the TMP, we have evaluated the non-negotiables or key performance parameter components that are critical for our system to perform.

.

TPM Parameter	Threshold Value	Objective Value	Measurement Method
1. Satisfaction surveys of program users	Scale 4.5/5	Scale 4.8/5	Perform satisfaction survey to all business groups on the risk prevention service provided by ECOps.
2. Enough tools and resources for compliance team	Scale 4.5/5	Scale 4.8/5	Conduct survey on tech tool & application systems to provide employees all the need to do their job
3. Daily tasks completion	90% daily requirement	95% daily requirement	Modeling daily required tasks completed
4. Tools used must be reliable	95%	99.9%	Performance evaluation modeling
5. All requirement policy codes has been applied in the business culture.	95%	99%	Individual policy check list given survey results
6. Audit and monitoring system available and reliable	24 hours per day	10 hours per day	Testing reliability of audit and monitoring system operation for every risk domain
7. Communication system is always established at all program domain condition	99.90%	99.00%	Use survey and communication data to model reliability and performance.
8. All training tools and education material sources	95%	99.90%	check list and training score accuracy verification

TPM Parameter	Threshold Value	Objective Value	Measurement Method
are available			
9. Power and network systems are reliable	99.50%	99%	Modeling consistence of network and power service availability
10. Risk domains and priorities are clear	99%	99.9%	Testing & demonstration on resulted performances
11. Government and regulator expectations are met	99%	99.9%	Analyze, demo and Check list consequence of adopting the guidelines
12. Workplace is safe and respectful	99%	99.5%	Analyze employee engagement survey, employee retention and turnouts.
13. Technology and training tools are sufficient and reliable	95%	99.9%	Performance and reliability through modeling
14. Both utilized knowledge and tools were able to identify, detect and respond to business risk	99%	99.9%	Accuracy modeling in performance and detected information
15. Stored information is used to predict future	98%	99%	Analyze possible future risks and trends
16. Budget and resources are always available	99%	100%	Efficiency Modeling and simulation
17. Adopted policies, regulatory guidelines and program commitments are reliable and functional in preventing business reputation	95%	99%	Performance modeling

KPP #	**Key Performance Parameter**	Score
1.	Program policies were functional and integrated in all business groups	
2.	Communication systems were always reliable and efficient	
3.	Training and education services were provided in a timely manner as expected	
4.	Technology and training tools were always reliable and available	
5.	Employees were available and reliable in all working days and areas	
6.	Technology tools and skilled employees were able to identify, detect, and respond to risks	
7.	The program was able to get all funds to cover salary and all necessary tools and trainings.	
8.	Audit and monitoring systems were able to review and disclose the analyzed results with decision makers	
9.	Adopted data collection tools were able to store and provide real time data accuracy.	
10.	Program was able to create risk profile considering prioritized risk domains	
11.	Business groups were able to always benefit and rely on the compliance program	
12.	Business reputation and financials were able to survive from all-risk's threats	
13.	Employee, customer, and suppliers had a pleasant experience with Compliance program	
14.	Our business is listed as the best and safest workplace to work with in the world.	

