Project Execution Plan

Project Team 3

Team Name: Clutch City Tech Solutions

UH | College of Technology

CIS 4375 Project Management & Practice

Fall 2020

PREPARED BY: Clutch City Tech Solutions

PREPARED FOR: CIS 4375 Project Management and Practice

DATE SUBMITTED: November 24, 2020

PROJECT SPONSOR: Lumico

CLIENT ACCEPTOR: Sil & Jackie Nguyen

PROJECT MANAGER: Daniel Howard

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Project Integration Management

Organizational Background and Rationale

Founded in July 2019 in Houston, TX, Lumico is a startup company owned by two sisters Sil and Jackie Nguyen. This company specializes in clothing and it includes a product selection ranging from men's, women's, and children's apparel. In August of 2019, the owners of the company decided they wanted to operate the business exclusively online. Being a brand-new business and operating online, the data gathering, and storage methods that Sil and Jackie are currently using are paper trails and excel sheets. Once the logistics of how they wanted to operate their company were sorted out, in October and November 2019, the owners met with several suppliers to begin selecting the products they wanted to sell in their store.

In February 2020, COVID-19 cases in the United States began rising dramatically and numbers could not be ignored anymore. Sil and Jackie decided to put a hold on selecting the products they wanted to sell. In June 2020, the owners decided that it was time to move forward and continue their work in the safest way possible.

In September 2020, the Clutch City Tech Solutions project manager, Daniel Howard sat down and talked to Lumico to see if we were a good fit for them and if they were a good fit for us. Sil and Jackie talked about what they wanted their application to be and what they required of it. Daniel, the Project Manager for CCT Solutions, listened and brought it back to the team where the team discussed the different options. Daniel then presented those options to Sil and Jackie. After thinking about it for a couple days, the owners came to a decision about what type of application they want for their business.

Sponsor History

Jackie Nguyen attended Houston Baptist University starting in the fall semester of 1994, graduating in 1999 with a B.S. in Psychology and Biology. After graduating, she was offered and accepted a position with the Baylor College of Medicine in Houston, TX as a Research Lab Technician. Jackie would only stay in this position for nine months when she was offered a role as section administrative assistant. Her role would continue to expand while at Baylor College of Medicine until she would interview for the Section Administrator Position and accepted it. By 2008, Jackie continued to progress and expand her business through her new role.

Jackie wanted to expand her skillset/knowledge, and this led her to apply for a research administrator position with Methodist Research Institute located in the MedCenter in Houston, TX. She was offered the position of Research Administrator for the department of Diabetes where her role would continue to expand. In 2015, she was approached by the Research chair and asked to assume the responsibilities of Administrator for the entire NanoMedicine department, which she accepted. Jackie would fill this role until a clinical section administrator opportunity became available at Baylor College of Medicine in 2017 which she would accept.

While Jackie worked in her professional career, she had a desire to go into business for herself and be her own boss. This desire was instilled in her from a young age as her parents are immigrants that fled Vietnam at the conclusion of the Vietnam War and came to the United States for the American dream. Her mother has owned numerous successful businesses and has always encouraged Jackie to start her own business. So, in the Fall of 2019, Jackie decided to start her own business with the help of her sister. This was the founding of Lumico.

Sponsor Organization Chart

Figure 1-1 below represents the employee organization of Lumico. Currently there are only two people working, who are also the founders, Jackie and Sil Nguyen. Jackie serves as the CEO/CFO while Sil serves through acquisitions, marketing, and sales.

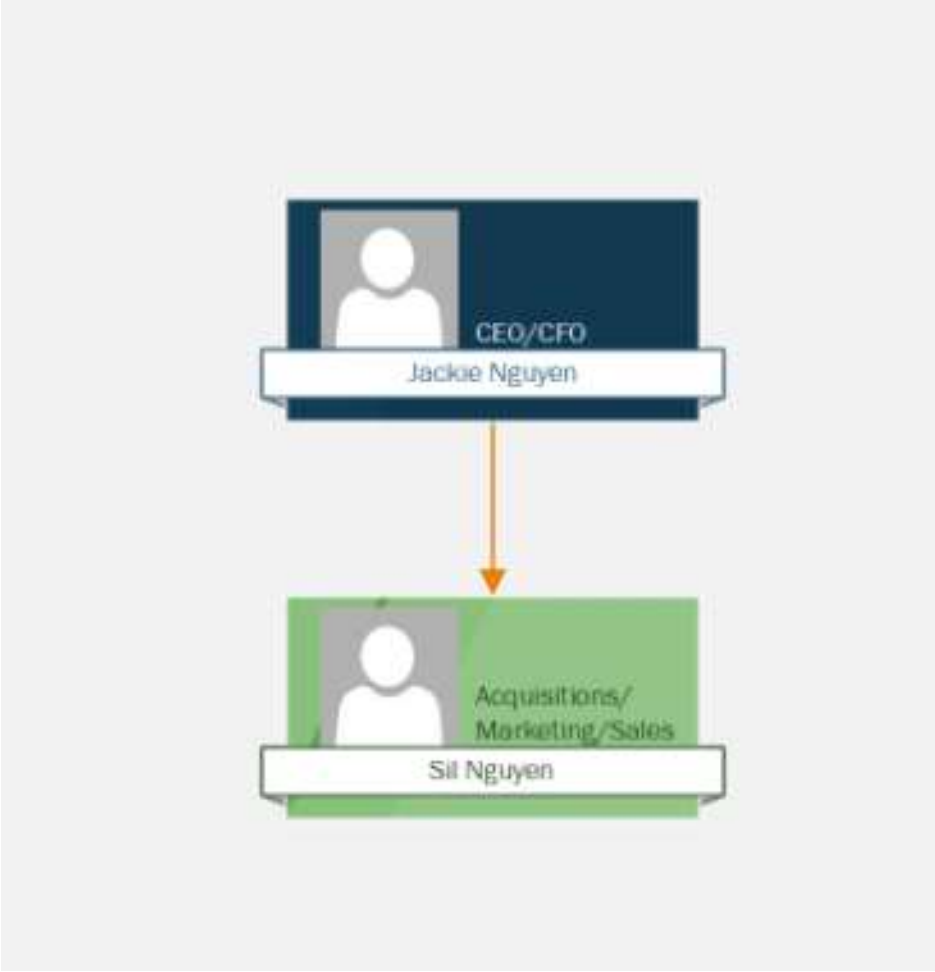


Figure 1-1: SWOT Analysis Diagram

SWOT Analysis

The figure shown below represents the SWOT analysis which points out the strengths, weaknesses, opportunities, and threats for this project. Being aware of these four concepts allows the people involved with the project to be aware of the risks, and places for improvements in efforts to maximize the success of the project.

Strengths	**Weakness**
• Focus on quality of work • Good business sense • Low overhead • Loyal and hardworking staff • Well qualified	• Not able to search records quickly • Information and records not organized in one place • Information is sometimes misplaced or lost • Lack of overall technical organization
Opportunities	**Threats**
• Increase of media outreach • Sales events, products to content creators or social media influencers. • Fast and reliable shipping.	• Loss of funding • Lack of technology implementation • Loss of data because of disorganization • Unable to secure suppliers

Figure 1-1: SWOT Analysis Diagram

Project Goals

The main objective of having an online store for costumers, is so they can visualize each product and have seamless experience while shopping. This also helps owner share their story on how and why they started the company. Along with all these benefits, going fully digital helps keep better track of inventory and sales than the current method of just excel. We have listed the project goals below.

- Smooth transition from Microsoft Excel and paper documentation to fully digital
- Successful display of items on the web-based storefront
- Owners can share their story on why and how they started this company
- Customers will be able to browse and purchase items
- Our clients will be able to manage their employees
- Our clients will be able to run reports on suppliers, inventory, and daily sales
- Fully test the application to exterminate all bugs in the application so it runs flawlessly.

Project Objectives

The objective of this project is to create an application for Lumico that helps the employees manage the storefront solely online as well as track transactions and customer information more effectively. As the client currently holds all data on Microsoft Excel and paper, our team aims to transition that to a database. This web-based application will allow the client to display the inventory in a more organized fashion for the customers and the database will allow the storage

and retrieval of customer information such as name and shipping address in a more seamless way.

Organization

This is the organization chart for Clutch City Tech Solutions, as seen in Figure 3. Daniel Howard, the Project Manager is on the top row, Nikheel Asodia, the Assistant Manager is on the second row. The bottom row consists of the analysts, Shreena Patel and Dhruv Patel, as well as the coders, Tyler Nullmeier, Viktoria Kasirovaite, and Musab Hamid.

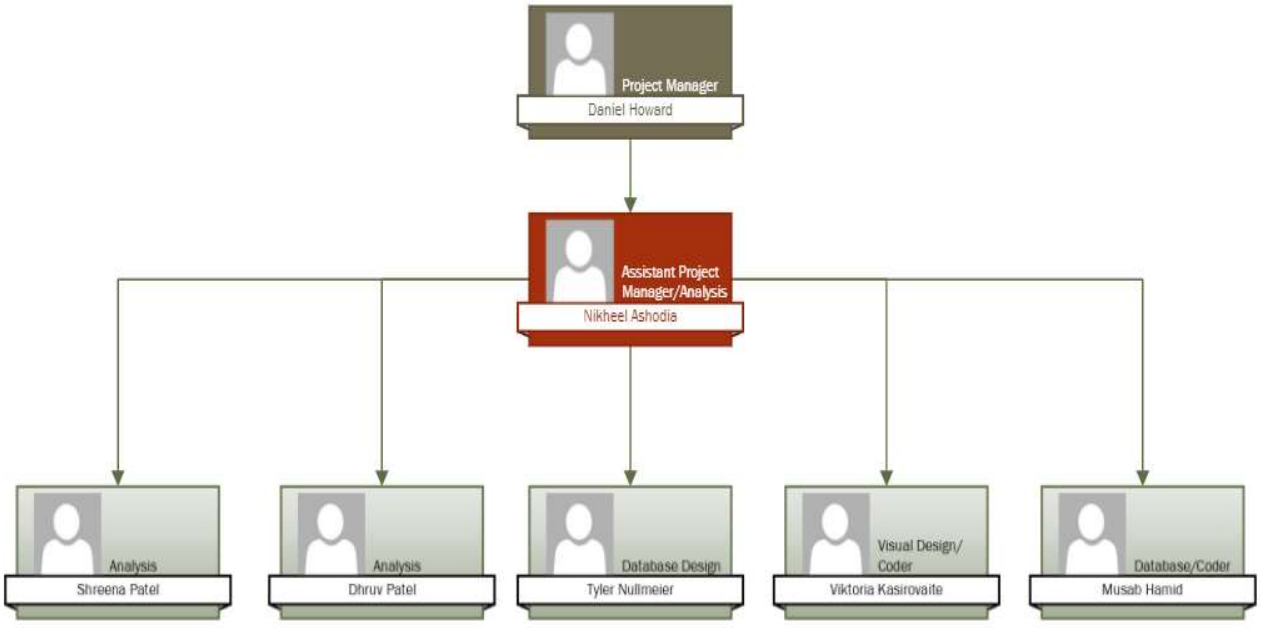


Figure 1-3: CCT Solutions Team Organization

Roles and Responsibilities Matrix

The figure below illustrates a breakdown of how this team has been organized for this project. It consists of the name of the team members, their role for this project, and a list of their key responsibilities. It is paramount for each member to have clear sight of their roles and responsibilities in order to complete the project successfully.

Name	Role	Responsibilities
Daniel Howard	CCT Solutions, Project Manager	1. Help the project team understand the needs and expectations of stakeholders. 2. Facilitate project communications. 3. Ensure risk audits are performed.
Nikheel Asodia	CCT Solutions, Assistant Manager	1. Help the team communicate by creating and distributing meeting minutes. 2. Facilitate project communications.
Shreena Patel	CCT Solutions, Business Analyst	1. Maintaining documentation for system requirements and requests.
Dhruv Patel	CCT Solutions, Quality Analyst	1. Maintaining documentation for system requirements and requests. 2. Establishing budget for developing the application. 3. Performing cost-benefit analysis on risk responses.
Viktorija Kasirovaite	CCT Solutions, GUI Developer, Designer, Tester	1. Maintaining compliance with project data specifications. 2. Ensuring the platform is secure and free of defects. 3. Maintaining good communications with the project team. 4. Migrate project to fallback server if necessary.

Musab Hamid	CCT Solutions, GUI Developer, Designer, Tester	1. Maintaining compliance with project data specifications. 2. Ensuring the platform is secure and free of defects. 3. Maintaining good communications with the project team. 4. Migrate project to fallback server if necessary.
Tyler Nullmeier	CCT Solutions, GUI Developer, Designer, Tester	1. Maintaining an accurate representation of all the data that will enter and leave the database. 2. Ensuring the platform is secure and free of defects. 3. Maintaining good communications with the project team. 4. Configure fallback server if necessary.
Sil and Jackie Nguyen	Client, Project Sponsor	1. Being open and honest about expectations and requirements by giving regular feedback. 2. Observing business risks that are escalated outside of the scope of CCT-Solutions' project.

Figure 1-4:Breakdown of CCT Solutions' Roles and Responsibilities

Success Criteria / Expected Business Benefits

Success Criteria

- Smooth transition from Microsoft Excel and paper documentation to a working, online application that meets stakeholder's requirements
- Successful display of products on the web-based storefront, and the ability to manage current and new inventory
- Customers have the ability to create an account, browse, and purchase items
- Client will be able to manage employee data on administrative portal
- Client will be able to run reports on suppliers, inventory, customers, and transactions
- Full completion of web application, as well as successful testing of the application to remove any bugs and potential issues

Expected Business Benefits

- Better control and ease of access of documentation once fully transitioned to digital
- Increased efficiency of managing employee information
- Generating revenue from products purchased from store front by customers
- Ease of managing inventory information in administrative portal
- Automation of running reports, which will save time and show relevant figures

High Level Scope Statement

The scope statement, Figure 1-5 below, is a tool for stakeholders and CCT Solutions teammates to refer to for accurately determining project goals, as well as making sure that those goals are in scope as agreed to by both Lumico and Clutch City Tech Solutions. Outlining the scope description, acceptance criteria, and deliverables allows for concise communication with our client to ensure that we both have the same end goals in mind for what the project work and finished application will be. In turn, constraints that we face for the duration of the project and the exclusions from the scope are outlined in order to further communicate our common goals and restrictions to the stakeholders.

Title	Lumico	**Project Manager**	Daniel Howard
Justification	We will create a web application according to Lumico's specifications for both customer and administrative actions. Our client's store front will include men's women's and children's items and will be displayed for customers to view and purchase. This will allow Lumico to sell their inventory and generate revenue.		
Scope Description	Lumico will consist of a customer facing storefront that displays inventory and customers will be able to select items and go through a checkout process. There will be an administrative process portal for handling employee information and inventory, and the ability to run reports on orders.		
Acceptance Criteria	• Smooth transition from Excel and paper documents to the online application		

	• Display of inventory in web storefront which allows customers to create an account, browse, and purchase • Ability for administration to manage employees and inventory and run reports on order information
Deliverables	• Functioning store front, which has gone through rigorous testing that allows users to browse, add and remove items to the cart and complete the registration and purchase process • Administrative portal that allows our clients to login with the corrective credentials, and then perform CRUD operations for employee information as well as inventory information. Inventory changes will reflect on the store front. • The ability to generate and display reports for orders.
Exclusions	Out of scope objectives include any specifications not explicitly outlined in the scope description, such as inclusion of ad services for revenue, finding suppliers for Lumico's inventory, providing hardware, search engine optimization, and postage.
Constraints	• Time: Project must be integrated and fully tested by November 24, 2020 • Cost: a budget of $52,840 has been allocated • Scope: Application must be developed with the clients and PMO's requirements in order to prevent scope creep and to meet time and cost constraints

Figure 1-5: High Level Scope Statement

High Level Scope Diagram

The scope diagram in Figure 1-6 shows what functionality is planned for the application. In summary, users can create an account, browse the store, and create an order. Employees can manage products, manage users, browser orders, and update orders. Part of managing products is the process of adding product images.

Product images are not shown as independent data flows because they are an integrated part of the product data model. For more information, see the data dictionary in the technical manual. Finally, we included PayPal as an external entity because users send their payment to PayPal for processing. Once PayPal processes the payment, a payment result is returned to the Lumico Webstore. Employees then ship the paid order to the customer.

Items outside of the scope of our project include advertising, search engine optimization (SEO), vendor management, and postage. We believe that a marketing professional or an expert in the apparel marketplace would be more knowledgeable about advertising and SEO requirements. Vendor management refers to the ability to track vendors and the products they supply. Postage refers to integrating shipping application programming interfaces (APIs) that can calculate shipping cost and track shipments. Lumico management prioritized other features ahead of vendor management and postage. Consequently, we left these features outside of the scope of our project.

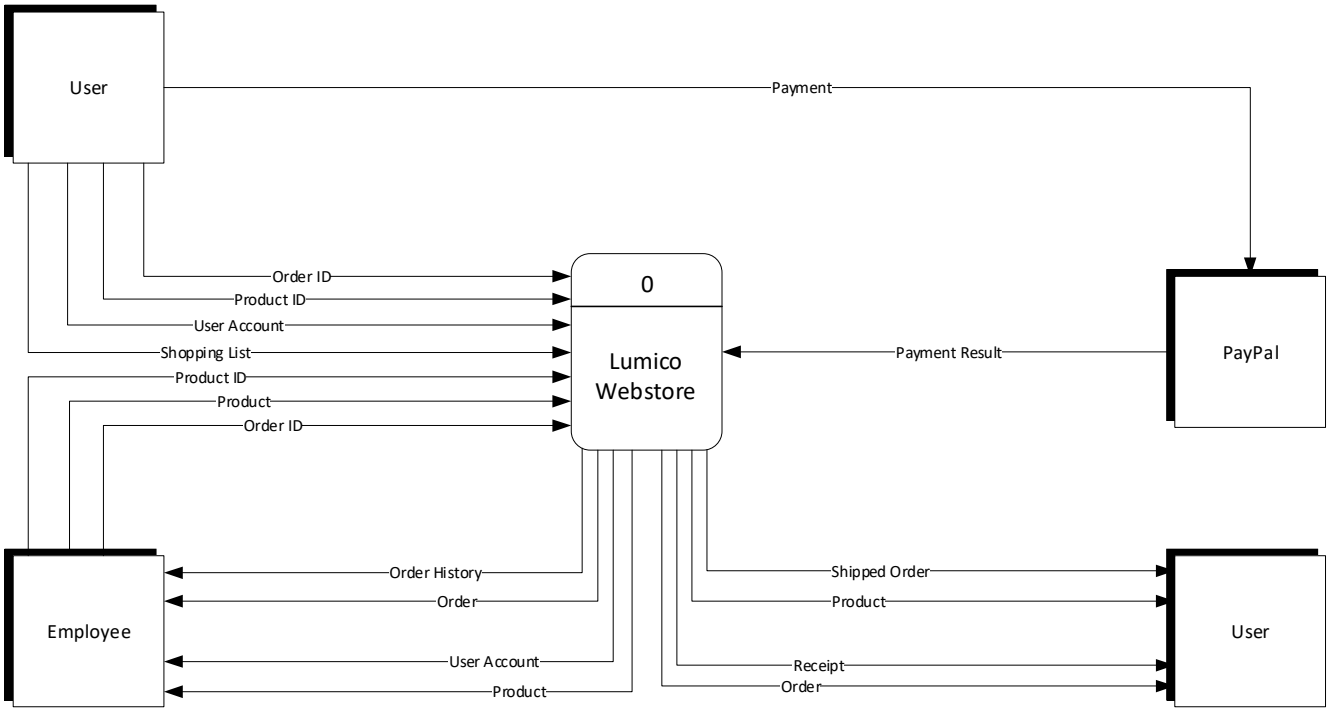


Figure 1-6: High Level Scope Diagram

High Level Scope Deliverables

An interview was held with Lumico and Clutch City Tech Solutions project manager Daniel Howard, where the deliverables, in Figure 1-7 below, were determined to be in scope for project documentation. Once outlined, the deliverables were then individually defined. These deliverables are to be presented digitally in the form of the Project Execution Plan to Lumico as well as the PMO upon finalized completion, for the purpose of documenting the project life cycle.