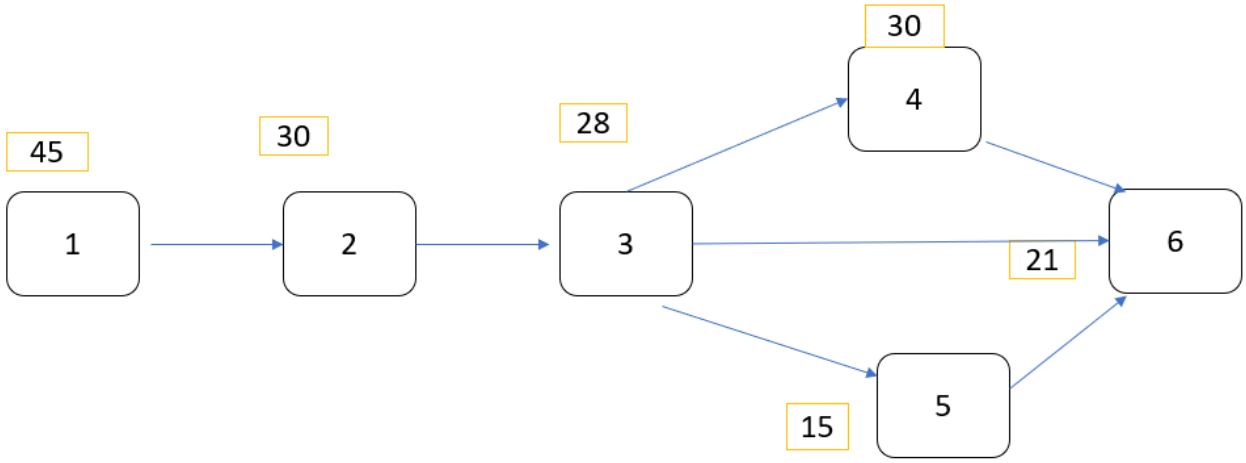
IMP (Integrated Master Plan) The integrated master plan (IMP) is an activity-based plan for our Compliance program events. Every one of those system activities is decomposed into specific operation where operations are decomposed into their relevant criteria.

IMP LEVEL	IMP ID	TASK NAME
Event	1.0	**System Design complete**
	1.1 1.2 1.3 1.4 1.5 1.6	Get user need Get funding Establish regulations Get tools Get software applications Get office space Get employees
Accomplishment	2.0	**Risk management done**
	2.1 2.2 2.3	Identify risk List risk Prioritize risks
Criteria	3.0	**Training stakeholders**
	3.1 3.2 3.3	Deploy trainings Train target individuals Record training data Record employee complaints
criteria	4.0	**Data analytics**
	4.1 4.2 4.3 4.4	Extract recorded compliance data Transform data Analyze data Socialize results with Audit & monitoring
Criteria	5.0	**Audit & Monitoring**
	5.1 5.2 5.3	Analyze results Consult with lawyers Socialize with leaders
Criteria	6.0	**Decision Makers**
	6.1 6.2 6.3 6.4	Make data-driven decisions Socialize results with top managers Improve and scale process Maintain the system

Sorted activities for the Critical path network

1. Get user need	14. Record employee complaints
2. Get funding	15. Extract recorded compliance data
3. Establish regulations	16. Transform data
4. Get tools	17. Analyze data
5. Get software applications	18. Socialize results with Audit
6. Get office space	19. Analyze results
7. Get employees	20. Consult with lawyers
8. Identify risk	21. Socialize with leaders
9. List risk	22. Make data-driven decisions
10. Prioritize risks	23. Socialize results with top managers
11. Deploy trainings	24. Improve process
12. Train target individuals	25. scale process
13. Record training data	26. Maintain the system

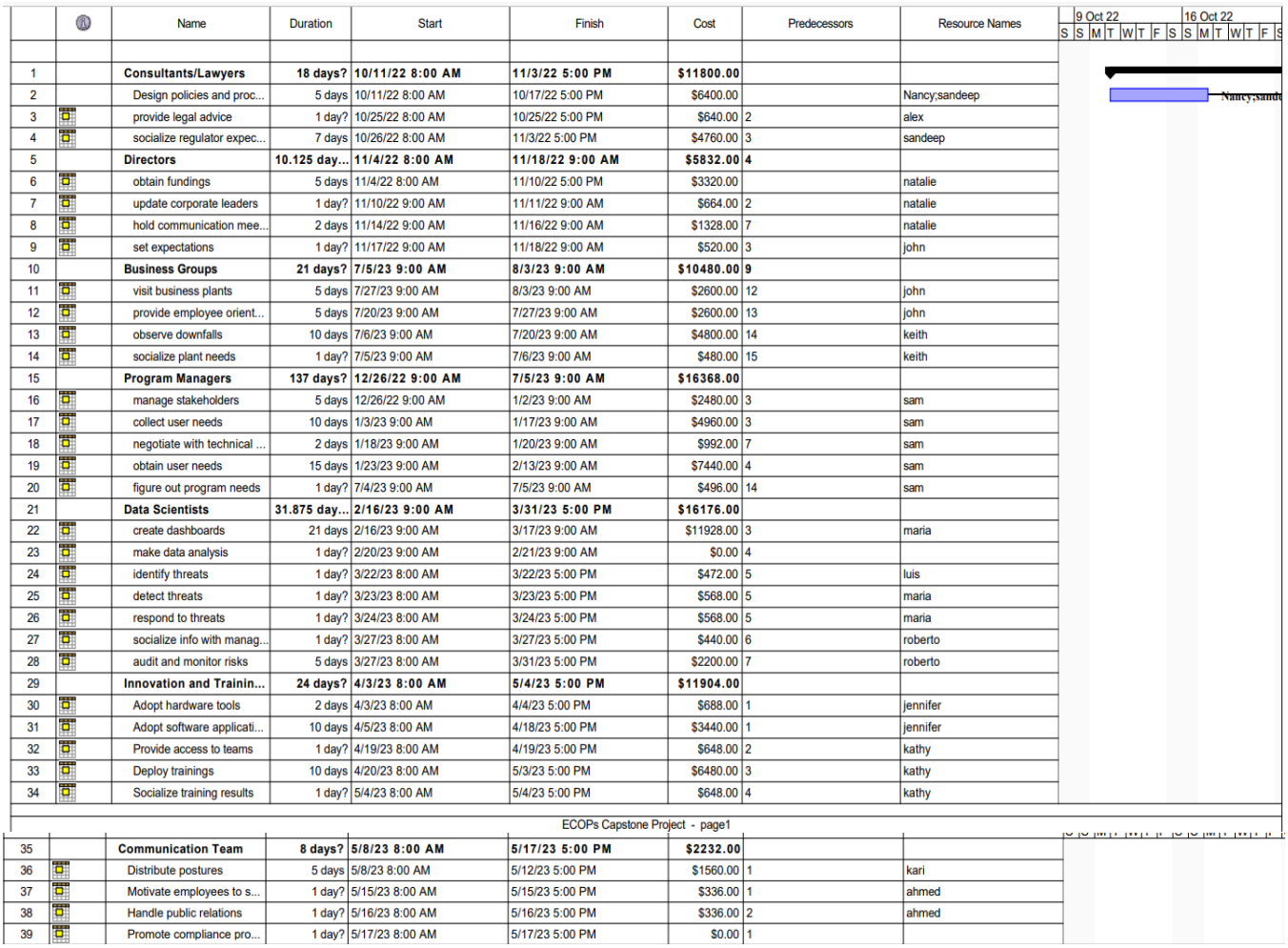
This is presorted activities for the critical path but there will be multiple paths to consider. After we built the method and calculated the possible schedule for every level, we were able to see the longest path sequence of activities that must be finished on time to complete the entire project. This algorithm will be dividing each project into component tasks to map out activities that need to be completed, so with this technique, we have evaluated and estimated the overall project budget and duration.



This network is based on the integrated master plan but not the detailed activities of the plan. We have shown the sorted list for the purpose of clarification, but the task order will be the same even in the detailed activity level. The detailed tasks are derived from the high-level plan, which is designing the system, establishing the risk profile, analyzing data, auditing, monitoring and final decision makings. The first task name in the IMP is the system design which is under number 1.0 through 1.6. The decimal numbers indicate the detailed activities for every task but tasks with whole numbers are high-level task and that is where the network is derived from. After the third task, which is about stakeholder trainings, we considered three paths. The first path goes through 1,2,3,4,6, the second is 1,2,3,6 and the third path is 1,2,3,5,6. The label with each number is the number of days to complete that task. Path one accumulated 154 days to complete the project. Path two indicates that it will take 124 days to complete the mission, while the third path shows 139 days, so we conclude that the longest duration was taken by the first path, and we consider it to be our critical path.

Integrated Master Schedule

The integrated master schedule will provide stakeholders a clear instruction for executing and tracking technical, schedule and cost of the Compliance program activities. We have linked individual tasks to its resources, whether it be assignees or the cost of doing relevant activity given its timeline. As demonstrated in our master plan network, dependencies and critical path evaluations were represented within the master schedule by linking relationships of the preceding tasks to the succeeding tasks. After calculating the project's start to finish, we were able to estimate the dollar cost, duration, and the responsible person for each task.