Title	Definition
Initial Project Proposal	Framework that outlines the project and includes what is to be accomplished, an explanation of objectives, and plans for achieving them
Project Integration Management	Coordination of all elements and processes in the project life cycle
Organizational Background and Rationale	Description of the background of the organization, as well as presenting the argument in favor of the proposed project
Sponsor History	Detailed background of sponsor's company history
Sponsor Organizational Chart	Chart that displays the hierarchy of employees within the sponsor's company
SWOT Analysis	Compilation of company's Strengths, Threats, Opportunities, and Weaknesses
Project Goals	Itinerary of what is to be achieved by the project at hand
Project Objectives	Statement of the objectives of the application that is to be created for the client
Project Team Organization	Display of the hierarchical roles of the project team
Organization	In the case of Lumico, is the same as the sponsor organizational chart
Roles and Responsibilities Matrix	Allocation of roles to project team members and description of assigned duties

Success Criteria/Expected Business Benefits	Detailing the criteria, the project is to be deemed successful under and the expected benefits the sponsor will experience
High Level Scope Statement	Outline of the results the project will produce, as well as the exclusions and constraints that are being operated under
High Level Scope Diagram	High-level overview of the project's main processes
High Level Deliverables	Definition of each deliverable required for the project
Business Case	Justification for initiating the project, including the commercial benefit
Cost vs. Benefits	Comparison between the costs necessary for the project and the benefits from project completion
Risk and Risk Mitigation	Identification, evaluation, and prioritization of project risks
Resources and Organizational Management Plan	Plan for managing and allocating the resources within the organization
Project Review Committee	Roles and key responsibilities of who is to review what project components
Stakeholder Management Plan	Outline of relevant stakeholders and how they will be engaged in the project
Assumptions and Constraints	Identification of the assumptions and constraints the project team will operate under
Risk Management Plan	Designated plan for mitigating and limiting projects risks that have been identified

Risk Log	Identification of all potential risks which are a threat to the project
Issue Log	List for tracking the issues that arise and prioritization of those issues
Communication Management Plan	Documents the process, types, and expectations of communications
Communication Overview	Overview of how effective communication is to be handled
Communication Matrix	Plan for when, why, how often, and how to communicate with stakeholders
Elevator Pitch	Brief description of the main ideas of the projects, presented in an introductory manner
Project Pitch	A more in-depth pitch which describes the more in-depth concepts of the project and its details
Stakeholder Reporting	Explanation on how to report vital project information to the relevant stakeholders
Scope Management Plan	Describes how the scope will be defined, developed, monitored, controlled, and verified
Work Breakdown Structure	Deliverable-oriented grouping of the work involved in a project that defines its total scope
Business Requirements Planning	Planning for the final business requirements document
Business Requirements Document	Describes the problems the project is trying to solve and the required outcomes necessary to deliver value

Scope Management Log	Documenting any changes pertaining to the project's scope
Time and Key Milestones Plan	Identification and timeline of the project's important milestones
Gantt Chart	Displays the project schedule information by listing project activities and their corresponding start and finish dates in calendar form
Pert Chart/ Network Diagram	Schematic display of the logical relationships among project activities and their sequencing
Milestones	Display of significant achievements in the duration of the project
Cost Management Budgeting Plan	Plan for planning, estimating, budgeting, and controlling project costs
Proposed Budget	Allocation of costs for project duration
Earned Value Worksheet	Determination of how well the project is meeting scope, time, and cost goals by entering actual information and then comparing it to the baseline
Procurement Plan	Defining the products and services needed to be obtained from external suppliers
Project Management Information Data Storage Plan	Plan for how information and data will be stored for the duration of the project
Procedures for Handling Project Documents	Standardized approach for managing project documents
Closing Project Plan	Necessary steps for completing and officially closing the project

Project Summary	Overview of the completion of the project and it's deliverables
Final Presentation	Presentation outlining the completion of the project at hand
Project Management Lessons Learned	Lessons learned by the team throughout the duration of the project
Status Reports	Weekly updates for project progress
References Used	External references cited throughout documentation

Figure 1-7: High Level Scope Deliverables

Business Case

1.0 Introduction

Clutch City Tech Solution, CCT Solutions, is a consulting team of 7 individuals who strive to provide the best management and consulting services in the Houston area. CCT Solutions works with its clients to minimize business risks and better the business by using information technology and project management. CCT Solutions gives various options for technology solutions, unique to each client so they can focus on running the business rather than the technology.

2.0 Business Objective

CCT Solutions aims to serve each client by providing reliability and efficiency so they can continue to excel in their business. This project management project will provide an application that will help the employees manage the online storefront. CCT Solutions will be creating a web-based storefront for our client, allowing them to display inventory of the items in a more organized fashion and a database that will allow the storage and retrieval of customer information. CCT Solutions has created reports such as risk reports, user reports, and communication reports in efforts to help the business once the application is handed off to the stakeholders.

3.0 Current Situation and Problem / Opportunity Statement

Lumico currently only has two employees who are also the owners, Sil and Jackie Nguyen. Lumico operates completely online and Sil and Jackie, have been working from their homes for a little over a year using their personal laptops. They are now looking for a better option that will prove to be more efficient in tracking sales and customers. Sil and Jackie requested an

application that will assist in the growth of their business. Listening to their concerns, CCT Solutions presented a few options to the owners and in the end, they selected the best option for them. CCT Solutions will be creating a web-based storefront and a database on the backend that will allow the storage of data remotely.

4.0 Analysis of Options and Recommendations

After listening to the concerns of Lumico, CCT Solutions presented three options for an application that will fulfill their technical needs:

1. Let Lumico operate as they are currently and operate without the help of CCT Solution's project.
2. Develop web-based storefront for the client, however they must continue to store their data as they do currently.
3. Develop a web-based storefront, as well as the database for the application.

5.0 Preliminary Project Requirements

The main feature of the project for the client are as followed:

1. Customers should have access to the items available on the website as well as their pricing.
2. Customers must be able to add the desired items to the cart as well as purchase them.
3. Customer name, contact information, purchased items, delivery address, and payment method must be tracked in the database.

4. The available items in the inventory must be tracked in the database and must be represented accordingly on the storefront.
5. The sold items must also be tracked on the database, who purchased them and what date.

6.0 Budget Estimate and Financial Analysis

The estimated cost to complete this project is $45,840. The project manager and assistant project manager each will work about 200 hours over the course of 3.5 months and the rest of the team members will work about 180 hours within the same time. The project manager will earn $30 per hour and the assistant manager will earn $26 per hour. The three system developers and testers will earn $25 per hour and the two analysts will earn $24 per hour. The software needed for this application is offered at no charge to the stakeholders. To make sure the application will run without issues, plenty of testing will need to be done. The testing will take about 60 hours and will cost about $10,000. Furthermore, in the event that a risk presents itself, the risk contingency plan put into place is estimated to cost $2,500. The completed system will require a yearly maintenance primarily to keep the system updated, which will also be free of charge.

The University of Houston College of Technology offers a significant discount for the clients, which will take off an estimated $45,840 from the total cost of the project. This leaves the sponsors with an estimated total of $0.00 for the completed project and application.

7.0 Schedule Estimate

1. Form team and distribute roles and responsibilities – September 1
2. Find a client for this project – September 10

3. Submit initial project proposal – September 22
4. Complete first draft of application and documentation – October 19
5. Submit Project Execution Plan Version 1 and get feedback for improvements from key stakeholders – October 20
6. Prepare for weekly status reports starting October 27
7. Complete all testing and debugging, and finalize all documentation – November 17
8. Submit Final Project Execution Plan and present our project successfully – November 24

8.0 Potential Risks

There are several risks that might be of concern during this project. The most important risk we may face is the stakeholders' failure to accept the final deliverable. The final system application could contain defects or not meet expectations. Another potential risk that we CCT Solutions may encounter is tied to nature. As COVID-19 cases rise, the risk for a team member or stakeholder to be infected with the virus also rises. In the case that one of these people do get the virus, the project could be significantly delayed. With hurricane season being from June 1st to November 30th, in the chance that a hurricane hits the Houston Metroplex, the project completion also could be delayed due to the damage and interruptions.

10.0 Exhibits

Preliminary Budget for the Project:

The preliminary budget for this project shown below has been discussed and agreed upon with the client.

WBS Items	Type	Role	Max	Std Rate	Total Hrs.	Cost
Project Management						
Daniel Howard	Work	Project Manager	100%	$30.00/hr.	200 hrs.	$6,000
Project Team Members						
Nikheel Asodia	Work	Assistant Manager	100%	$26.00/hr.	200hrs.	$5,200
Musab Hamid	Work	Developer, Tester	100%	$25.00/hr.	180 hrs.	$4,500
Viktorija Kasirovaite	Work	Developer, Tester	100%	$25.00/hr.	180 hrs.	$4,500
Tyler Nullmeier	Work	Developer, Tester	100%	$25.00/hr.	180 hrs.	$4,500
Shreena Patel	Work	Business Analyst	100%	$24.00/hr.	180 hrs.	$4,320
Dhruv Patel	Work	Quality Analyst	100%	$24.00/hr.	180 hrs.	$4,320

Software						
Licensed Software		Cost	100%			$0
React						$0
GroupMe						$0
Microsoft SharePoint						$0
Zoom						$0
GitHub						$0
PayPal API						$0
Heroku						$0
Testing						
Testing Cost		Cost, Work	100%		60hrs	$10,000
Risk						
Risk Contingency Plan		Cost	100%			$2,500
Maintenance						
Yearly Maintenance		Cost, Work	100%			$0
Total Cost						**$45,840**

Discount						
UH Discount						**($45,840)**
Total Cost After Discount						**$0**

Figure 1-8: Business Case for the project

Cost vs. Benefits

Cost

- This list describes all the costs for the development of this project.
    - One of the biggest costs would be application development cost.
    - Yearly upkeep cost of the application.
    - Application downtime cost.
    - Learning curve of maintaining the application.

Benefits

- There are numerous tangible and intangible benefits of developing this project. Few of the key benefits are listed below.
    - One of the most important benefits is the application helps keep everything organized.
    - The application also helps keep inventory in check.
    - Helps keep the inventory lean, which intern lowers the cost of warehouse.
    - Gives a better overall experience for customers.
    - Provides a better idea of customer instinct of which product sells more and during which months.
    - Makes it easier to scale the business as needed.

Project Resource Management Plan

Project Review Committee

The project review committee consists of members that the team have been recognized as essential to the successful delivery of the project objectives and goals. The figure below lists the name of the members of the project review committee, including each member's role and key responsibilities.

Name	Role	Key Responsibilities
Jackie Nguyen and Sil Nguyen	Sponsor	Makes key business decisions for the project, approving budget, communicates the project goals to the project manager.
Thomas Gibbs	Project Manager Office, Director	Overlooks the entire project, sets project requirements and provides feedback.
Daniel Howard	Project Manager	Manages the project deliverables, manages the project schedule, assigns deliverables, provides regular updates to the project manager office manager, manages project budget.
Nikheel Asodia	Assistant Project Manager	Assists the project manager with deliverable management, relays the requests from the sponsor to the rest of the team.

Figure 2-1: Project Review Committee Roles and Responsibilities

Project Stakeholder Management Plan

The Stakeholder Management Plan consists the key stakeholders that are crucial to the development of this project. The key stakeholders include the Project Manager Office, the Project Sponsors, and the project development team, CCT Solutions.

Stakeholder	Impact
Project Manager Office Manager – Professor T. Gibbs	The PMO Manager overlooks the entire project and makes sure that everything is completed on time and within the budget and scope of the client and sponsors.
Sponsors – Lumico, Sil & Jackie Nguyen	Lumico's CEO's Sil and Jackie Nguyen, who are also sponsors will fund the project fully and provide timely feedback for the required system for their company.
Clutch City Tech Solutions Team	CCT Solutions will provide the client and PMO Manager with the completed documents and system that meet the project requirements of the two.

Figure 3-1: Key Project Stakeholders

Assumptions and Constraints

The proposed business and solution have been approved by the Project Management Office Manager and will be actively supporting the project. The team is divided and is assigned tasks based on their skillset. Although there is a limited number of team members, everyone has the required skills to contribute to their portion of the project. Due to COVID-19, team members are not able to meet in person, however they are available for weekly meetings held by the Project Manager. During these meetings, each team member is able to give updates on their parts of the project. Each document must be completed by the date set by the Project Manager for the continuous progression of the project. The cost of the project, which is subject to change as the project progresses, is going to be $45,840 in total and CCT Solutions will provide an additional discount of 100% which brings the total down to $0. The project cost will be fully funded by the sponsors and paid in full upon completion. Key stakeholders will be present and available for the duration of the project to provide feedback so the project can remain on a progressive path. All deliverables and system requirements must be completed and ready for presentation by November 24th.

The system that CCT Solutions will provide for Lumico is used for overall management as well as allowing potential customers to browse available inventory and order items in an efficient manner. One side of the application is reserved for management and employees and this will allow them to add and manage inventory, employees, customers and possibly suppliers. The system uses the PayPal payment system in order to provide management with an itemized report of where each order will be sent out to and will send out a confirmation email with a unique order ID to the customers automatically. PayPal will also encrypt all payment information so that it is secure and safe. The new system will meet all expectations of the stakeholders.

Project Communication Management Plan

Communication Overview

Teamwork is one of the most important tools in order to make a project successful. To attain good teamwork, there must be effective communication between all members of the team. Each member should be able to convey their ideas and thoughts skillfully which generates healthy discussions. Effective communication can be achieved by an understanding of the other team member's wants and needs relating to the project. For a successful project outcome, this level of communication should be maintained throughout the entire project.

For this project, our team communicated through the medium of GroupMe, Email, Zoom, Microsoft SharePoint, and GitHub. Additionally, group meetings are scheduled for once a week based on each team member's availability. Tasks are assigned by the project manager beforehand which allows the meetings to be more productive and efficient. In each meeting, the progress of each task is tracked and observed by the project manager. During this time, the project manager also aids team members if needed. If there is any significant deviance from the scope baseline on the task, the project manager will then identify the problem immediately and formulate a solution with the group before the problem extends to later stages of the project. The project manager will consistently remind the group about deadlines to keep everything on track. The project manager would also set the agendas for the weekly meetings of what needed to be discussed during the meeting times. Meanwhile, the assistant project manager would be recording the minutes of each meeting to keep track of details of each meeting. Communication is key to the success of our project and some of the tools that will help us be more efficient and that will play a major role in our communications are:

One of our main forms of communication for our project is GroupMe application. GroupMe is a form of communication that allows users to form private groups and send messages, share files, and links to every team member. When one person from the team sends a message or shares something, everyone can view the message. This is one of the vital features that helps our group succeed and keeps the entire group on the same page.

E-mail is another form of communication that we have used to send out invites for Google Drive for sharing files and for one on one questions or suggestions on modifications for the project. Emails were also used as a reminder for any task assigned. Team members that are assigned the same tasks also used email to share files. E-mail has been one of the key tools used for communication in the initial stages of the project.

Zoom and Microsoft teams are the web-conference applications that we used for group meetings on a weekly basis. The video conferencing application was used so that each member of the team can give an update on their tasks and anyone from the team can provide feedback. Any big decision that must be made, is done so at the weekly video conference meetings because every team member attends it. The video conferencing application Zoom, and Microsoft Teams is our primary source of meeting and it is of great use in the current circumstances of COVID-19.

SharePoint is a cloud-based storage service that allows us to store files and share the files amongst any team members. One of the best features of SharePoint is that it allows our group to edit, synchronize files across devices, and share files amongst each other. The application is on the Microsoft platform, so it makes editing and communication much simpler and easier. This allows live edits of files between multiple members. This application allows us to store and backup to ensure that if we lose any data from our reports, we will have something to fall back on. SharePoint was the most reliable and safest cloud application that our group collectively uses.

GitHub is another communication source our team uses. GitHub is a platform that allows you to host repositories for other people to see and expand their ideas on. The three developers for CCT Solutions, Tyler, Musab, and Viktorija, have been using this platform to communicate their ideas for the system.

Communication Matrix

This Figure 4-1 summarizes the communication management plan for this project. This document is accessible to all the stakeholders and it gets updated as the project advances. The figure below shows a breakdown of communication management plan for this project. It

illustrates the purpose of key communications, the medium used to communicate, how frequent it is done, and the audience for each key communication.

Type	Purpose	Medium	Frequency	Audience
Kickoff Meeting	Introduce project and confirm objectives, goals, and deliverables.	Virtual meeting (Zoom Conference Call)	Once	Project Team, Project Sponsor
Identify Team Members and Roles	Defining and understanding each member's role in the project.	Virtual meeting (Zoom Conference Call)	Once	Project Team
Project Team Meetings	Review status of project.	Virtual meeting (Zoom Conference Call)	Weekly	Project Team
Check-ins/ meeting recap	Update interested parties on project status based on notes from project team meetings.	Email, SharePoint	Weekly	Project Sponsor
Project Status Meetings	Update leadership on project status and give opportunity to ask questions.	Virtual meeting (Zoom Conference Call)	Monthly	Project Team
GUI Review	Give the project sponsor the opportunity to give feedback on the application design.	Virtual meeting (Zoom Conference Call)	Weekly	Project Sponsor, Project Manager, GUI Designer

Figure 4-1: Communication Matrix for CCT Solutions

Elevator Pitch

Hello, we are Clutch City Tech Solutions, we are a group of 7 passionate and hardworking students from the University of Houston who are majoring in Computer Information Systems. We are currently working on a project for our Project Management class which consists of finding a business in need of technical help such as developing a new application or improving their current application. We decided to find a business in the Greater Houston metroplex as most of our members consider that their home. After searching for a business that would be a good fit and meet our project requirements, we came to a decision that Lumico was the perfect fit. Lumico is an online clothing company founded by two sisters from Houston, TX. Currently they are a very small company and two sisters are the only employees of the company. We believed this company was a good fit as they looked to grow their company with the help of CCT solutions and by doing so we felt we would be giving back to the community.

Due to the current COVID-19 pandemic, Lumico has faced many difficulties and they were unable to launch their business in the grand way they had originally wanted. As a small start-up, both sisters are working from home using their personal computers and have no applications or website. During our initial meeting with them, we got a better understanding of what they needed our help with. In order to grow their business and succeed, they needed a website to sell their products but at the same time track the customer's information and potentially store the information to help establish long lasting relationships between Lumico and their customers. Taking their requests into consideration, we came to a conclusion that CCT solutions would develop a web-based storefront where the customers will be able to see and buy the items available for purchase. A database was also created to store necessary customer's information and Lumico would be able to contact their customers regarding any potential sales, or

any potential problems with the order such as improper payment or the wrong address being provided.

Project Proposal

Lumico is a small, start-up company that focuses on the selling of men's, women's, and children's apparel. Lumico is not a typical box type store where customers can walk in and purchase and leave with their items. As the business world is moving more towards online interaction between businesses and customers, Lumico has made the decision to operate as a virtual storefront. This decision has resulted in a few problems that need to be solved in order for Lumico to operate successfully.

Problems

Currently Lumico has no working web application that would allow for customers to view and/or purchase merchandise. Work was begun six months ago but that was put on hold due to the recent Covid-19 pandemic. Another problem is that there is no current database to store data for employees, customers, or sales data. Employee data and Lumico financials are currently being entered into Excel spreadsheets.

Proposed Solutions

Clutch City Tech Solutions suggests a web application design that will allow customers to view merchandise in a reactive and smooth setting and then allow purchases to be made. A shopping cart will be included, and customers will be able to view what is in their cart and either change what is in the cart, purchase, or cancel the transaction before purchase is complete. Purchasing will be handled through a third-party API called PayPal. There will be two different "views" for this application. One for customers and one for employees. The employee view will allow

employees with the proper credentials to make changes to inventory types and quantities while also allowing them to make changes to employee information. Data will be no longer stored in excel spreadsheets on a home computer. Clutch City Tech Solutions proposes a remote MongoDB database. This will allow larger quantities of data to be stored and accessed more quickly than it is currently. Customer, employee, sales, and inventory data will be stored in this database. Lastly, in order to reduce the physical storage space needed for servers, the entire web application and database will be hosted remotely on the cloud. This will allow for reduced costs to Lumico as the purchase of servers and data centers will not be necessary.