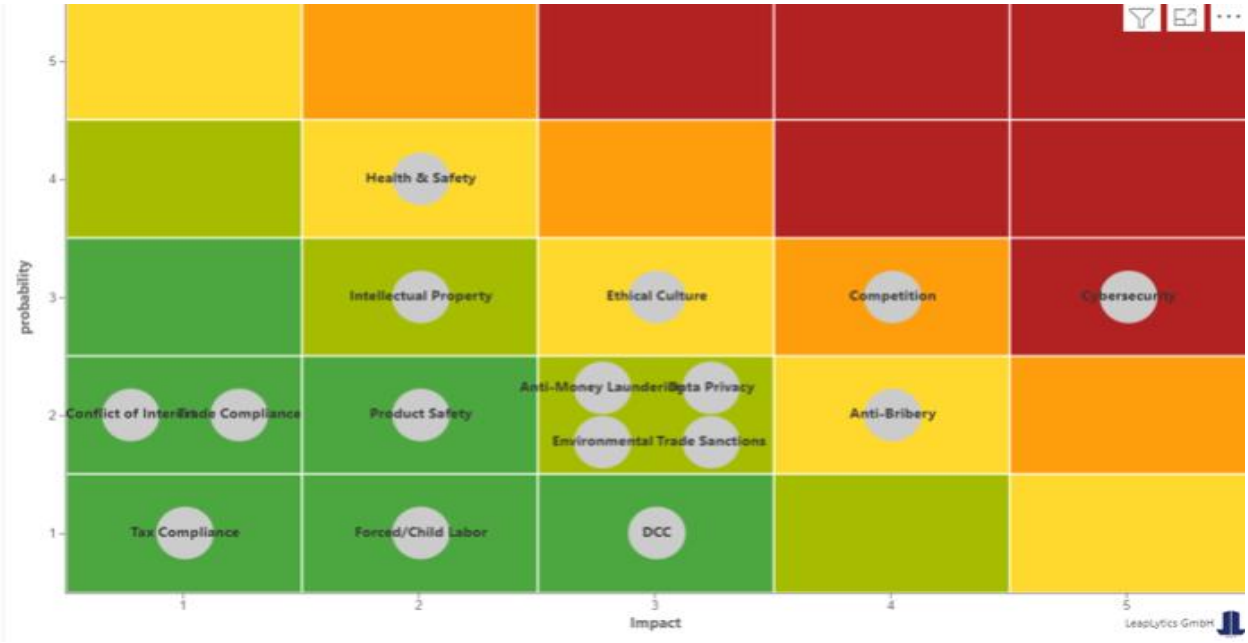
	Name	Duration	Start	Finish	Cost	Predecessors	Resource Names
1	**Consultants/Lawyers**	**18 days?**	**10/11/22 8:00 AM**	**11/3/22 5:00 PM**	**$11800.00**		
2	Design policies and proc...	5 days	10/11/22 8:00 AM	10/17/22 5:00 PM	$6400.00		Nancy;sandeep
3	provide legal advice	1 day?	10/25/22 8:00 AM	10/25/22 5:00 PM	$640.00	2	alex
4	socialize regulator expec...	7 days	10/26/22 8:00 AM	11/3/22 5:00 PM	$4760.00	3	sandeep
5	**Directors**	**10.125 day...**	**11/4/22 8:00 AM**	**11/18/22 9:00 AM**	**$5832.00**	**4**	
6	obtain fundings	5 days	11/4/22 8:00 AM	11/10/22 5:00 PM	$3320.00		natalie
7	update corporate leaders	1 day?	11/10/22 9:00 AM	11/11/22 9:00 AM	$664.00	2	natalie
8	hold communication mee...	2 days	11/14/22 9:00 AM	11/16/22 9:00 AM	$1328.00	7	natalie
9	set expectations	1 day?	11/17/22 9:00 AM	11/18/22 9:00 AM	$520.00	3	john
10	**Business Groups**	**21 days?**	**7/5/23 9:00 AM**	**8/3/23 9:00 AM**	**$10480.00**	**9**	
11	visit business plants	5 days	7/27/23 9:00 AM	8/3/23 9:00 AM	$2600.00	12	john
12	provide employee orient...	5 days	7/20/23 9:00 AM	7/27/23 9:00 AM	$2600.00	13	john
13	observe downfalls	10 days	7/6/23 9:00 AM	7/20/23 9:00 AM	$4800.00	14	keith
14	socialize plant needs	1 day?	7/5/23 9:00 AM	7/6/23 9:00 AM	$480.00	15	keith
15	**Program Managers**	**137 days?**	**12/26/22 9:00 AM**	**7/5/23 9:00 AM**	**$16368.00**		
16	manage stakeholders	5 days	12/26/22 9:00 AM	1/2/23 9:00 AM	$2480.00	3	sam
17	collect user needs	10 days	1/3/23 9:00 AM	1/17/23 9:00 AM	$4960.00	3	sam
18	negotiate with technical ...	2 days	1/18/23 9:00 AM	1/20/23 9:00 AM	$992.00	7	sam
19	obtain user needs	15 days	1/23/23 9:00 AM	2/13/23 9:00 AM	$7440.00	4	sam
20	figure out program needs	1 day?	7/4/23 9:00 AM	7/5/23 9:00 AM	$496.00	14	sam
21	**Data Scientists**	**31.875 day...**	**2/16/23 9:00 AM**	**3/31/23 5:00 PM**	**$16176.00**		
22	create dashboards	21 days	2/16/23 9:00 AM	3/17/23 9:00 AM	$11928.00	3	maria
23	make data analysis	1 day?	2/20/23 9:00 AM	2/21/23 9:00 AM	$0.00	4	
24	identify threats	1 day?	3/22/23 8:00 AM	3/22/23 5:00 PM	$472.00	5	luis
25	detect threats	1 day?	3/23/23 8:00 AM	3/23/23 5:00 PM	$568.00	5	maria
26	respond to threats	1 day?	3/24/23 8:00 AM	3/24/23 5:00 PM	$568.00	5	maria
27	socialize info with manag...	1 day?	3/27/23 8:00 AM	3/27/23 5:00 PM	$440.00	6	roberto
28	audit and monitor risks	5 days	3/27/23 8:00 AM	3/31/23 5:00 PM	$2200.00	7	roberto
29	**Innovation and Trainin...**	**24 days?**	**4/3/23 8:00 AM**	**5/4/23 5:00 PM**	**$11904.00**		
30	Adopt hardware tools	2 days	4/3/23 8:00 AM	4/4/23 5:00 PM	$688.00	1	jennifer
31	Adopt software applicati...	10 days	4/5/23 8:00 AM	4/18/23 5:00 PM	$3440.00	1	jennifer
32	Provide access to teams	1 day?	4/19/23 8:00 AM	4/19/23 5:00 PM	$648.00	2	kathy
33	Deploy trainings	10 days	4/20/23 8:00 AM	5/3/23 5:00 PM	$6480.00	3	kathy
34	Socialize training results	1 day?	5/4/23 8:00 AM	5/4/23 5:00 PM	$648.00	4	kathy
35	**Communication Team**	**8 days?**	**5/8/23 8:00 AM**	**5/17/23 5:00 PM**	**$2232.00**		
36	Distribute postures	5 days	5/8/23 8:00 AM	5/12/23 5:00 PM	$1560.00	1	kari
37	Motivate employees to s...	1 day?	5/15/23 8:00 AM	5/15/23 5:00 PM	$336.00	1	ahmed
38	Handle public relations	1 day?	5/16/23 8:00 AM	5/16/23 5:00 PM	$336.00	2	ahmed
39	Promote compliance pro...	1 day?	5/17/23 8:00 AM	5/17/23 5:00 PM	$0.00	1	