Benefits

The main benefits to Lumico begin with cost reduction as both the web application and database will be hosted remotely. This means that additional hardware will not need to be purchased to host the web app and database. While there is some cost to having the application and database hosted remotely, this cost is considerably lower than purchasing the hardware and then integrating the application and database onto the new hardware. Another added benefit to our proposal is that since the application is web based, it will be available to customers and employees even during non-peak hours. The store never closes so that increases Lumico's opportunities to capture more business. Clutch City Tech Solutions is also providing our services at a reduced rate as this reduces the initial costs to Lumico as well.

Risks

There are risks to operating as a virtual storefront with both the web application and database being operated remotely. Servers that are hosting the web application and database are subject to downtime that is either planned or unplanned. Unplanned server outages can reduce the ability for Lumico to operate effectively. Another risk is that hosting remotely can become more expensive when bundling options provided by Heroku for example. Expanding these options

such as storage space too quickly can lead to higher costs to Lumico if done before they are needed. If Lumico decides to not go with our proposal, they will be unable to operate until another solution is found. Clutch City is offering a reduced rate for this project that Lumico will be hard pressed to find another company to match or beat.

Timeline and Costs

Clutch City Tech solutions can have a working web application and database remotely hosted and operational within 2 months. This will allow Lumico to resume sales and operations much faster than they are currently projecting. Clutch City Tech Solution is projecting a total project cost of approximately $45,840.

Communication Planning

This document provides a steady stream of communication to keep the deliverables of this project on track and get them over the finish line. It shows the audience of each deliverable, the medium it is created or updated through, how frequently it is updated, the team member/s responsible for the deliverable.

Communication Planning

Audience	Information	Method	Frequency	Lead	Comments/ Participants
Project Team, Sponsor	Initial Project Proposal	SharePoint, Email	Once	Shreena Patel	Created and maintained by Shreena and Dhruv.
Project Team, Sponsor	Project Team Organization	SharePoint, Zoom Conference Call	Update as needed	Daniel Howard	Created and maintained by Daniel and Nikheel.
Project Team, Sponsor	Organizational Background and Rationale	SharePoint	Once	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Sponsor History	Zoom Meeting, SharePoint	Once	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Sponsor Organizational Chart	Zoom, SharePoint	Once	Daniel Howard	Created and maintained by Daniel.

Project Team	Team Communication plan	GroupMe, SharePoint, Zoom	Weekly	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	SWOT Analysis	SharePoint	Update as needed	Daniel Howard	Created and maintained by Daniel.
Project Team, Sponsor	Project Goals	SharePoint	Once	Dhruv Patel	Created and maintained by Dhruv.
Project Team	Roles and Responsibility Matrix	SharePoint	Once	Daniel Howard	Created and maintained by Daniel.
Project Team, Sponsor	High Level Scope Statement	SharePoint/ Email	Update as needed	Viktorija	Created and maintained by Viktorija.
Project Team, Sponsor	High Level Deliverables	SharePoint, Zoom	Update as needed	Viktorija K.	Created and maintained by Viktorija.
Project Team, Sponsor	Business Case	SharePoint, Zoom, Email	Update as needed	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Cost vs. Benefits	SharePoint, Email	Update is needed	Dhruv Patel	Created and maintained by Dhruv.
Project Team, Sponsor	Quality Management Plan	SharePoint, Email	Update as needed	Tyler Nullmeier	Created and maintained by Tyler.

Project Team, Sponsor	Resources and Organizational Management Plan	SharePoint, Email	Update as needed	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Project Review Committee	SharePoint, Email, Zoom	Update as needed	Nikheel Asodia	Created and maintained by Nikheel.
Project Team, Sponsor	Stakeholder Management Plan	SharePoint, Email	Once	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Assumptions and Constraints	SharePoint	Update as needed	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Risk Management Plan	SharePoint	Updated as needed	Tyler Nullmeier	Created and maintained by Tyler.
Project Team, Sponsor	Risk Register	SharePoint,	Weekly	Tyler Nullmeier	Created and maintained by Tyler.
Project Team	Issue Log	SharePoint,	Weekly	Tyler Nullmeier	Created and maintained by Tyler.
Project Team, Sponsor	Communication Management Plan	SharePoint	Once	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Communication Overview	SharePoint	Once	Nikheel Asodia	Created and maintained by Nikheel.

Project Team, Sponsor	Communication Matrix	SharePoint	Once	Nikheel Asodia	Created and maintained by Nikheel.
Project Team, Sponsor	Elevator Pitch	SharePoint	Weekly	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Stakeholder Reporting	SharePoint, Email	Weekly	Nikheel Asodia	Created and maintained by Nikheel.
Project Team	Work Breakdown Structure	SharePoint	Weekly	Daniel Howard	Created and maintained by Daniel.
Project Team, Sponsor	Business Requirements Planning	SharePoint	Once	Nikheel Asodia	Created and maintained by Nikheel.
Project Team, Sponsor	Scope Management Log	SharePoint	Monthly	Shreena Patel	Created and maintained by Shreena.
Project Team	Time and Key Milestones Plan	SharePoint	Weekly	Dhruv Patel	Created and maintained by Dhruv.
Project Team	Gantt Chart	SharePoint	Update as needed	Daniel Howard	Created and maintained by Daniel.
Project Team	Pert Chart/ Network Diagram	SharePoint	Update as needed	Daniel Howard	Created and maintained by Daniel.
Project Team	Milestones	SharePoint, Zoom	Update as needed	Shreena Patel	Created and maintained by Shreena.

Project Team, Sponsor	Cost Management Budgeting Plan	SharePoint	Monthly	Shreena Patel	Created and maintained by Shreena.
Project Team, Sponsor	Proposed Budget	SharePoint	Once	Dhruv Patel	Created and maintained by Dhruv.
Project Team, Sponsor	Earned Value Worksheet	SharePoint	Update as needed	Dhruv Patel	Created and maintained by Dhruv.
Stakeholder	Procurement Plan	SharePoint	Monthly	Shreena Patel	Created and maintained by Shreena.
Project Team	Project Management Lessons Learned	SharePoint	Weekly	Nikheel Asodia	Created and maintained by Nikheel.
Project Team, Sponsor	Status Report	SharePoint	Weekly	Nikheel Asodia	Created and maintained by Nikheel.

Figure 4-2: Communication Planning Diagram for CCT Solutions

Stakeholder Reporting

This document shows the breakdown of communication plan between the project team and the stakeholders. It documents how frequently team members report to the stakeholders about the progress of the key deliverables and the project itself. The stakeholders in return provide their feedback to the team.

Purpose	Frequency	Lead	Comments/Participants
Sponsor History	Once	Daniel Howard	Daniel held the virtual meeting and documented it.
Sponsor Organizational Chart	Once	Daniel Howard	Daniel
SWOT Analysis	Weekly	Daniel Howard	The analysis was assisted by Shreena and Dhruv.
Project Goals	Once	Daniel Howard	Daniel held the meeting with the sponsor to define and finalize on the project goals.
Expected Business Benefits	Once	Shreena Patel	Shreena held virtual meeting with the project sponsor to define the success criteria for this project.
Status Reporting	Monthly	Nikheel Asodia	Nikheel emails the reports to the sponsor about the project status.
Meeting	Weekly	Daniel Howard	Sponsor and Project Team
Stakeholder Management Plan	Once	Shreena Patel	Shreena.
Risk and Risk Mitigation	Once	Tyler Nullmeier	Tyler held the meeting with the project sponsor to discuss, finalize and document the risk prioritization.
Project Review Committee	Once	Nikheel Asodia	Nikheel and Daniel finalized with the project sponsor on the review committee.
Risk Management Plan	Once	Tyler Nullmeier	Tyler presented the Risk Management Plan to the stakeholder virtually and documented the final plan.

Business Requirement Plan	Once	Shreena Patel	Shreena finalized and documented the final business requirement plan.
Scope Management Plan	Once	Shreena Patel	Shreena developed the scope management plan after holding the discussions with the sponsor.
Cost Management and Budget Plan	Once	Dhruv Patel	Created and maintained by Dhruv
Proposed Budget	Once	Dhruv Patel	Created and maintained by Dhruv.
Earned Value Worksheet	Monthly	Dhruv Patel	Created and maintained by Dhruv.
Procurement Plan	Monthly	Shreena Patel	Created and maintained by Shreena.
Scope Management Log	Weekly	Shreena Patel	Created and maintained by Shreena.
Project Management Data Storage Plan	Once	Shreena Patel	Created and maintained by Shreena.

Figure 4-3: Communication between CCT Solutions and Stakeholders Diagram

Project Scope Management Plan

Work Breakdown Structure

Below is an image of our Work Breakdown Structure that has been condensed for space. The Work Breakdown Structure is used to show the outline of tasks that were scheduled, completed, the amount of time taken to complete, and by whom. A link has been provided below the figure to the WBS file that will allow each phase to be expanded.

		Task Mode	Task Name	Duration	Actual Work	Baseline Cost	BCWP	Actual Cost	Start	Finish	Resource Names
0			Lumico Web Application Project	576 hrs	255.66 hrs	$37,048.86	$6,059.49	$6,221.01	Tue 8/25/20	Wed 12/2/20	Software Costs,B
1	✓		Team Created	8 hrs	8 hrs	$0.00	$0.00	$0.00	Tue 8/25/20	Tue 8/25/20	
2			Initial Project Proposal	88 hrs	10 hrs	$2,290.78	$254.24	$254.24	Tue 9/8/20	Tue 9/22/20	Daniel Howard,Dh
3	✓		Project Documentation	152 hrs	97.67 hrs	$25,952.00	$2,696.00	$2,487.67	Mon 9/28/20	Thu 10/22/20	
46	✓		Budget and Finances	16 hrs	11 hrs	$1,032.00	$264.00	$264.00	Fri 10/16/20	Mon 10/19/20	
50	✓		Document Handling	7 hrs	7 hrs	$172.00	$172.00	$172.00	Mon 10/19/20	Mon 10/19/20	
53	✓		Application Coding	61 hrs	67 hrs	$1,675.00	$1,675.00	$1,675.00	Wed 10/7/20	Fri 10/16/20	
59	✓		Database Management	21 hrs	21 hrs	$526.24	$526.24	$526.24	Wed 10/7/20	Fri 10/9/20	
63	✓		Application Testing	19 hrs	19 hrs	$1,878.00	$472.00	$472.00	Tue 11/10/20	Thu 11/12/20	
68			Project Close	16 hrs	15 hrs	$3,522.83	$0.00	$369.86	Tue 12/1/20	Wed 12/2/20	

GANTT CHART

Figure 5-1: Work Breakdown Structure for CCT Solutions

Work Breakdown Structure

User Interface Requirements

Most users today have the expectation that user interfaces will work at the home or office and on the go. The employees at Lumico were no exception. To accommodate this desire, our development team used React, a JavaScript framework, and Tachyons, a style sheet framework, to ensure that pages would be mobile friendly, fast, and responsive.

Security Requirements

At Clutch City Tech Solutions, we take security seriously. To maintain the reputation of Lumico and keep Lumico's clients safe, we outsourced as much sensitive information as possible to trusted third party platforms like Heroku, PayPal, and MongoDB Atlas. Payment processing will be handled by PayPal, a reputable payment processing platform. The entire site is hosted on Heroku. Sites hosted on Heroku have Transport Layer Security (TLS) enabled; therefore, all connections made to the site are secure. This level of security is guaranteed by Heroku's certificate that was issued by DigiCert Inc. The database is hosted on MongoDB Atlas. The main advantage of MongoDB Atlas is that it supports secure and scalable database connections. We could not, however, outsource all security.

Employees and users are responsible for using secure passwords. When a user or employee creates an account, their password must contain at least one number, one uppercase, and one lowercase letter. Additionally, passwords must be at least eight digits long. We believe that this policy will encourage more secure passwords; however, employees and users are responsible for making passwords that are difficult to guess.

Performance and Capacity

Part of Clutch City Tech Solution's goal was to provide Lumico with a database that could scale effectively. Consequently, we developed a transactional database that uses a document-based design. While transactional databases tend to use a relational design, we believe that the document-based design offered by MongoDB will scale well and be more maintainable. Using MongoDB also allowed our team to host the database on MongoDB Atlas. Consequently, as long as the database design is effective, scaling the database to handle more capacity should be as easy as paying for more capacity.

Migration Requirements

As the client currently holds all data on Microsoft Excel and paper, our team aims to transition that to a database. We plan to coax the data in their Excel documents into the correct format for the database, export the data to csv format, and then import it directly into the database. The data they store on paper will be more challenging to import.

One idea we have is to use optical character recognition (OCR) to convert the paper data to a digital format. OCR is not perfect, however, so we will need to manually ensure that the data was recognized correctly. From there, we should be able to use the same process we used to import the Excel data.

Backup Requirements

We recommend Lumico use the mongodump and mongorestore programs to backup and restore their database. For more details about these programs, see the technical manual. We are also recommending that Lumico use two databases: a test database and a live database. This setup allows Lumico to always keep a copy of the previous version of their data until they are ready to update. There are some drawbacks, however.

This approach to database backup puts more burden on Lumico employees. If this approach is used, employees need to be sure that they only make changes to the test database, never the live database. One solution we are considering is the idea of having our application make changes to the test database and then having a synchronization task that pushes the updates to the live database.

Scope Management Log

The image below represents the things that needed to be done for the completion of the database end of the application as well as the due dates.

Description	Task Status	Date
Data Gathering Meetings	Completed	September 26,2020
Chatter	Completed	September 20, 2020
Execution Plan	Completed	October 20, 2020
Lumico Web Application		
• Administrators		
• New Employee • Update Employee • New Vendor • Update Vendor	Completed	November 10,2020
Employee		
• New Product • Update Product • Product List	Completed	November 10,2020
Customers		
• Customer Information • Order Information	Completed	November 10,2020
Testing	Completed	November 24,2020
Due	Completed	November 24,2020

Figure 5-2: Scope Management Log

Project Schedule Management Plan

Time and Key Milestones

The figure below represents the due dates that were set for each milestone of the project. Some were set by the Project Manager, and some were set by the PMO. There were a few instances where the date of completion was before the due date, however everything was completed and turned in by the due date that was set.

Task	Description	Date Completed	Date Due
Assemble Team	Form a team and distribute roles and responsibilities.	September 1, 2020	September 1, 2020
Find a Client	Find a client for this project that will help fulfill project requirements.	September 8, 2020	September 10, 2020
Submit Project Charter	Turn in the Initial Project Proposal/ Project Charter to the PMO, Prof. Gibbs, for review	September 20, 2020	September 20, 2020
Application Prototype and Database Sample	Have application prototype and database sample complete for feedback from team	October 4, 2020	October 1, 2020

Complete Project Execution Plan Version 1.0	Have all documents and application requirements completed and formatted for turn in.	October 20, 2020	October 19, 2020
Submit Project Execution Plan Version 1.0	Turn in the Project Execution Plan 1.0 and wait for feedback from key stakeholders.	October 20, 2020	October 20, 2020
Weekly Meeting Status Reports	Complete all project information and present weekly status reports to PMO.	October 27, 2020 November 2, 2020 November 8, 2020 November 15, 2020	October 27, 2020 November 3, 2020 November 10, 2020 November 17, 2020
Complete Final Execution Plan and System Application	Complete all system testing and debugging and finalize all documents for submission.	November 22, 2020	November 17, 2020
Submit Final Project Execution Plan	Turn in completed Project Execution Plan and present the project successfully.	November 24, 2020	November 24, 2020

Figure 6-1: Key Milestones for CCT Solutions

Gantt Chart Image

Below is an image of the Gantt chart for Clutch City Tech Solutions that shows the duration and resources assigned to the tasks as listed in the Work Breakdown Structure. A link has been provided below the figure to view the Gantt chart in PDF format.

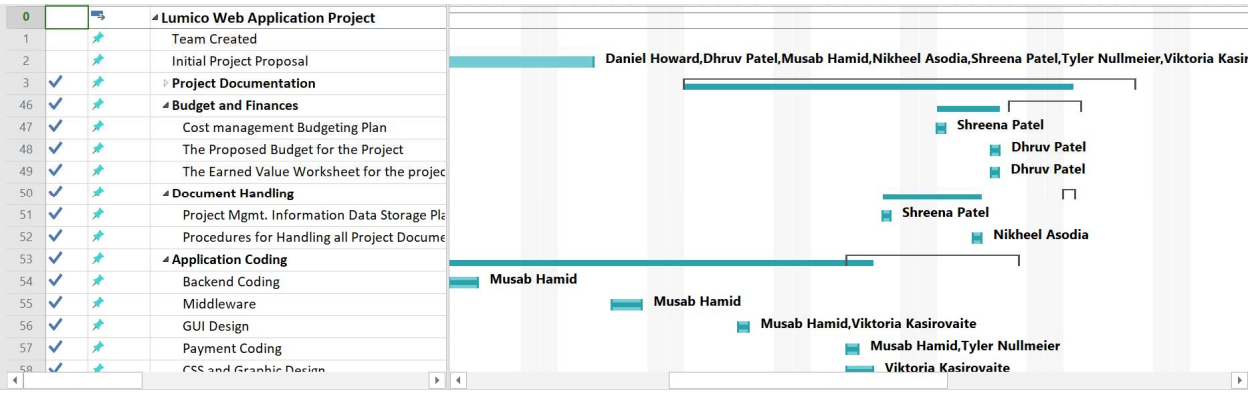


Figure 6-2: CCT Solutions GANTT Chart

Gantt Chart CCTS

PERT Chart/ Network Diagram

Pictured below is a sample of our network diagram. The network diagram shows tasks and the resources assigned to them along with predecessors. This is a visual representation of how the tasks are outlined and assigns them an ID based on which part of the Work Breakdown Structure that they belong to. A link to the file with the full view of the network diagram has been provided below the figure.

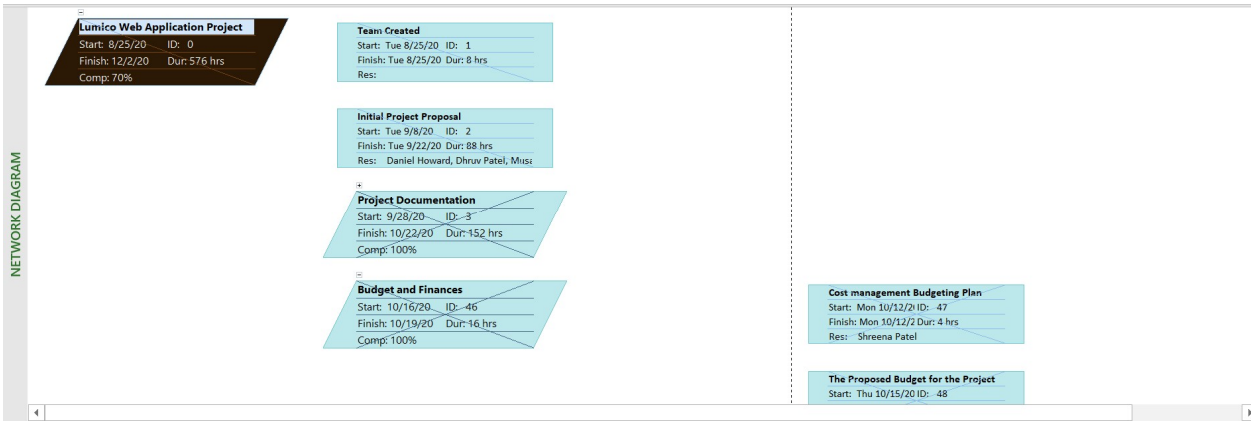


Figure 6-3: CCT Solutions Network Diagram

[Network Diagram CCTS]

Proposed Budget for the Project

WBS Items	Type	Role	Max	Std Rate	Total Hours	Cost
1. Project Management						
1.1 Project Manager						
1.1.1 Daniel Howard	Work	Project Manager	100%	$30.00/hr	200h	$6,000
1.2 Project team members						
1.2.1 Nikheel Asodia	Work	Assistant Manager	100%	$26.00/hr	200h	$5,200
1.2.2 Mushab Hamid	Work	Developer, Tester	100%	$25.00/hr	180h	$4,500
1.2.3 Victoria Kasirovaite	Work	Developer, Tester	100%	$25.00/hr	180h	$4,500
1.2.4 Tyler Nullmeier	Work	Developer, Tester	100%	$25.00/hr	180h	$4,500
1.2.5 Shreena Patel	Work	Business Analyst	100%	$24.00/hr	180h	$4,320
1.2.6 Dhruv Patel	Work	Quality Analyst	100%	$24.00/hr	180h	$4,320
2. Software						
2.1 Software	Cost	Free	100%			$0
React		Free				$0
GroupMe		Free				$0
Microsoft SharePoint		Free				$0
Zoom		Free				$0
Git/GitHub		Free				$0
PayPal API		Free				$0
Heroku		Free				$0
3. Testing						
3.1 Testing Cost	Cost / Work		100%		60h	$10,000
4.Risk						
4.1 Risk Contingengy Plan	Cost		100%			$2,500
5. Maintanance						
5.1 Maintanance Self Service	Cost/Work		100%			$0
6. Training						
6.1 Training	Cost	Free				$0
Total Cost						**$45,840**
7. Discount						
7.1 UH Discount						($45,840)
Total Cost After Discount						**$0**

Table 7-1: Proposed Budget for Lumico

The Earned Value Worksheet for the Project

The image below shows a comparison of the actual cost of work performed (ACWP) versus the baseline cost of work performed (BCWP) while also showing the estimated costs of the project. As can be seen, the BCWP is less than the ACWP thus the project is under budget.