Risk register and Heat Map

The risk register will be a main document for us to list the potential risks of our project. The document also contains the impact, cost, and likelihood of all risk domains, and after we create this profile, we'll propose some mitigation plans that will help us reduce the likelihood of risk occurrences. We will finally trigger some qualitative and quantitative techniques to show that system risks can be solved or reduced before they become problematic to program existence.

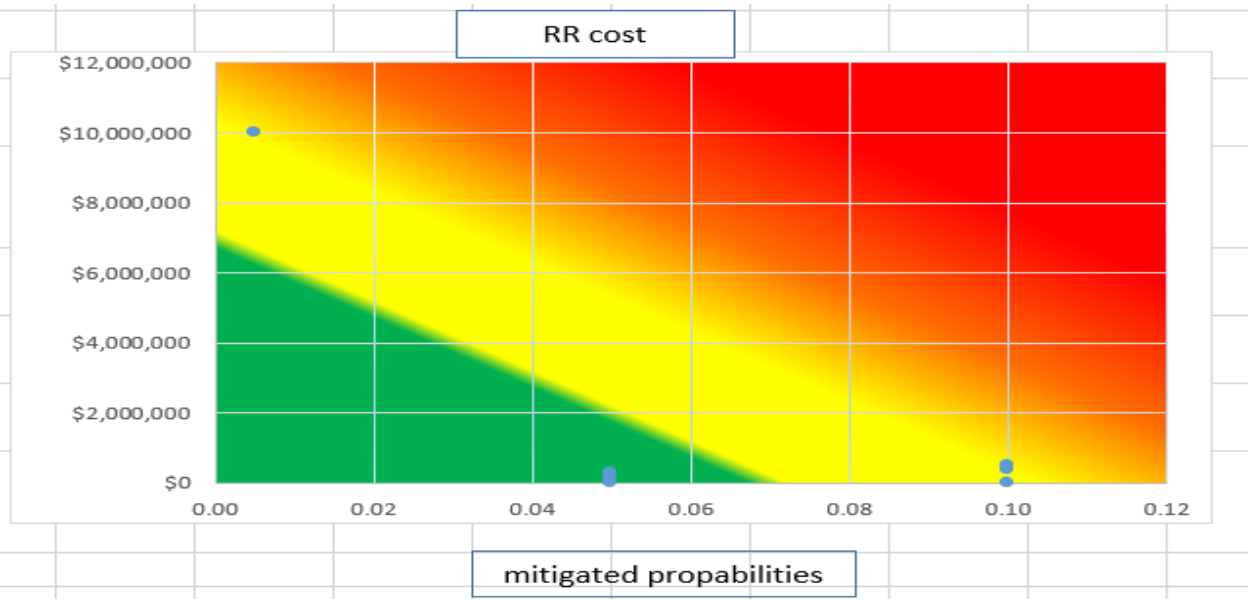
	A	B	C	D	E	F
1	Risk Domain	Impact	Probability	Mitigation plan	IR	RR
2	Anti-bribery	4	2	Updated policies. Conduct vendor due diligencies and monitoring	3.5	1.5
3	Anti_money_Laundering	3	2	us technology, training, data analysis and monitoring	3	1
4	Ethical culture	3	3	promote company culture, provide employee training, behavior data analysis	3	1
5	conflict of interest	1	2	engage with customer. Use technology	3	1
6	competition	4	3	prevent, mediation and awareness	4	1.5
7	cyber security	5	3	software updates, MFA to restrict access and have recovery plan	4	2
8	data privacy	3	2	secure storage policies, protection, background check, response plans	2.5	0.5
9	Derivatives & Commadity Compliance	3	1	risk hedge and worst-case scenario price locking	3	1.5

We have implemented an overall assessment for establishing risk management plans for our project, through finding the possible risks, their impact and cost, and how often they happen given probability scores. We have prioritized the identified risks and the outcome will serve as the risk profile for our project, and even though such qualitative analysis may not provide precise information to make accurate decisions, we were able to obtain the probability of our risk domains and map to their impact scores.