Figure 7-1: Earned Value Worksheet

Below is an image of variance over time that shows a graphical comparison of cost variance and schedule variance based on the projects work breakdown structure. Since the cost variance (CV) never has a negative value and the schedule variance (SV) is not positive, then the project is on schedule and under budget.

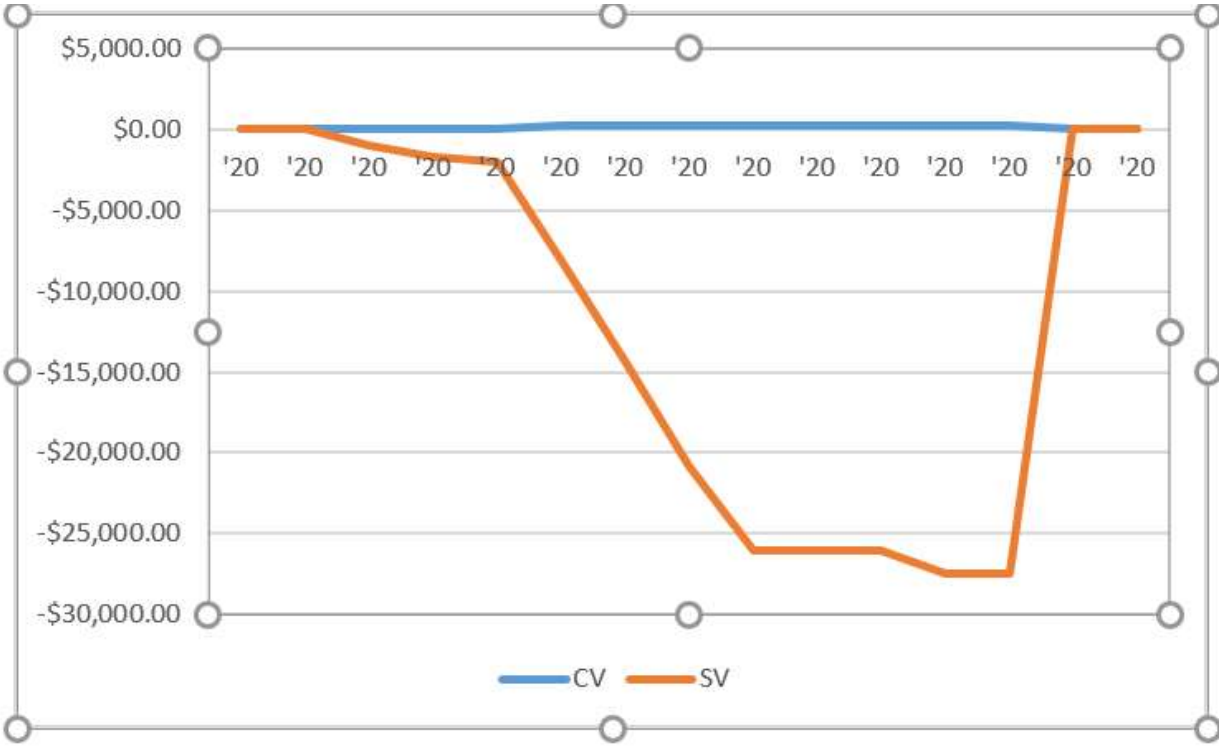


Figure 7-2: Earned Value: Cost Variance and Schedule Variance

Cost Details

The figure below is a report created that shows the actual cost, remaining cost, cost, baseline cost, and the variance cost based on each top-level task for the project according to the work breakdown structure.

Cost details for all top-level tasks.

Name	Fixed Cost	Actual Cost	Remaining Cost	Cost	Baseline Cost	Cost Variance
Team Created	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Initial Project Proposal	$0.00	$254.24	$2,036.54	$2,290.78	$2,290.78	$0.00
Project Documentation	$0.00	$2,487.67	$0.00	$2,487.67	$25,952.00	($23,464.33)
Budget and Finances	$0.00	$264.00	$0.00	$264.00	$1,032.00	($768.00)
Document Handling	$0.00	$172.00	$0.00	$172.00	$172.00	$0.00
Application Coding	$0.00	$1,675.00	$0.00	$1,675.00	$1,675.00	$0.00
Database Management	$0.00	$526.24	$0.00	$526.24	$526.24	$0.00
Application Testing	$0.00	$472.00	$0.00	$472.00	$1,878.00	($1,406.00)
Project Close	$0.00	$369.86	$304.97	$674.83	$3,522.83	($2,848.00)

Figure 7-3: Actual Costs and Baseline Costs with their Variances

Project Risk Management Plan

Purpose

The Risk Management Plan explains how risks will be managed throughout the project's life. The plan includes details about the methodology used to identify risks, their probability, and their impact, as well as who is responsible for those risks, why they are responsible, and what actions should be taken when risks are triggered. The plan also deals with positive risks, or opportunities, and what actions should be taken to encourage their occurrence. Finally, the Risk Management Plan also explains how risks will be monitored and what methods will be used to avoid overlooking risks.

Methodology

For this project, our team will use expert judgement, brainstorming, interviewing, document analysis, and benchmarking to identify risks. Musab Hamid and Tyler Nullmeier are the experts that will guide risk assessments related to technology. Musab Hamid is a student at the University of Houston College of Technology with an extensive background in JavaScript. Tyler Nullmeier is graduating from the University of Houston College of Technology with the highest-grade point average of his graduating class and has worked professionally on two similar projects in the past. Daniel Howard, with his background in sales and management, is the expert that will guide business related risk assessments. All members of the Clutch City Tech team are experts on the institutional risks that revolve around the College of Technology. We do not have an expert on environmental risks. Consequently, external sources like NOAA, the CDC, and the HHS will help our team rank these risks. We will use benchmarking to examine the competition

and identify risks they have accounted for or overlooked. After the initial Risk Management Plan is completed, risk review meetings will be held during each weekly project status report meeting. The first documentation we will produce is a risk breakdown structure.

A risk breakdown structure identifies individual risks and their categories. It will be populated by the results of our brainstorming, document analysis, and benchmarking. From there we can move on to qualitative risk analysis.

In qualitative risk analysis, we will use expert judgement to determine risk probabilities and impacts and rank them accordingly. Some factors we will consider when assigning probability and impact include: the scope of the risk, the proximity of the risk, the detectability of the risk, and how confident we are that we can respond to the risk effectively. With this information, we will create a top-ten list of the highest priority risks and include it in the risk report in Appendix II. While some projects also include quantitative risk analysis, the time and cost constraints of our project made this process unfavorable. After qualitative risk analysis we will create a risk register and risk report.

The risk register and risk report include various details accrued during the risk management process. These documents will be updated periodically as the project moves forward. We will use a list of the top-ten risks as a window into our project's risk status; however, the risk register and risk report back up the top-ten list with additional information such as risk responses and situations that indicate a risk was triggered. One final consideration for project risk management is the risk audit.

Risk audits review the risk management process and ensure it is still performing effectively. A risk audit should be performed at least once per month. Ideally, however, a risk audit should be performed during the sprint retrospective meeting at the end of each sprint. The project manager is responsible for ensuring these audits are performed.

Risk Categories and Breakdown

The risk breakdown structure for our project is shown in Figure 8-1. As described in the methodology section, this structure was derived from our attempts to identify risks. While we were identifying risks, we began to understand various categories each risk belonged to. The risk breakdown structure is a hierarchical structure. The “Lumico Online Platform” node is level one: it is the origin of all risk categories and risks. The nodes connected directly to “Lumico Online Platform” are level two nodes; they represent risk categories. Finally, the nodes connected to each risk category are level three nodes; they correspond to individual risks in each category.

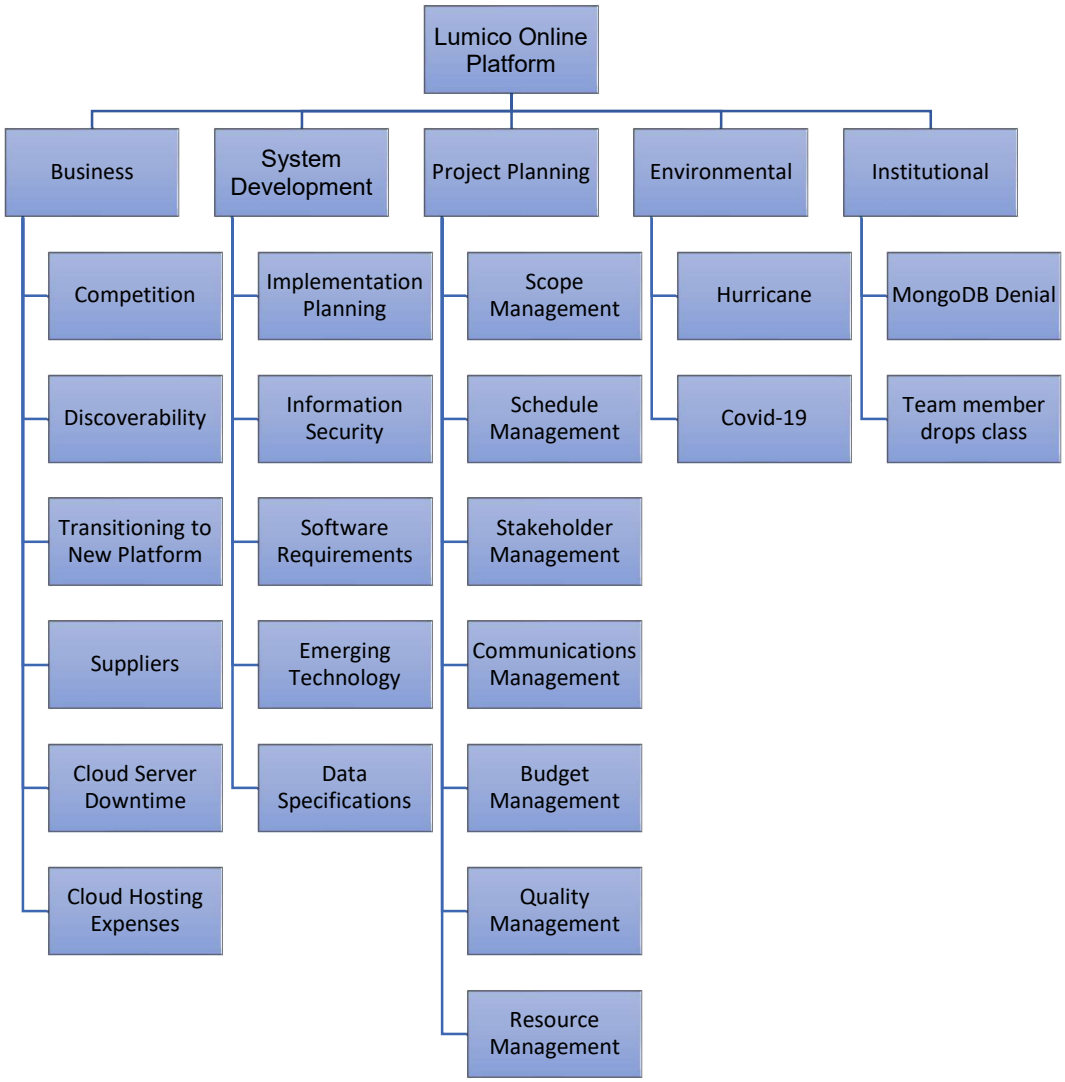


Figure 8-1: Lumico Risk Breakdown Structure

Identified risk categories include Business, System Development, Project Planning, Environmental, and Institutional. Business risks are risks that directly impact Lumico staff and operations. Business risks need to be escalated to Lumico because they are outside of the scope of our project team. System development risks are risks associated with developing the new platform. The development team are the owners of system development risks. Project planning risks are risks associated with our project planning. Most of these directly relate to the knowledge areas present in the Project Management Body of Knowledge. Project planning risks will affect the entire project; therefore, all project team members are responsible for these risks. Environmental risks are external to the project and business; all stakeholders are responsible for managing these risks. Institutional risks are risks introduced by the College of Technology; all project team members need to be mindful of these risks.

Funding and Timing of Risk Response

Given our project's time and cost constraints, primarily avoidance and mitigation strategies should be employed. Mitigation and avoidance strategies that take effect early in our project have a high potential to minimize the number of risks triggered and, thus reduce time and cost lost to risk occurrence. With that said, many of the responses identified in the risk register and risk report will need to be performed periodically throughout the project. If our risk mitigation is effective, no additional costs should be incurred for the risks in the Systems Development or Project Planning categories. We did, however, create a fallback plan to prepare for the worst-case scenario.

Risk Probability and Impact

We will leverage the experience of many individuals on our team to assign a probability, impact, proximity, and detectability score to each risk. Numbers ranging from one to ten will represent each measure, one being the lowest and ten being the highest. Below we detail two formulas for scoring and ranking risks. The risk score combines all measures of risk into one average. As a risk's score increases, so too should its rank or priority. The ranking formula provided below will serve as a starting point for ranking items; however, analyst discretion will be required when multiple items share a rank.

Risk Score = (Probability + Impact + Proximity + 10 - Detectability) / 4
Ranking Formula: 10 - Risk Score

Some factors we will consider when assigning probability and impact include: the scope of the risk, the proximity of the risk, the detectability of the risk, and how confident we are that we can respond to the risk effectively. Detectability describes how easy it is to detect a risk being triggered before that risk causes an issue. Proximity describes how near in the future a risk could become a problem. Risks with high proximity should be high priority. A guide to risk scores is included in the following table.

Scale	Probability	Time	Quality
10	> 8	More than 1 week	Very significant impact on overall function or acceptance
8	[6, 8]	About 1 week	Significant impact on overall functionality
6	[4, 6]	About 5 days	Some impact in key functional areas
4	[2, 4]	About 3 days	Minor impact on overall functionality
2	[1, 2]	About 1 day	Minor impact on low priority functions
0	< 1	Less than 1 day	Little to no change in functionality

Table 8-1: Detailed Definitions of Probability and Impact

We will use three additional techniques for determining risk probability. We believe that expert judgment will help us determine baseline probabilities before the unique nature of our project is accounted for. From there, we will interview team members to get an idea of their confidence levels regarding risk avoidance and mitigation. Finally, we will assume that the most complex processes will have a higher probability of triggering risks.

Revised Stakeholders' Tolerances

Sil and Jackie Nguyen, the owners of Lumico, had a balanced risk tolerance at the start of the project. If the stakeholders' risk tolerance becomes higher, we could consider moving from a software as a service model to a platform as a service model. With a platform as a service, the project team would have a lot more freedom and control. This model, however, puts the burden of information security on Lumico and the project team, thus increasing risk.

Monitoring

To monitor risks, we should try to have well defined risk triggers in our risk register. Well defined risk triggers will help us identify situations that could require risk response. To develop these triggers, we should use the S.M.A.R.T. criteria where triggers must be specific, measurable, assignable, realistic, and time framed. This will make it easier for everyone to identify risk triggers occurring over the course of the project.

Risk Documentation

We will use a risk breakdown structure to identify risks. Once risks have been identified, we will use a bubble chart to rank risks. After a formal ranking has been established, we will use a top-ten list of risks to highlight the most important risks. Throughout this entire process, we will be using a risk register and risk report to maintain detailed information about each risk.

The bubble chart is part of quantitative risk analysis and will show risk priorities briefly. The impact and probability of each risk will be combined into one measure called adjusted impact. Adjusted impact will equal the impact multiplied by the probability divided by ten. On the bubble chart, the bubble size indicates the risk's adjusted impact, the color indicates the risk's risk score, and risks closest to the top right of the chart have the closest proximity and lowest detectability.

The risk register is a spreadsheet with columns Risk Number, Rank, Risk Score, Risk, Description, Category, Root Cause, Triggers, Potential Responses, Risk Owner(s), Probability (out of 10), Impact (out of 10), and Status. Each column should be filled in using the formats

defined previously in this plan. Whereas the risk register gives a data-centric view of risk, the risk report should explain what we know, how we know it, and what our priorities should be.

The risk report should be in a journal format with dated entries. Once information has been added to this document, it should never be removed. Each subsequent entry can be made to reflect alterations made from previous entries. Each entry should include, at a minimum, (1) the highest priority risk category and an explanation of its priority; (2) any contingency plans that have been developed to respond to the risks associated with the highest priority category; (3) tools used to identify and prioritize risks; (4) identified risks that were added to the risk register, their rank, and any tools used to rank them; (5) identified risks that were not added to the risk register and why they were not included. Any contents that are unchanged from one entry to the next should be directly referenced in the new entry by the date of the original entry.

Risk Management Documents

Table 8-2 is a copy of our project team's risk register at the completion of the project. This document details all of the risks we identified while working on our project, what might trigger them, their root cause, potential responses, and the groups or individuals who are responsible for monitoring them. Each risk is ranked based on criteria described in the Risk Management Plan. We moved risks to the bottom of the ranking as they were resolved.

Risk Number	Rank	Risk Score	Risk	Description	Category	Root Cause	Triggers	Potential Responses	Risk Owner(s)	Probability (out of 10)	Impact (out of 10)	Status
18	1	5.8	COVID-19	COVID-19 is a deadly virus: if a stakeholder is infected, that could significantly delay the project, or worse.	Environmental	Viral mutation	A stakeholder tests positive for COVID19.	Avoid exposure to the virus as much as possible: take precautions during everyday life like wearing a mask in public, maintaining a distance of 6-15 feet from others when	All stakeholders	5	8	Ongoing
21	2	5.0	Cloud server downtime	Servers that are hosting the web application and database are subject to downtime that is either	Business	Heroku availability and reliability issues	Denial of service attack, configuration issues, regulatory changes.	Seek incident remediation.	Sil and Jackie Nguyen	1	10	Ongoing

				planned or unplanned. Unplanned								
9	3	5.0	Competition	Lumico could find it very difficult to find a foothold in the market due to intense competition.	Business	Low budget and lack of discoverability	The competition starves Lumico of the necessary amount of business to continue operations.	Lumico could keep a lean selection of highly curated products to target niche markets that are willing to go out of their way to find what they want.	Lumico's owners, Sil and Jackie Nguyen	5	5	Ongoing
15	4	4.8	Suppliers	Lumico could have difficulty acquiring goods to sell.	Business	Lack of supplier networking	One of Lumico's suppliers goes out of business or will no longer supply goods.	Increase the size of Lumico's product catalog, and the number of suppliers Lumico works with.	Sil and Jackie Nguyen	4	8	Ongoing
11	5	4.5	Transitioning to New Platform	Lumico staff will need to learn the new system.	Business	Introduction of new system	First release of the new system.	Use feedback from Lumico while designing the system so that their staff will be familiar with the system when it is deployed.	All stakeholders	6	2	Ongoing
10	6	4.3	Discoverability	Customers might find it difficult to find Lumico.	Business	Lack of marketing	Lumico experiences a very small amount of business for an extended period.	Improve search engine optimization and use a variety of advertising initiatives.	Sil and Jackie Nguyen	5	5	Ongoing
17	7	3.0	Hurricane	The Atlantic hurricane season is June 1st to November 30th. Hurricanes can cause massive damage and interruptions.	Environmental	Seasonal patterns	A hurricane is set to hit a location where a stakeholder resides.	Establish network and power redundancies that will allow continued operations in the event of equipment failure.	All stakeholders	1	10	Ongoing
22	8	2.8	Cloud hosting expenses	Expanding options such as storage space too quickly can lead to higher costs to Lumico if done before they are needed.	Business	Increasing resource requirements	Required resources become greater than available resources. For example, the required bandwidth may become greater than the allotted amount.	Keep a close eye on resource requirements and plan to increase capacity in the future.	All stakeholders	6	4	Ongoing
12	9	2.3	Software Requirements	The web development team must be sure that all of the APIs we use support our application standards, for example JSON schema draft 7.	Systems development	Evolving standards	Changing the technology used to fulfill project deliverable requirements.	Maintain a list of standards that we can reference to ensure new technologies meet our requirements.	Musab Hamid, Tyler Nullmeier, and Victoria Kasirovaite	4	8	Resolved
6	10	7.8	Implementation Planning	The project could run into problems later due to factors that were overlooked in implementation planning.	Systems development	Poor implementation planning	The proposed system could fail to meet even the most basic requirements.	Everyone on the team brainstorms issues that could occur due to our planned implementation.	Musab Hamid, Tyler Nullmeier, and Victoria Kasirovaite	5	10	Resolved
14	11	5.8	Data Specifications	If data specifications are not followed, this could cause significant rework and many defects.	Systems development	Data specifications are inadequate or ignored	Invalid data being stored in the database.	Ensure that a detailed data dictionary is defined early.	Musab Hamid and Tyler Nullmeier	5	8	Resolved
20	12	5.8	A team member drops the class	In the event that a team member cannot complete the class, they may drop the class and leave a gap in our project team.	Institutional	Something interfering in the team member's ability to continue the class	A team member drops the class for any reason.	Share project information within the team effectively so that everyone has the knowledge they need to contribute to any part of the project if needed.	All project team members	3	6	Resolved
5	13	5.5	Communications Management	The project approach could become inconsistent if communication is poor.	Project Planning	Poor communication among team members	Two team members could produce duplicated or contradictory deliverables.	Team members are assigned deliverables they are responsible for and constantly communicate their progress and approaches.	All project team members	2	5	Resolved
16	14	5.3	Resource Management	We only have a few people assigned to web development. If one becomes incapacitated for any reason, it could be bad.	Project Planning	Minimal allocation of human resources	Web developer becomes incapacitated.	Include other members of the team in web development discussions so that they have the knowledge they need to contribute if needed.	Musab Hamid, Tyler Nullmeier, and Victoria Kasirovaite	3	8	Resolved
19	15	5.3	MongoDB denial	While our project team did its best early in the semester to ensure that MongoDB was acceptable, our ability to use this database engine has been called into question.	Institutional	Changes to organizational standards	The team is informed by the organization they are part of that the MongoDB is not acceptable for this project.	Plan for a relational implementation in parallel to the MongoDB implementation.	All project team members	2	7	Resolved

13	16	5.0	Emerging Technology	There is uncertainty involved in using emerging technology.	Systems development	Lack of historic trials	One of the new technologies used on the project ceases to exist.	Only use software distributions that have a proven record.	Musab Hamid, Tyler Nullmeier, and Victoria Kasirovaite	2	6	Resolved
1	17	4.8	Scope Management	The scope of the project may be too great.	Project Planning	Poor scope planning	Requirements become too much for the team to bear.	Use a phased approach to project execution where lower priority requirements are added only after higher priority items are completed.	All project team members	5	8	Resolved
7	18	4.5	Information Security	Data breaches could leak sensitive information.	Systems development	Poor information security practices	An unintended way to gain access to the system.	The project team is outsourcing vital platforms where security is a concern to highly secure platform providers.	Musab Hamid and Tyler Nullmeier	1	8	Resolved
8	19	4.3	Stakeholder Management	The project could fail to meet expectations due to poor stakeholder communication.	Project Planning	Poor stakeholder management	Project fails to meet stakeholder expectations.	Take stakeholder communication seriously and constantly reach out to the stakeholder for feedback.	All project team members	3	7	Resolved
2	20	3.8	Schedule Management	The project schedule may be inefficient.	Project Planning	Poor schedule planning	Project deliverables experience dependency violations or schedule overruns.	Maintain good communication among team members so scheduling issues will be discovered and resolved in a timely manner.	All project team members	4	3	Resolved
4	21	2.8	Deliverable acceptance	The final web platform could contain defects or fail to meet expectations.	Project Planning	Poor quality and testing procedures	Lumico's owners and customers experience bugs, or functions that do not meet their expectations.	Maintain good communication with the stakeholder and test the websites for defects or poor design throughout development.	Musab Hamid, Tyler Nullmeier, and Victoria Kasirovaite	1	4	Resolved
3	22	2.0	Budget Management	The project budget could constrain the team's response to the stakeholder's needs or constrain the stakeholder's ability to improve.	Project Planning	Poor budget planning	The project team or the product owner surpasses the 210 MB maximum allowed for MongoDB Atlas or requires features that the server host does not provide.	Maintain a contingency plan for migrating to another server hosting provider. Establish and maintain processes for managing MongoDB data for size efficiency.	All project team members and product owner.	2	3	Resolved

Table 8-2: Risk Register

Risk Report

Appendix II contains our project team's unabridged risk report. As described in the Risk Management Plan, the full risk report contains journal entries for each risk review. The following section is a summary of the overall risk report that pulls all of the journal entries together to describe the risks that impact our project team the most.

High Priority Risk Category

The top two risks identified during our project pertained to the System Development category. This is made evident by Table 8-2 which shows the top-ten highest ranked risks before our project was completed, and Figure 8-2 which ranks risks visually. While we have very competent web developers on our team, during the benchmarking portion of our risk review we recognized that most of the systems development projects we analyzed contained at least one defect. Additionally, our team members that had expert experience in this field explained that it was very likely that we would overlook certain requirements for our project if we were not careful. Furthermore, they told us that these mistakes would be very time intensive to fix if we did not catch them early. We adjusted the probability, impact, detectability, and proximity of Systems Development risks accordingly.

Contingency Plans for Highest Priority Risk Category

Below is the work breakdown structure (WBS) for our fallback plan if our planned server host does not meet our requirements. In such a case, we will move our operation to a virtual private server (VPS) host. We will update this WBS with more details over time. Regardless, the WBS

makes one thing clear: most of the work of transition is related to installation and configuration of software.

Many of these tasks are self-explanatory; however, some merit a little more elaboration. Task 4.d. will allow our project team to take advantage of pluggable authentication module's (PAM) two factor authentication (2FA) support to improve secure shell (SSH) security. This task will require our web developers to modify several configuration files to setup Google 2FA for each user. Once a user is configured, the user will receive a Quick Response (QR) code that they can scan with Google Authenticator. After scanning the code, the Google Authenticator application will automatically create a one-time password generator that the user can use when logging into our server with SSH.

We estimate that this fallback response will take our three web developers 25-40 hours to complete. Additionally, most VPS hosts cost around five to fifteen dollars per month. Consequently, a contingency budget of $2,500 should be allotted in case this fallback plan is necessary.

Secondary risks associated with the fallback plan are essentially the same as risks we identified for the System Development category. Risks associated with information security practices, however, will have an increased probability of occurrence because our team would become fully responsible for information security.

System Development Fallback Plan

1. Secure a hosting platform
    a. Pick a hosting platform
        i. Gather a list of options

ii. Perform cost-benefit analysis
iii. Subscribe to the platform

2. Install OS
    a. Pick operating system
        i. Review requirements
        ii. Assess software availability
    b. Configure users
        i. Determine which users are required
        ii. Create required users
    c. Configure automatic updates
        i. Review documentation for the package manager
        ii. Use built-in automation or syscron
3. Setup domain
    a. Buy domain
        i. Ensure that we need to buy a domain
        ii. Gather a list of options
        iii. Perform cost-benefit analysis
    b. Configure domain records
        i. Ensure domain visibility
        ii. Setup any required subdomains
4. Install and configure security software
    a. Install Fail2ban
        i. Use package manager or compile from source
        ii. Configure filter lists
    b. Configure firewall software
        i. Block all ports

ii. Open only the ports we will use

c. Setup IP whitelisting/blacklisting on hosting platform
   i. Determine allowed IP ranges
   ii. Block disallowed IP ranges
   iii. Configure a whitelist for SSH connections

d. Harden SSH with Google Authentication 2FA PAM module
   i. Review the PAM module documentation
   ii. Configure 2FA for all project team members

5. Install web server
   a. Configure virtual host
      i. Setup reverse proxy to application servers
   b. Setup letsencrypt.org TLS certificate management
      i. Ensure that Certbot will automatically renew certificates
6. Install database
   a. Configure database users
      i. Determine which users are required
      ii. Create required users
   b. Add data structures
      i. Review data specifications
      ii. Create data structures in database
7. Migrate what we have developed so far to the new server
   a. Migrate software
      i. Clone git repos
      ii. Ensure that all required files are correctly located
   b. Install dependencies
      i. Install system software with the OS package manager

ii. Use Node Package Manager to install node packages

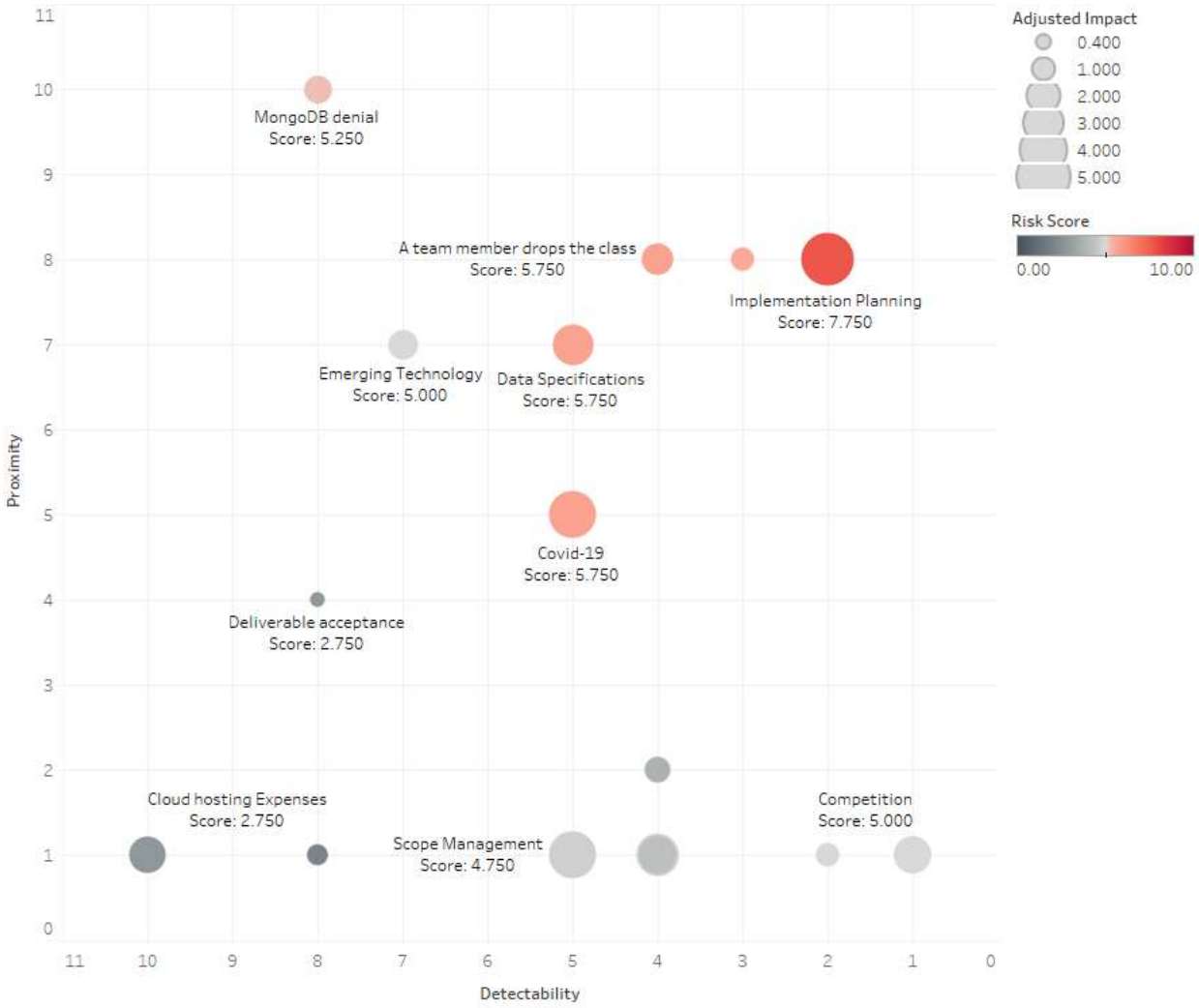
Identified Risks Added to the Risk Register

To identify risks, first we gathered risks and categorized them in a risk breakdown structure. The resulting risk breakdown structure can be seen in Figure 8-2. Following the development of the risk breakdown structure, we created the bubble chart seen in Figure 8-3 to prioritize risks based on the criteria in the Risk Management Plan. Once the risks were prioritized, we created Table 8-3: a list of the top-ten highest ranked risks.

Risk Breakdown Structure

Figure 8-2: Lumico Risk Breakdown Structure

Bubble Chart (Ranking of Risks)



Detectability vs. Proximity. Color shows Risk Score. Size shows Adjusted Impact. The marks are labeled by Risk and Risk Score. Details are shown for Risk Number.

Figure 8-3: Bubble Chart of Risks

Risk Number	Probability	Impact	Detectability	Proximity	Adjusted Impact	Risk	Rank
1	5	8	5	1	4	Scope Management	5.25
2	4	3	4	2	1.2	Schedule Management	6.25
3	2	3	8	1	0.6	Budget Management	8
4	1	4	8	4	0.4	Deliverable acceptance	7.25
5	2	5	3	8	1	Communications Management	4.5
6	5	10	2	8	5	Implementation Planning	2.25
7	1	8	2	1	0.8	Information Security	5.5
8	3	7	4	1	2.1	Stakeholder Management	5.75
9	5	5	1	1	2.5	Competition	5
10	5	5	4	1	2.5	Discoverability	5.75
11	6	5	4	1	3	Transitioning to New Platform	5.5
12	4	2	8	1	0.8	Software Requirements	7.75
13	2	8	7	7	1.6	Emerging Technology	5

14	5	6	5	7	3	Data Specifications	4.25
15	4	8	4	1	3.2	Suppliers	5.25
16	3	8	1	1	2.4	Resource Management	4.75
17	1	10	10	1	1	Hurricane	7
18	5	8	5	5	4	Covid-19	4.25
19	2	7	8	10	1.4	MongoDB denial	4.75
20	3	6	4	8	1.8	A team member drops the class	4.25
21	1	10	2	1	1	Cloud server downtime	5
22	6	4	10	1	2.4	Cloud hosting expenses	7.25

Table 8-3: Tabulated view of the data displayed in Figure 8-2

List of Top-ten Risks

Risk	Rank This Week	Rank Last Week	Number of Weeks in Top Ten	Risk Resolution Progress	Potential Responses
Implementation Planning	1	1	6	Detailed plans are being formed.	Everyone on the team brainstorms issues that could occur due to our planned implementation.
Data Specifications	2	2	6	The data dictionary has been defined and will be updated as needed.	Ensure that a detailed data dictionary is defined early.
Covid-19	3	3	5	All team members have undergone training to help them prevent the spread of Covid-19.	Avoid exposure to the virus as much as possible: take precautions during everyday life like wearing a mask in public, maintaining a distance of 6-15 feet from others when possible, washing hands thoroughly, and observing recommendations made by health experts.
Communications Management	4	5	6	The team will increase communication frequency with more meetings and status reports.	Team members are assigned deliverables they are responsible for and constantly communicate their progress and approaches.
Cloud Server Downtime	5	6	3	The service level agreement was reviewed to find that Amazon Web Services claims 99.99% uptime with incident remediation.	Seek incident remediation.

Resource Management	6	7	6	More team members are being included in the development process.	Include other members of the team in web development discussions so that they have the knowledge they need to contribute if needed.
Cloud Hosting Expenses	7	8	3	Capacity planning considerations will be included in the technical manual.	Keep a close eye on resource requirements and plan to increase capacity in the future.
Competition	8	9	6	Lumico's management is looking into search engine optimization strategies and targeted advertising.	Lumico could keep a lean selection of highly curated products to target niche markets that are willing to go out of their way to find what they want.
Emerging Technology	9	10	6	Stable technologies have been selected.	Only use software distributions that have a proven record.
Scope Management	10	0	0	The most important scope items have been completed, lower priorities items will be added as time allows.	Use a phased approach to project execution where lower priority requirements are added only after higher priority items are completed.

Table 8-4: Top-ten risks impacting the project team

Project Quality Management Plan

Quality Objectives

The scope of our project with Lumico includes a web-based apparel store front and a web-based administrative interface. Both of these interfaces will be developed with the same tools: Node, React, Tachyons, Express, and MongoDB. The testing team is responsible for testing both interfaces and ensuring that scope objectives are met, and risks related to development are monitored adequately. The test team includes various members from Clutch City Tech Solutions and users from Lumico. Aspects of the project's scope that will fall under the scrutiny of testing include user interface and user experience, CRUD functionality, data integrity, and security.

Quality Metrics

Two quality metrics exist for this project. There will be a code audit each week. This process measures the amount of new application code that is in line with project scope and requirements, serves as a checklist for automated testing implementation, and documents all of the application's major interfaces. If a large amount of application code is out of line, this should trigger a review of the implementation planning or data specification risk triggers to determine if these risks have been triggered. The second quality metric measures the amount of application code that is working correctly.

Our project will use automated testing to generate a score card for the application each week. This scorecard will help the developers ensure that any changes they make do not break other parts of the application. If fewer than 90% of the tests are passing, this should trigger a review of

the implementation planning or data specification risk triggers to determine if these risks were triggered.

Training Requirements

One of our team members studied instructional design in the past and developed an approach to instruction for a website very similar to this one. The approach they used to develop training included steps resembling the analysis, design, development, implementation, and evaluation (ADDIE) model. The first step is to identify if there is a problem that can be solved with training. This is something that CCT Solutions will do as application testing commences. The second step, if training would prove useful, is to identify the root causes of the problems with Pareto analysis. Given the root causes, we will perform context and learner analysis to help us identify the general characteristics of the learners such as their age, gender, and education level so that the training can be tailored to their needs. Following this, we will perform procedural analysis, a technique used to identify the steps involved in completing a task. Then we will sequence our instruction, develop videos and documentation about every problem identified, and implement guided design to walk employees through the training.

Technologies for Testing

We will use Mocha, a node library, for unit testing and data integrity testing. Mocha scripts must be placed in the test folder in the root of the project and named module_name.test.js where module_name is the name of the module being tested. To test the web application programming interface (API), we will create a node script that uses the node library Axios to perform API requests. We will also try to perform invalid actions to test validation and security. All test data

should be written to a unique database named LumicoTestDB. These tests should not run on the production database because they will delete large amounts of data. We recommend downloading MongoDB at https://www.mongodb.com/try and running these tests on your local computer. You will also need to add MONGO_TEST_URI to your .env file. This variable should equal the URI of the MongoDB instance you are using. For example, MONGO_TEST_URI=mongodb://localhost:27017/LumicoDBTest.