Quantitative analysis: This is a technique used to quantify risk outcome before & after mitigation

	Description	Type	Probability	Impact	IR	Mitigation	Probability	Impact	RR
3	Software system failures	Technical	0.15	$5,000,000	$750,000	vendors shall provide qualified and reliable tools	0.10	$5,000,000	$500,000
4	Hardware failures	schedule	0.15	$3,500,000	$525,000	computer & printing qualification	0.10	$3,500,000	$350,000
5	company/gov rule failure	Technical	0.10	$1,000,000	$100,000	employee training and education	0.05	$1,000,000	$50,000
6	un reliable employee	schedule	0.25	$50,000	$12,500	Employee qualification	0.10	$50,000	$5,000
7	power system failure	Technical	0.15	$100,000	$15,000	backup systems	0.05	$100,000	$5,000
8	safety violations	Technical	0.15	$500,000	$75,000	V&V - safety procedure socialized.	0.05	$500,000	$25,000
9	cyber attack	Technical	0.15	$4,000,000	$600,000	active SW configurations & MFA	0.05	$4,000,000	$200,000
10	corruption/bribery	Technical	0.10	$6,000,000	$600,000	active Ab training and assessments	0.05	$6,000,000	$300,000
11	company in court	financial/reputational	0.02	$2,000,000,000	$40,000,000	Active monitoring systeystems and Compliance lawyers.	0.01	$2,000,000,000	$10,000,000
12									
13					**$42,677,500**				**$11,435,000**



The quantitative analysis is where we defined real calculations of inherent and residual risk given their cost and chances of occurrences. The multiplication of probability and cost given the original and mitigated risks, the outcome will differ based on probability changes after mitigation and that is what we wanted to see; that we have response plans to reduce possible risks. We have also mapped risks into three different regions depicting the severity of each risk given impact, so green regions are highly less severe, but red or yellow region is where we need to put more effort and mitigation plan strategies. In our case, we have identified around $43M as the cost of our inherited risk, but after mitigations were proposed, we ended up with $11M, which is about 72% less than the original cost of risk.

Conclusions

Ethics and Compliance programs are in-demand systems for today's corporates. There's significant return when it comes to avoiding all business risk types including fraud, cyber security, ethical culture, conflict of interest and many more. We have established this system applying the knowledge of system's engineering field. We have utilized the Department of defense's architectural framework to develop the ECOps system. We have provided overarching user requirements and tested those requirements utilizing the appropriate methods for quantifying the validity of the system. The program adopted an integrated master plan and schedule to show activities and resources needed to finish those tasks. Finally, we have carried an RMA analysis where we assessed the reliability, maintainability & availability of our system. We've registered program risks and proposed qualitative and quantitative analysis to mitigate those risks.

Citations

- Team, Editorial. “U.S. Department of Justice's Recent Guidance Documents (Dec 2021).” *Ethics and Compliance Initiative*, 4 Jan. 2022, https://www.ethics.org/us-department-of-justices-recent-guidance-documents/.
- *History of the integrity, Ethics and Compliance Movement: A cautionary ...* (no date). Available at: https://assets.corporatecompliance.org/portals/1/PDF/Resources/ethikos/past-issues/2014/scce-2014-01-ethikos-josephson.pdf (Accessed: November 19, 2022).
- Beck, Anton F., and Robert J. Monson. *The Art of Systems Engineering: A How-to Guide for Systems Engineers*. Robert J. Monson and Anton Beck, 2016.
- Monson, Robert J. *Mastering Project Management: Surviving the Maelstrom and Delivering on Commitments*. Robert J. Monson, 2017.
- Mariscotti, Eduardo Esteban. “Ethics Opinions and Ethics and Compliance Organizations.” *Corporate Risks and Leadership*, 2020, pp. 685–690., https://doi.org/10.4324/9781003038238-30.
- “Chief Compliance/Ethics Officer (CCO).” *Encyclopedia of Business Ethics and Society*, 2008, https://doi.org/10.4135/9781412956260.n126.
- Stanton, Neville A., et al. *Human Factors Methods: A Practical Guide for Engineering and Design*. Taylor and Francis, 2017.
- https://ctmfile.com/story/setting-up-and-maintaining-a-world-class-ethics-compliance-programme