Testing and Monitoring Methodology

The testing methodology we tailored to this project includes five phases. Testing should be performed on a weekly basis as program updates occur. Each phase of testing should be repeated every time testing is performed. The first phase is discovery.

During the discovery phase, testers should perform a code audit to identify new API endpoints, methods, and classes. After identifying new items, the testing team should work with the developers to expand upon the documentation attached to each item. This step should help ensure that everyone knows how each item functions and what each item is intended to do. After expanding documentation, testers should review the project scope and project requirements documentation. If any items are outside of scope, this should be documented and communicated to the developers and project manager before any further testing occurs. Users at Lumico should then be allowed to give feedback about how well each item that was within scope meets scope requirements. Their feedback should be documented in detail. After the discovery phase, unit testing can begin to test each individual component of the program.

Unit testing should begin with the creation of assertion-based Mocha scripts on the express server. These scripts should use the server's internal methods to create, read, update, and delete

data. Once developed, these tests are fully automated and can be launched with the npm test command. After unit testing, we should preform integration testing to ensure that each component works together properly.

To test integration, we must be able to test how the web API interacts with external inputs. We will use Axios to insert, update, and delete test data of each type through our project's web API. The test data should include both valid and invalid entries for each entity and each operation. After the test data is added or updated, Mocha scripts can be leveraged to test data integrity using our project's data schema. If any invalid data was present, this should be documented. Mocha scripts should also be used after deleting the data to ensure that it was deleted successfully. After integration testing, we will perform system testing to test the user experience and security.

System testing should take place in the web browser to better reflect how users interact with the system. Each type of user interaction should be tested to ensure that users can only alter data they are intended to. To aid in this step, testers might want to consider using the TamperMonkey browser addon to automate common tasks. User acceptance testing should follow system testing.

User acceptance testing is supposed to give users the ability to provide feedback on the best results we have available to them at the time. Consequently, there should be no obvious bugs identified in this phase. Any bugs that are uncovered in this phase should be examined further to identify flaws in the testing process. Ultimately, the goal of this phase is to obtain user feedback regarding fitness for use.

Test Phase	Deliverable
Discovery	
	Code Audit Report
	Technical Manual Updates
	User Feedback
Unit Testing	
	Mocha Test Results
Integration Testing	
	Mocha Test Results
System Testing	
	Error Report
User Acceptance	
	User Feedback
	Error Report

Table 9-1: Testing Deliverables classified by testing phase

Testing Documentation Formats

Code Audit Report

A code audit report should be an Excel spreadsheet that lists each item that will be tested in each module. The module's path from the root of the project directory should also be identified. Items that are eligible for automated testing with Mocha and the status of each test's implementation—Forthcoming, Working, or Work in Progress—should also be identified in this report. As the documentation is updated, the technical manual should also be updated. Appendix IV and Appendix V of the technical manual contain the code audit report.

User Feedback

User feedback should be documented in an informal format. At a minimum, however, user feedback needs to be documented with the date, the person who gave the feedback, and the context of the feedback.

Mocha Test Results

The results of automated testing can be obtained by redirecting the output of the npm test command to a text file. The test data used when conducting the tests should also be included in the Mocha test results.

Error Report

The error report is intended to identify issues that did not occur during automated testing. Each entry should include all the information necessary to recreate the error. This includes the webpage the error occurred on, the status of the error, the priority of the error (based on how many areas of the website it impacts and how it will be to fix), preconditions that must be met to recreate the error, any other comments that might be useful, and a description of the error. Appendix VI of the technical manual contains the error report.

Mocha Test Results

The following are our latest Mocha test results. A green checkmark next to the test means it was passing. A red number next to a test, however, means it was failing. 95% of the tests passed during the last test run. The tests were separated into two major categories: MongoDB and Lumico API. MongoDB tests tested the Mongoose models. Lumico API tests tested the web API.

```
MongoDB
    User CRUD
        delete users
            √ delete all users
        insert users
            √ should not add user #1
            1) should not add user #2
            √ should add user #3 (111ms)
        find users
            √ test #1 should find user(s)
    Product CRUD
        delete products
            √ delete all products
        insert products
            √ should not add product #1
            √ should add product #2
            2) should not add product #3
        find products
            √ test #1 should find product(s)
    Order CRUD
        delete orders
            √ delete all orders
        insert orders
            √ should not add order #1
            √ should add order #2
        find orders
            √ test #1 should find order(s)
            √ test #2 should find order(s)
```

Lumico API
- Products
  - √ get all products
- Users
  - register user
    - √ should not add user #1
    - √ should add user #2
    - √ should add user #3
  - login user
    - √ should not login user #1
    - √ should login user #2 (106ms)
    - √ should login user #3 (105ms)
  - get user profile
    - √ should not get user profile #1
    - √ should get user profile #2 (99ms)
    - √ should get user profile #3 (100ms)
- Orders
  - Creates a new order
    - √ should not place order #1 as user #1
    - √ should not place order #2 as user #1
    - √ should not place order #1 as user #2 (102ms)
    - √ should place order #2 as user #2 (105ms)
    - √ should not place order #1 as user #3 (103ms)
    - √ should place order #2 as user #3 (102ms)
  - Get a user's orders
    - √ should not get orders for user #1
    - √ should get orders for user #2 (104ms)
    - √ should get orders for user #3 (104ms)
  - Updates an order to set its status to paid
    - √ should not pay orders for user #1
    - √ should pay orders for user #2 (173ms)
    - √ should pay orders for user #3 (178ms)
  - Admin order handling
    - √ get all orders (113ms)
    - √ deliver all orders (118ms)

37 passing (2s)
2 failing

Failed Tests

1) MongoDB
    User CRUD
        insert users
            should not add user #2:
        Error: User should not have been added to collection.
            Reason: Invalid email address

2) MongoDB
    Product CRUD
        insert products
            should not add product #3:
        Error: Product should not have been added to collection.
            Reason: Invalid countInStock

The second insert user test failed because the user's email address was invalid, but the user was added to the database anyway. The third insert products test failed because the product had an invalid countInStock. These errors are not a problem, however, because there is validation that catches these invalid values before they get to the server. In the future, it might be a good idea to put the validation closer to that database, though. For a full listing of the test data used for the tests, see the technical manual.

Project Procurement Plan

The figure below is from the PMBOK guide and it represents the general overview of the Project Procurement Plan. As shown, specific inputs, tools and techniques, and outputs are listed for this knowledge area.

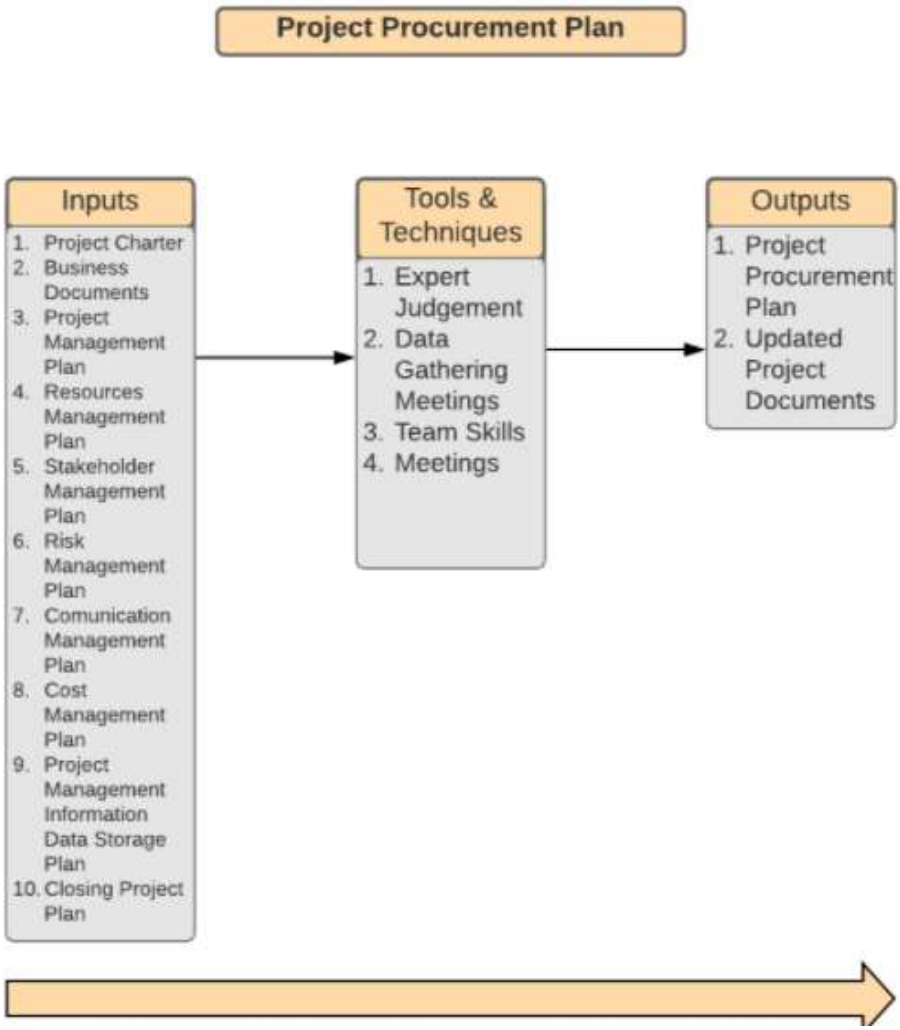


Figure 10-1: Project Procurement Plan Overview, PMBOK Guide Pg. 460

Project Management Information Data Storage Plan

Below are links of the SharePoint folders that CCT Solutions used in order keep everything stored in an organized manner.

- Application Documents
- Application Testing
- Database
- Documentation
- Meeting Minutes
- MS Project
- PEP Feedback
- Presentation PowerPoint
- Weekly Status Reports

Closing Project Plan

Executive Summary

Exceptional people desire exceptional solutions to their problems. Our team at Clutch City Tech Solutions set out with the belief that we were up to the challenge of supplying Lumico with the solution they required. Their desire was to have an online store front and administrative interface. As we close the project, we would like to summarize how the technologies that we have selected met the business needs of Lumico.

Lumico desired a fast, attractive, and mobile-friendly web interface for customers, employees, and administrators. React is a JavaScript framework that allowed our project team to quickly create an intuitive and robust web interface. React, and the style framework Tachyons, helped our team address the requirements for the web interface. Robust storage was another requirement established by Lumico.

Our team worked with Lumico to move their data to the robust document-based provided by MongoDB. Going forward, this database environment will allow Lumico to monitor all manner of statistics regarding their business and become a competitive online vendor. Upon presenting the finished webstore to Lumico management, both parties agreed that CCT Solutions met project requirements regarding employee, customer, inventory, and order management.

Lessons Learned

Tyler Nullmeier

For the **Risk Management Plan**, the risk scoring and risk ranking formulas helped us quickly create a roughly prioritized list of project risks. These formulas also made it very easy to plot all project risks on bubble charts because they quantified risk numerically. Additionally, the risk breakdown structure worked well for categorizing risks. This categorization helped determine what type of knowledge was relevant to each risk. Granted, using a journal format for the risk report was needlessly verbose and created extraneous work. It would have worked better to have all the information we wanted to include in the risk report on the first page of the document. To maintain the archival aspect of the journal format, we could have recorded dated entries detailing only the changes made to the document after each risk review.

For the **Quality Management Plan**, the document formats used for recording errors and application interfaces worked well. It was easy to sort errors by priorities, status, and type. Each entry also included enough information to communicate the location affected by the error and the conditions leading to it. We also utilized automated testing for quality management. Unfortunately, while these tests were good in theory, most errors were found after the automated testing phase. Consequently, we could have utilized automated tests more effectively. We should have created these tests earlier in the application's development so that the feedback they provide would have been available earlier in development.

Daniel Howard

What I learned the most about was the **Project Time Management** knowledge area. The ability to properly plan your project during the planning phase can help your project stay on task from the beginning to end. Using tools such as the Work Breakdown Schedule can help you estimate the duration of tasks for the project and develop a schedule for these tasks. This allows the project manager to control the schedule of tasks in order to meet deadlines. We decided against implementing Scrum and instead used a predictive approach. The scope of the project lacked the complexity and length when compared to other web applications that have been developed. Implementing Scrum after we the schedule was already created would've more than likely slowed down our project and caused confusion. We were still able to remain agile in order to quickly implement features and fix issues that arose while still meeting our deadlines and producing a quality product.

Shreena Patel

This project has taught me a lot of thing such as **Project Communication Management** and **Project Schedule Management**. Our team had wonderful communication throughout the entire semester for the most part. A project as important as this one could prove to be very difficult if there are teammates and stakeholders who do not cooperate and communicate well with each other. Having documentation such as the WBS, and Gantt chart, kept everyone accountable of the time and quality of their work for the project.

Musab Hamid

One of the main important factors in ensuring a successful project outcome was making sure that our stakeholders were kept in contact with and that our stakeholders were kept happy. This mostly refers to the **Project Stakeholder Management** knowledge area. The client was kept in contact with and was shown the application in progress on a weekly basis. This ensured that any features and changes that the client did not approve of were immediately altered and that the finished product was tailored to the client's need. This in turn also helped the development team focus on specific areas and functionality that were of utmost importance to the clients' needs.

Nikheel Asodia

The importance of technology and communications could not be more highlighted than it is during these times. I learnt that **Project Communication Management** was one of the most important factors that led to a timely and successful completion of this project. For instance, deliverables such as project team organization and communication planning were paramount to the cohesion of the team’s work.

Dhruv Patel

One of the most important parts I have learned from this project is **Project Communication Management**. Communication plays an important role if the project will be successful or not. In our project, we made sure that we communicated openly so that each person has an idea of what needs to be completed. We communicated with our team if we needed any more assistance for any task. There were times where I felt that we didn’t reach any conclusion on things, but we

overcame the difficulties by communicating and understand each person's point. Clear communication of our team reduced the amount of stress for the project.

Viktorija Kasirovaite

Through the duration of the project, I experienced the concept of the triple threat constraint (time, cost, scope) in action. Specifically, the importance of solidifying and clarifying a scope early on in a project for clear communication with all stakeholders. This is also a crucial point for team members to understand as well, so everyone's efforts are towards the same end goals and there are no discrepancies in understanding the overall scope and things that need to be done. Scope creep is a very real threat for all projects, whether it be academic or in the professional setting, and managing scope and that all deliverables are in accordance with the defined scope will ensure that all involved will be satisfied with project completion. While we did not necessarily have a need for managing a real "cost" factor due to our client's generous UH discount, the direct correlation between managing defined scope and the project time that was allotted is an overarching factor that determined our project's success.

Approval

This document has been approved as the official Business Requirements Document for the

CCT Solutions Project Management project and accurately reflects the current understanding of all business requirements.

Following approval of this document, requirements changes will be governed by the project's change management process, including impact analysis and appropriate reviews and approvals, under the general control of the Project Plan and according to Professor Gibbs policy. As the official elaboration of project requirements, this document, once signed, will not be revised. Approval Change Request Documents, if present, will be attached to the Business Requirements Document as updates.

Prepared by:

___Shreena Patel_____ _____November 24, 2020_____
Business Analyst Date

Approved by:

___Sil Nguyen, Jackie Nguyen____ ____November 24, 2020_____
Client Acceptor Date

___Daniel Howard_____ ____November 24, 2020_____
Project Manager Date

Reviewed by

_____ _____
Professor Gibbs Date

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Appendix

Appendix I: Meeting Minutes

September 16, 2020

Topic: Project Progress and Strategy

Opening
The regular meeting of CCT Solutions was called to order at 9:00 PM on September 16, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer
Musab Hamid, GUI Developer and Testing
Tyler Nullmeier, GUI Developer and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Project charter: The project charter was ready to be verified by our analysts, Shreena and Dhruv. Daniel Howard also mentioned the team needs a confirmation from the professor on how he wants the project charter to be delivered.
Application Demo feedback: The application was demonstrated by Howard to the client. The client was very satisfied with the user interface and suggested some changes they would like to see.

ERD Strategy: Tyler explained the approach he plans to use for the project's ERD diagram. There may be some changes made as the application development progresses.
Company Logo: Company logo was assigned to Viktoria. The logo was set to be ready by end of the week.
Documentation Assignment: The strategy of assigning documents within the team was discussed in length and finalized.
Application Progress: Musab provided an update of the application progress. Daniel also relayed the information to he got from the clients to Musab. Musab will integrate those changes in the coming weeks.
Assistant Project Manager Appointment: Daniel announced that Nikheel Asodia will be the assistant project manager. He also declared his duties and expectations for this role.
Version Control: The development team decided to use GitHub as the control version system for this project. Musab stated that he will share the project code with Viktoria and Tyler by the end of the day.
Project Presentation Strategy: Daniel led the discussion on how to work on the final project presentation. The strategy was finalized by the team and deadlines for the presentation preparations were set.
Meeting Time Error: Daniel had addressed the error of Zoom meeting, which showed different times for the members.

Adjournment
The meeting was adjourned by Daniel Howard at 10:15 PM. The next meeting will be held on 09/23/2020 at 8:00PM on Zoom.
Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

September 23, 2020

Topic: Application Progress and Document Updates

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on September 23, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
WBS Strategy: Daniel proposed the team to get started on the WBS and set a deadline for the document.
Application Update: Musab update the team with the application progress. The administrator portal was close to completion.
Product Clarity: Howard clarified the range of products the company has to offer as it has to be integrated to the application.
Payment Strategy: Musab, Howard, and Tyler discussed the API and structure to be used for the payment method of the application.
Application Mock-up: Viktoria updated the team with the mock-up progress. She mentioned that the mock-up of the application should be ready by next week.
Schedule Development: Howard updated the team with his progress on schedule development. He mentioned that the metrics for work-time accountability would be in hours and not in days.
First batch deadline: Howard announced a deadline of 09/28/2020, to complete the first batch of documents.

Adjournment
The meeting was adjourned by Daniel Howard at 08:40 PM. The next meeting will be held on 09/30/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia

Minutes Approved by: Shreena Patel

September 30, 2020

Topic: Application progress and Document updates

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on September 30, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Information redundancies: Dhruv, Daniel, and Shreena asked for more clarification on few documents such as sponsor history and organization history, as the information seem redundant.
Data Integration: Daniel also announced the deadline date for the data integration of this project.
Application update: Musab updated the team with his progress on the application. He also approved to start data integration, which will be led by Tyler.
Next Milestone: Daniel announced the deadline dates for the next set of documents.

Adjournment
The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 10/07/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

October 07, 2020

Topic: Application progress and Document updates

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on October 07, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Mongo DB or SQL: The professor was yet to announce if we can use Mongo database or not, as a result, Musab and Tyler lead the discussion to adapt to both situations.
ERD Update: Tyler updated the team of his progress with the ERD and normalized ERD.
Test Information: The team decided to prioritize the final exam, then move on with the project.
Risk Management: Tyler provided an update with the risk management document and discussed the inclusion of Covid-19 and critical weather conditions.
Application Design: Musab, Tyler, and Viktoria led the team discussion on their approach to add new features to the application and application design.

Adjournment

The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 10/15/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

October 15, 2020

Topic: Application progress and Project Execution Plan Verification

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on October 15, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Project Execution Plan Verification: Dhruv shared the information he received upon his meeting with the Thomas Gibbs concerning deliverable clarity.
Deliverables Update: All members of the team provided an update on their deliverable status and expected completion date.
Elevator Speech: Daniel discussed about his approach on the elevator speech.
Application Update: Musab and Tyler provided an update on the application development and discussed their concerns.

Adjournment
The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 10/18/2020 at 8:00PM on Zoom.
Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

October 18, 2020

Topic: Application progress and Project Execution Plan Verification

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on October 18, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Database Change: Musab and Tyler discussed their decision to move from Mongo DB to SQL due to the demands of the project.
Resource Re-allocation: financial part of the documentation was re-assigned to Daniel.
Application Testing: Daniel discussed the deadline to commend the first round of testing.
Application and Documentation Deadline: The Team discussed on hard deadline to have both the application and documentation ready.

Adjournment
The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 10/21/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

October 21, 2020

Topic: Application progress and Project Execution Plan Verification

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on October 21, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Application Development: Musab and Daniel led the discussion on a minor change in approach of the application development.
Status Report: Daniel announced on who would take care of the status reports.

Adjournment
The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 10/28/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

October 28, 2020

Topic: Application progress and Project Execution Plan Verification

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on October 28, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Application Development: Daniel relayed the feedback he got from Thomas Gibbs concerning our development team's change of direction.
Application Update: Musab demonstrated the application to the team. He also provided the updated status of the application.
Project Execution Plan Feedback: The team discussed about the uncertainty about the PEP feedback timeline.

Adjournment
The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 11/04/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

November 04, 2020

Topic: Application progress

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on November 04, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Application Development Update: After the meeting with Thomas Gibbs, the developing team was discussing on how to integrate the recommendations of the professor.
Application Demonstration: Musab also provided another demonstration of the application.
Application Design: Viktoria discussed with team about the design she was planning to deploy on the application.

Adjournment
The meeting was adjourned by Daniel Howard at 08:30 PM. The next meeting will be held on 11/11/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

November 11, 2020

Topic: Application progress with design and PEP Feedback

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on November 11, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Project Execution Plan (PEP) Feedback: The team discussed the and analyzed the PEP and discussed on how to commence the corrections.

Application Demonstration: Viktoria completed the designing part of the application and demonstrated it to the team.
Deliverable Deadline: The team decided to have all the corrected deliverables by 11/20/2020.

Adjournment
The meeting was adjourned by Daniel Howard at 08:40 PM. The next meeting will be held on 11/18/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

November 18, 2020

Topic: Technical Document Progress and Project Execution Plan Corrections

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on November 18, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Project Execution Plan (PEP) Corrections: The team was discussing their progress about the corrections of the PEP.

Presentation Development: The team discussed on how to approach the development and delivery of the presentation.
Technical Document: Tyler and Musab updated the team on their progress about the technical document.

Adjournment
The meeting was adjourned by Daniel Howard at 08:40 PM. The next meeting will be held on 11/21/2020 at 8:00PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

November 21, 2020

Topic: Presentation Strategy

Opening
The regular meeting of Clutch City Tech Solutions was called to order at 8:00 PM on November 21, 2020, virtually through Zoom conference call.

Present
Daniel Howard, Project Manager
Nikheel Asodia, Assistant Project Manager and Analyst
Viktoria Kasirovaite, GUI Developer and GUI Designer, Testing
Shreena Patel, Business Analyst
Dhruv Patel, Quality Analyst
Musab Hamid, GUI Developer, Designer, and Testing
Tyler Nullmeier, GUI Developer, Designer, and Testing

Approval of Agenda
The agenda was unanimously approved as distributed.

New Agenda
Presentation Delivery: Daniel led the discussion on how the team will deliver the presentation and assigned slides to team members.
Presentation Development: The team discussed on how to approach the development and delivery of the presentation.

Adjournment
The meeting was adjourned by Daniel Howard at 08:40 PM. The next meeting will be held on 11/23/2020 at 9:30PM on Zoom.

Minutes Submitted by: Nikheel Asodia
Minutes Approved by: Shreena Patel

Appendix II: Risk Report

October 03, 2020

High Priority Risk Category

The top two risks identified in the last risk review pertained to the System Development category. This is made evident by Table TAPX-1 which shows the top-ten highest ranked risks. While we have very competent web developers on our team, during the benchmarking portion of our risk review we recognized that most of the systems development projects we analyzed contained at least one defect. Additionally, our team members that had expert experience in this field explained that it was very likely that we would overlook certain requirements for our project if we were not careful. Furthermore, they told us that these mistakes would be very time intensive to fix if we did not catch them early. We adjusted the probability, impact, detectability, and proximity of Systems Development risks accordingly.

Contingency Plans for Highest Priority Risk Category

Below is the work breakdown structure (WBS) for our fallback plan if our planned server host does not meet our requirements. In such a case, we will move our operation to a virtual private server (VPS) host. We will update this WBS with more details over time. Regardless, the WBS makes one thing clear: most of the work of transition is related to installation and configuration of software.

Many of these tasks are self-explanatory; however, some merit further elaboration. Task 4.d. will allow our project team to take advantage of PAM's two factor authentication (2FA) support to improve secure shell (SSH) security. This task will require our web developers to modify several configuration files to setup Google 2FA for each user. Once a user is configured, the user will receive a Quick Response (QR) code that they can scan with Google Authenticator.

After scanning the code, the Google Authenticator application will automatically create a one-time password generator that the user can use when logging into our server with SSH.

We estimate that this fallback response will take our three web developers 25-40 hours to complete. Additionally, most VPS hosts cost around five to fifteen dollars per month. Consequently, a contingency budget of $2,500 should be allotted in case this fallback plan is necessary.

Secondary risks associated with the fallback plan are essentially the same as risks we identified for the System Development category. Risks associated with information security practices, however, will have an increased probability of occurrence because our team would become fully responsible for information security.

System Development Fallback Plan

1. Secure a hosting platform
    a. Pick a hosting platform
        i. Gather a list of options
        ii. Perform cost-benefit analysis
        iii. Subscribe to the platform
2. Install OS
    a. Pick operating system
        i. Review requirements
        ii. Assess software availability
    b. Configure users
        i. Determine which users are required
        ii. Create required users

c. Configure automatic updates
    i. Review documentation for the package manager
    ii. Use built-in automation or syscron

3. Setup domain
    a. Buy domain
        i. Ensure that we need to buy a domain
        ii. Gather a list of options
        iii. Perform cost-benefit analysis
    b. Configure domain records
        i. Ensure domain visibility
        ii. Setup any required subdomains
4. Install and configure security software
    a. Install Fail2ban
        i. Use package manager or compile from source
        ii. Configure filter lists
    b. Configure firewall software
        i. Block all ports
        ii. Open only the ports we will use
    c. Setup IP whitelisting/blacklisting on hosting platform
        i. Determine allowed IP ranges
        ii. Block disallowed IP ranges
        iii. Configure a whitelist for SSH connections
    d. Harden SSH with Google Authentication 2FA PAM module
        i. Review the PAM module documentation
        ii. Configure 2FA for all project team members
5. Install web server

   a. Configure virtual host
      i. Setup reverse proxy to application servers
   b. Setup letsencrypt.org TLS certificate management
      i. Ensure that Certbot will automatically renew certificates
6. Install database
   a. Configure database users
      i. Determine which users are required
      ii. Create required users
   b. Add data structures
      i. Review data specifications
      ii. Create data structures in database
7. Migrate what we have developed so far to the new server
   a. Migrate software
      i. Clone git repos
      ii. Ensure that all required files are correctly located
   b. Install dependencies
      i. Install system software with the OS package manager
      ii. Use proprietary package managers where necessary

Identified Risks Added to the Risk Register

To identify risks, first we gathered risks and categorized them in a risk breakdown structure. The resulting risk breakdown structure can be seen in Figure APX-1ta. After categorizing risks, we removed a few for various reasons detailed in the Identified Risks not added to the Risk Register

section. Following the development of the risk breakdown structure, we created the bubble chart seen in Figure APX-2 to prioritize risks based on the criteria in the Risk Management Plan. Once the risks were prioritized, we created Table TAPX-1 : a list of the top-ten highest ranked risks.

Risk Breakdown Structure

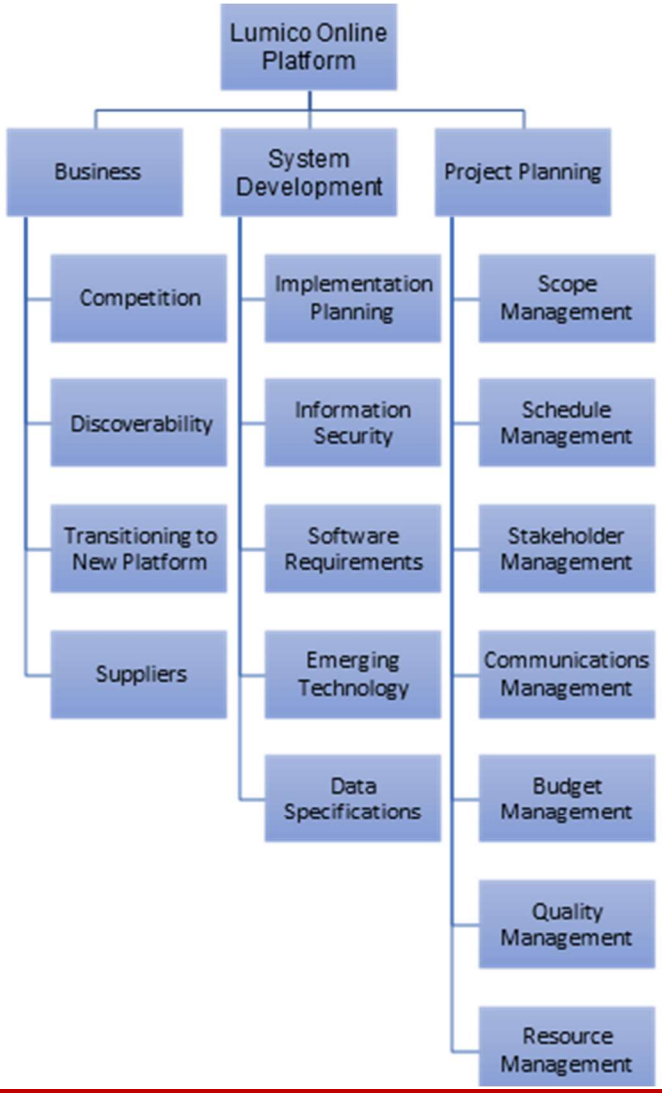


Figure APX-1: Risk Breakdown Structure, 10/3/20

Bubble Chart (Ranking of Risks)

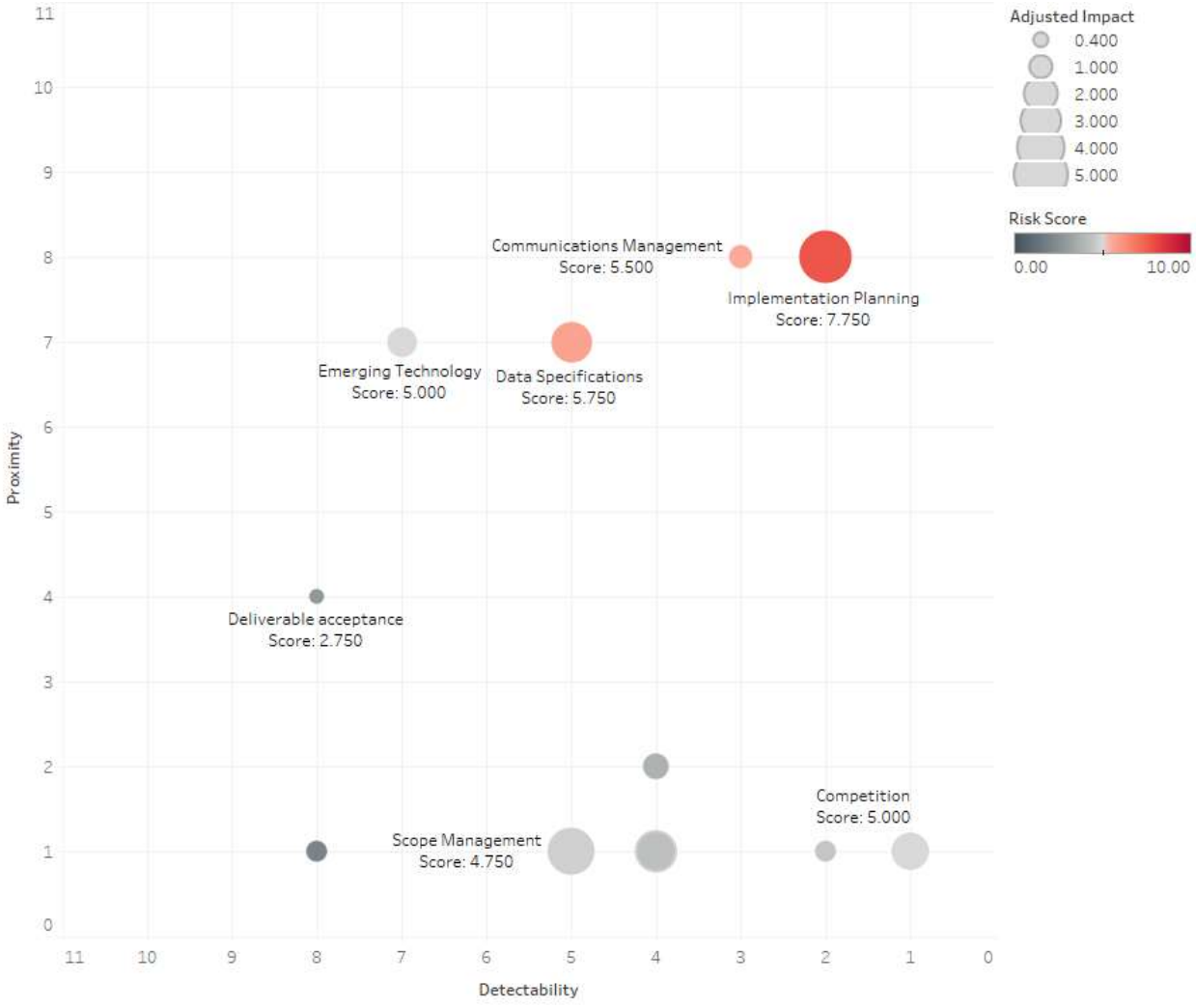


Figure APX-2: Risk Breakdown Plotted on Bubble Chart as of 10/3/20

Risk Number	Probability	Impact	Detectability	Proximity	Adjusted Impact	Risk	Rank
1	5	8	5	1	4	Scope Management	5.25
2	4	3	4	2	1.2	Schedule Management	6.25
3	2	3	8	1	0.6	Budget Management	8
4	1	4	8	4	0.4	Deliverable acceptance	7.25
5	2	5	3	8	1	Communications Management	4.5
6	5	10	2	8	5	Implementation Planning	2.25
7	1	8	2	1	0.8	Information Security	5.5
8	3	7	4	1	2.1	Stakeholder Management	5.75
9	5	5	1	1	2.5	Competition	5
10	5	5	4	1	2.5	Discoverability	5.75
11	6	5	4	1	3	Transitioning to New Platform	5.5
12	4	2	8	1	0.8	Software Requirements	7.75
13	2	8	7	7	1.6	Emerging Technology	5
14	5	6	5	7	3	Data Specifications	4.25
15	4	8	4	1	3.2	Suppliers	5.25
16	3	8	1	1	2.4	Resource Management	4.75

Table TAPX-1: Tabulated View of the Data Displayed

List of Top-ten Risks

Risk	Rank This Week	Rank Last Week	Number of Weeks in Top Ten	Risk Resolution Progress	Potential Responses
Implementation Planning	1	0	1	Detailed plans are being formed.	Everyone on the team brainstorms issues that could occur due to our planned implementation.
Data Specifications	2	0	1	The data dictionary has been defined and will be updated as needed.	Ensure that a detailed data dictionary is defined early.
Communications Management	3	0	1	The team will increase communication frequency with more meetings and status reports.	Team members are assigned deliverables they are responsible for and constantly communicate their progress and approaches.
Resource Management	4	0	1	More team members are being included in the development process.	Include other members of the team in web development discussions so that they have the knowledge they need to contribute if needed.
Competition	5	0	1	Forthcoming	Lumico could keep a lean selection of highly curated products to

					target niche markets that are willing to go out of their way to find what they want.
Emerging Technology	6	0	1	Stable technologies have been selected.	Only use software distributions that have a proven record.
Scope Management	7	0	1	Our planned phased approach to development is continuing as planned.	Use a phased approach to project execution where lower priority requirements are added only after higher priority items are completed.
Suppliers	8	0	1	Forthcoming	Increase the size of Lumico's product catalog, and the number of suppliers Lumico works with.
Information Security	9	0	1	Outsourcing of critical infrastructure is proceeding as planned.	The project team is outsourcing vital platforms where security is a concern to highly secure platform providers.
Transitioning to New Platform	10	0	1	Our communications with Lumico about system requirements continue.	Use feedback from Lumico while designing the system so that their staff will be familiar with the system when it is deployed.

Table TAPX-2: Top 10 risks as of 10/3/20

Identified Risks not added to the Risk Register

While identifying risks, we also identified stakeholder acceptance as a System Development risk; however, we removed this risk because it was very similar to the stakeholder management risk.

October 07, 2020

High Priority Risk Category

The highest priority risk remains the same as in the entry for October 3, 2020.

Contingency Plans for the Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

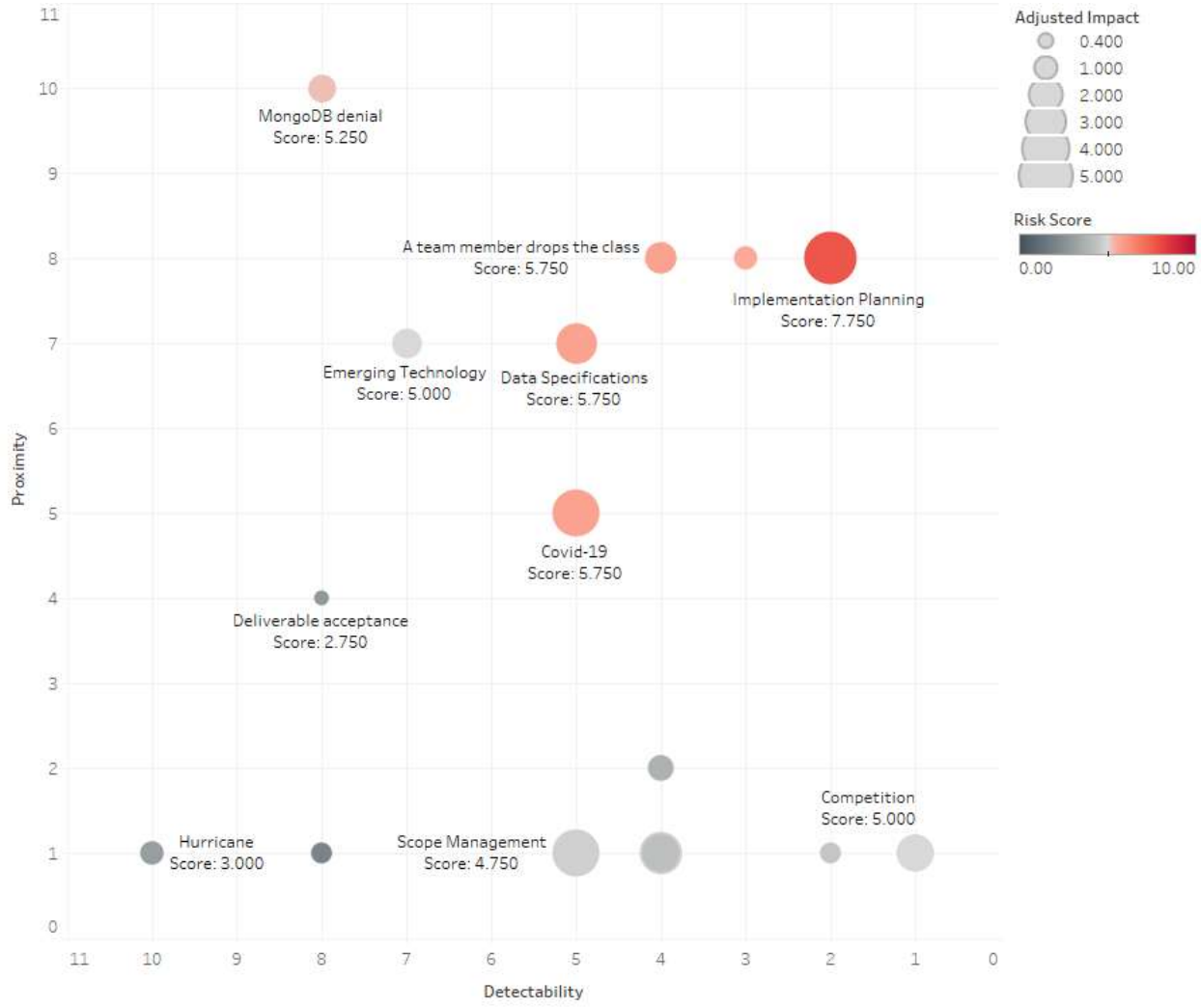
Identified Risks added to the Risk Register

For more details about the process of risk identification, see the Risk Management Plan. During the risk review on October 7, 2020, we identified four new risks: hurricanes, COVID-19, MongoDB denial of use, and team members dropping the class. After identifying these risks, we decided that it would be best to add two new categories to the risk register and completed the formal change process to add these categories. The two new risk categories were environmental and institutional. See the Risk Management Plan for more details about what these categories entail. Figure APX-3 shows the updated risk breakdown structure after additions were made.

Risk Breakdown Structure

Figure APX-3: Risk Breakdown structure as of 10/7/20

Bubble Chart (Ranking of Risks)



Detectability vs. Proximity. Color shows Risk Score. Size shows Adjusted Impact. The marks are labeled by Risk and Risk Score. Details are shown for Risk Number.

Figure APX-4: Risk Breakdown Plotted on Bubble Chart as of 10/7/20

Risk Number	Probability	Impact	Detectability	Proximity	Adjusted Impact	Risk	Rank
1	5	8	5	1	4	Scope Management	5.25
2	4	3	4	2	1.2	Schedule Management	6.25
3	2	3	8	1	0.6	Budget Management	8
4	1	4	8	4	0.4	Deliverable acceptance	7.25
5	2	5	3	8	1	Communications Management	4.5
6	5	10	2	8	5	Implementation Planning	2.25
7	1	8	2	1	0.8	Information Security	5.5
8	3	7	4	1	2.1	Stakeholder Management	5.75
9	5	5	1	1	2.5	Competition	5
10	5	5	4	1	2.5	Discoverability	5.75
11	6	5	4	1	3	Transitioning to New Platform	5.5
12	4	2	8	1	0.8	Software Requirements	7.75
13	2	8	7	7	1.6	Emerging Technology	5
14	5	6	5	7	3	Data Specifications	4.25
15	4	8	4	1	3.2	Suppliers	5.25
16	3	8	1	1	2.4	Resource Management	4.75
17	1	10	10	1	1	Hurricane	7
18	5	8	5	5	4	Covid-19	4.25
19	2	7	8	10	1.4	MongoDB denial	4.75
20	3	6	4	8	1.8	A team member drops the class	4.25

Table TAPX-3: Tabulated view of Figure APX-4

List of Top-ten Risks

Risk	Rank This Week	Rank Last Week	Number of Weeks in Top Ten	Risk Resolution Progress	Potential Response
Implementation Planning	1	1	2	Detailed plans are being formed.	Everyone on the team brainstorms issues that could occur due to our planned implementation.
Data Specifications	2	2	2	The data dictionary has been defined and will be updated as needed.	Ensure that a detailed data dictionary is defined early.
Covid-19	3	0	1	All team members have undergone training to help them prevent the spread of Covid-19.	Avoid exposure to the virus as much as possible: take precautions during everyday life like wearing a mask in public, maintaining a distance of 6-15 feet from others when possible, washing hands thoroughly, and observing recommendations made by health experts.

A team member drops the class	4	0	1	Project team members studied very hard for their final exam and are awaiting test results.	Share project information within the team effectively so that everyone has the knowledge they need to contribute to any part of the project if needed.
Communications Management	5	3	2	The team will increase communication frequency with more meetings and status reports.	Team members are assigned deliverables they are responsible for and constantly communicate their progress and approaches.
Resource Management	6	4	2	More team members are being included in the development process.	Include other members of the team in web development discussions so that they have the knowledge they need to contribute if needed.
MongoDB denial	7	0	1	Professor Gibbs said he would email the program director about the use of MongoDB.	Plan for a relational implementation in parallel to the MongoDB implementation.
Competition	8	5	2	Forthcoming	Lumico could keep a lean selection of highly curated products to target niche markets that are

					willing to go out of their way to find what they want.
Emerging Technology	9	6	2	Stable technologies have been selected.	Only use software distributions that have a proven record.
Scope Management	10	7	2	Our planned phased approach to development is continuing as planned.	Use a phased approach to project execution where lower priority requirements are added only after higher priority items are completed.

Table TAPX-4: Top 10 Risks as of 10/7/20

Identified Risks Not Added to the Risk Register

We considered other natural disasters, such as flooding and tornados, in our risk review. Our project team, however, is so widespread that it was difficult to determine the probability and impact of natural disasters that occur on a smaller scale than hurricanes.

October 14, 2020

Highest Priority Risk Category

The highest priority risk remains the same as in the entry for October 3, 2020.

Contingency Plans for Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

Identified Risks Added to the Risk Register

No additional risks were identified during this risk review.

Identified Risks Not Added to the Risk Register

No additional risks were identified during this risk review.

October 21, 2020

Highest Priority Risk Category

The highest priority risk remains the same as in the entry for October 3, 2020.

Contingency Plans for Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

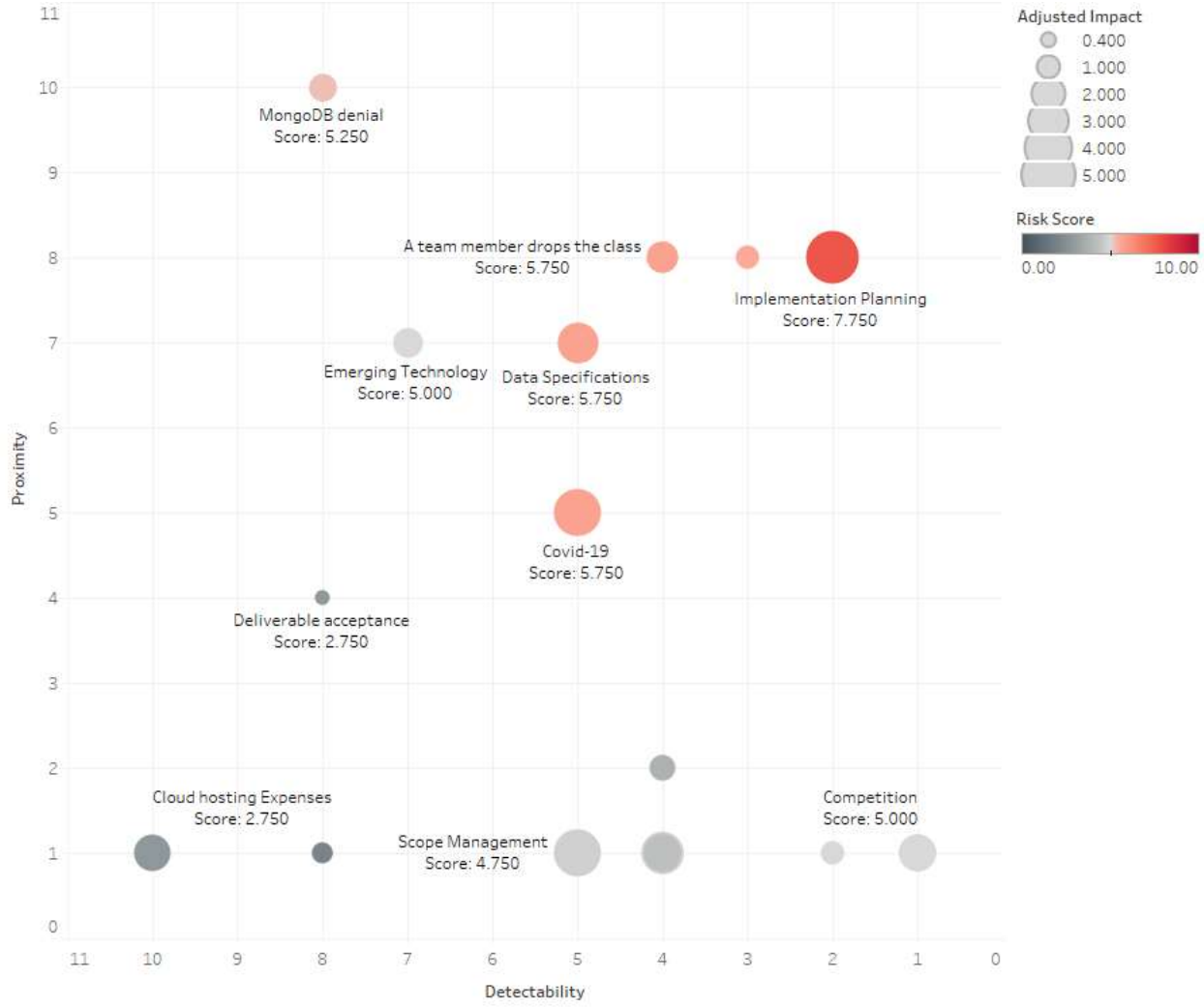
Identified Risks Added to the Risk Register

During the risk review meeting on October 21, 2020, we identified two new risks: cloud server downtime and remote hosting expenses. Servers that are hosting the web application and database are subject to downtime that is either planned or unplanned. Unplanned server outages can reduce the ability for Lumico to operate effectively. Downtimes could be caused by denial of service attacks, configuration issues, or regulatory changes. Such downtimes should be very rare on Amazon Web Services because they claim to have 99.99% uptime in the service level agreement. If downtime does occur, however, incident remediation should be sought to recoup losses. Remote hosting expenses may occur when expanding options such as storage space unexpectedly. This can be mitigated by keeping a close eye on resource utilization. Both of these risks were business risks.

Risk Breakdown Structure

Figure APX-5: Risk Breakdown Structure as of 10/21/20

Bubble Chart (Ranking of Risks)



Detectability vs. Proximity. Color shows Risk Score. Size shows Adjusted Impact. The marks are labeled by Risk and Risk Score. Details are shown for Risk Number.

Figure APX-6: Risk Breakdown Plotted on Bubble Chart as of 10/21/20

Risk Number	Probability	Impact	Detectability	Proximity	Adjusted Impact	Risk	Rank
1	5	8	5	1	4	Scope Management	5.25
2	4	3	4	2	1.2	Schedule Management	6.25
3	2	3	8	1	0.6	Budget Management	8
4	1	4	8	4	0.4	Deliverable acceptance	7.25
5	2	5	3	8	1	Communications Management	4.5
6	5	10	2	8	5	Implementation Planning	2.25
7	1	8	2	1	0.8	Information Security	5.5
8	3	7	4	1	2.1	Stakeholder Management	5.75
9	5	5	1	1	2.5	Competition	5
10	5	5	4	1	2.5	Discoverability	5.75
11	6	5	4	1	3	Transitioning to New Platform	5.5
12	4	2	8	1	0.8	Software Requirements	7.75
13	2	8	7	7	1.6	Emerging Technology	5
14	5	6	5	7	3	Data Specifications	4.25
15	4	8	4	1	3.2	Suppliers	5.25
16	3	8	1	1	2.4	Resource Management	4.75
17	1	10	10	1	1	Hurricane	7
18	5	8	5	5	4	Covid-19	4.25
19	2	7	8	10	1.4	MongoDB denial	4.75
20	3	6	4	8	1.8	A team member drops the class	4.25

21	1	10	2	1	1	Cloud server downtime	5
22	6	4	10	1	2.4	Cloud hosting expenses	7.25

Table TAPX-5: Tabulated view of data displayed in Figure APX-5

List of Top-ten Risks

Risk	Rank This Week	Rank Last Week	Number of Weeks in Top Ten	Risk Resolution Progress	Potential Response
Implementation Planning	1	1	4	Detailed plans are being formed.	Everyone on the team brainstorms issues that could occur due to our planned implementation.
Data Specifications	2	2	4	The data dictionary has been defined and will be updated as needed.	Ensure that a detailed data dictionary is defined early.
Covid-19	3	3	3	All team members have undergone training to help them prevent the spread of Covid-19.	Avoid exposure to the virus as much as possible: take precautions during everyday life like wearing a mask in public, maintaining a distance of 6-15 feet from others when possible, washing hands thoroughly, and observing recommendations made by health experts.

A team member drops the class	4	4	3	Project team members studied very hard for their final exam and are awaiting test results.	Share project information within the team effectively so that everyone has the knowledge they need to contribute to any part of the project if needed.
Communications Management	5	5	4	The team will increase communication frequency with more meetings and status reports.	Team members are assigned deliverables they are responsible for and constantly communicate their progress and approaches.
Cloud Server Downtime	6	0	1	The service level agreement was reviewed to find that Amazon Web Services claims 99.99% uptime with incident remediation.	Seek incident remediation.
Resource Management	7	6	4	More team members are being included in the development process.	Include other members of the team in web development discussions so that they have the knowledge they need to contribute if needed.
Cloud Hosting Expenses	8	0	1	Capacity planning considerations will be included in the technical manual.	Keep a close eye on resource requirements and plan to increase

					capacity in the future.
Competition	9	8	4	Forthcoming	Lumico could keep a lean selection of highly curated products to target niche markets that are willing to go out of their way to find what they want.
Emerging Technology	10	9	4	Stable technologies have been selected.	Only use software distributions that have a proven record.

Table TAPX-6: Top 10 Risks as of 10/21/20

Identified Risks Not Added to the Risk Register

No additional risks were identified during this risk review.

November 4, 2020

Highest Priority Risk Category

The highest priority risk remains the same as in the entry for October 21, 2020.

Contingency Plans for Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

Identified Risks Added to the Risk Register

No additional risks were identified during this risk review.

Identified Risks Not Added to the Risk Register

No additional risks were identified during this risk review.

November 11, 2020

Highest Priority Risk Category

The highest priority risk remains the same as in the entry for October 21, 2020.

Contingency Plans for Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

Identified Risks Added to the Risk Register

No additional risks were identified during this risk review.

Identified Risks Not Added to the Risk Register

No additional risks were identified during this risk review.

November 18, 2020

Highest Priority Risk Category

The highest priority risk remains the same as in the entry for October 21, 2020.

Contingency Plans for Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

Identified Risks Added to the Risk Register

No additional risks were identified during this risk review.

Identified Risks Not Added to the Risk Register

No additional risks were identified during this risk review.

November 20, 2020

Highest Priority Risk Category

Having completed our project, the systems development and project management risks have all been resolved. The risks that our project team escalated to Lumico are all that remain.

Contingency Plans for Highest Priority Risk Category

The contingency plan for the highest priority risk remains the same as in the entry for October 3, 2020.

Identified Risks Added to the Risk Register

No additional risks were identified during this risk review; however, several risks were resolved. Consequently, the top-ten list of risks has been updated.

List of Top-ten Risks

Risk	Rank This Week	Rank Last Week	Number of Weeks in Top Ten	Risk Resolution Progress	Potential Responses
Covid-19	1	3	6	All stakeholders have undergone training to help them prevent the spread of Covid-19.	Avoid exposure to the virus as much as possible: take precautions during everyday life like wearing a mask in public, maintaining a distance of 6-15 feet from others when possible, washing hands thoroughly, and observing recommendations made by health experts.
Cloud Server Downtime	2	5	4	The service level agreement was reviewed to find that Amazon Web Services claims 99.99% uptime with incident remediation.	Seek incident remediation.
Competition	3	8	7	Lumico's management is looking into search engine optimization strategies and targeted advertising.	Lumico could keep a lean selection of highly curated products to target niche markets that are willing to go out of their way to find what they want.
Suppliers	4	0	1	Detailed plans are being formed.	Increase the size of Lumico's product catalog, and the number of suppliers Lumico works with.

Transitioning to New Platform	5	0	1	Stakeholders at Lumico were involved in the development of the webstore.	Use feedback from Lumico while designing the system so that their staff will be familiar with the system when it is deployed.
Discoverability	6	0	1	Stakeholders at Lumico are reasearching ways to optimize their site for search engines.	Improve search engine optimization and use a variety of advertising initiatives.
Hurricane	7	0	1	All key infrustructure has been outsourced to platforms that provide redundancies to keep the webstore going in case of a hurricane.	Establish network and power redundancies that will allow continued operations in the event of equipment failure.
Cloud Hosting Expenses	8	8	4	Capacity planning considerations will be included in the technical manual.	Keep a close eye on resource requirements and plan to increase capacity in the future.
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Table TAPX-7: Risk Breakdown structure as of 11/20/20

Identified Risks Not Added to the Risk Register

No additional risks were identified during this risk review.

Appendix III: Issue Log

Issue #	Description	Impact on Project	Date Reported	Reported By	Assigned To	Priority (H/M/L)	Due Date	Status	Comments
1	We were unsure how to host our website at the end of the project.	Different hosting providers require different skills to work with.	08/25/2020	Tyler Nullmeier	Musab Hamid & Tyler Nullmeier	H	10/19/2020	Resolved	Musab suggested AWS and Tyler suggested HostWinds VPS.
2	We were unsure if we needed to include color options with the products.	Alterations to data definitions.	09/23/2020	Tyler Nullmeier	Daniel Howard	M	10/19/2020	Resolved	The solution was to phase colors in later if we have time.
3	We were unsure which documents were supposed to be included in our execution plan	Alterations to project execution plan.	09/23/2020	Shreena Patel	Shreena Patel	H	09/30/2020	Resolved	Shreena, Daniel, Dhruv, and others completely re-planned our project execution plan.
4	We were not sure if we could use MongoDB Atlas from the website or not.	Determines if back-end server is necessary.	09/25/2020	Tyler Nullmeier	Musab Hamid & Tyler Nullmeier	M	10/19/2020	Resolved	We do need a back-end server. We are still not sure if we want AWS or a VPS host.
5	Sponsor History requirements were unclear	Alterations to project planning documents.	09/30/2020	Dhruv Patel	Daniel Howard & Shreena Patel	M	10/07/2020	Resolved	Sponsor history gives the background of the sponsor. For instance, it might detail what prompted the sponsor to start the business
6	We were having troubles getting product images uploaded to our test server.	Alterations to website design.	09/30/2020	Musab Hamid	Tyler Nullmeier	M	10/07/2020	Resolved	We are using the FileReader API with a file type form input to display a preview of the product image, and upload the base64 encoded version to the database.
7	It is unclear if we are allowed to use MongoDB.	Alterations to the entire system.	10/06/2020	Musab Hamid and Tyler Nullmeier	Professor Gibbs	H	10/10/2020	Resolved late on 10/19/2020	Professor Gibbs said that this issue was caused by the program director changing the course requirements. He also said that he was having troubles contacting the program director.
8	Sizes are being removed in favor of providing unique products.	Alterations to scope of project	10/28/2020	Musab Hamid	All Project Team Members	H	11/20/2020	Resolved	Requires updating nearly the entire project planning document.
9	Improve the project execution plan based on feedback.	Alterations to the project execution plan	10/28/2020	Nikheel Asodia	All Project Team Members	H	11/20/2020	Resolved	Requires updating nearly the entire project planning document.

10	Change delivered to shipped on the admin order screen	Alterations to order model and order screens	11/02/2020	Professor Gibbs	Musab Hamid & Tyler Nullmeier	H	11/18/2020	Resolved late on 10/19/2020	
11	State is missing from shipping information	Alterations to order model and order screens	11/02/2020	Professor Gibbs	Musab Hamid & Tyler Nullmeier	H	11/18/2020	Resolved	
12	Include business requirements management plan in the technical documentation	Alterations to project execution plan.	11/02/2020	Professor Gibbs	All Project Team Members	M	11/20/2020	Resolved	
13	Change category to dropdown on admin products screen	Alterations to products screen	11/02/2020	Professor Gibbs	Musab Hamid & Tyler Nullmeier	H	11/18/2020	Resolved	
14	Country should not be included in shipping address if Lumico is only serving customers in the United States	Alterations to the order model and order screen	11/02/2020	Professor Gibbs	Musab Hamid & Tyler Nullmeier	H	11/18/2020	Resolved	Country is disabled and set to default as United States

Figure APX-7: Issue log