



VIRTUAL CONSULTANT

RISK MANAGEMENT PLAN

Version *<1.0>*
<09/23/2021>

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VERSION HISTORY

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason
1.0	Aratrika Pal	09/23/2021	Shruthi Srinivas	10/03/2021	Initial Risk Management Plan draft
2.0	Aratrika Pal	10/08/2021	Shruthi Srinivas	10/09/2021	Final Risk Management Plan

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1 INTRODUCTION

1.1 PURPOSE OF THE RISK MANAGEMENT PLAN

A risk is an event or condition that, if it occurs, could have a positive or negative effect on a project's objectives. Risk Management is the process of identifying, assessing, responding to, monitoring, and reporting risks.

The following are some of the main classifications of risks that can affect a software project:

- Project Risks: Schedule slippage - Since the software is intangible, it is very tough to monitor and control something that cannot be identified.
- Technical Risks: Technical risks concern potential method, implementation, interfacing, testing, and maintenance issues. It also consists of an ambiguous specification, incomplete specification, changing specification, technical uncertainty, and technical obsolescence.
- Business Risks: Risks of building an excellent product that no one needs, losing budgetary or personnel commitments etc.
- People Risks
- Estimation Risks
- Requirement Risks: Arise from the changes to customer requirements and the process of managing the requirements change.
- Tools Risks: Arise from software tools and other support software,

This Risk Management Plan defines how risks associated with the Virtual Consultant App project will be identified, analyzed, and managed. It outlines how risk management activities will be performed, recorded, and monitored throughout the lifecycle of the project and provides templates and practices for recording and prioritizing risks.

The Risk Management Plan is created by the project manager in the Planning Phase of the CDC Unified Process and is monitored and updated throughout the project.

The intended audience of this document is the project team, project sponsor and management.

2 RISK MANAGEMENT PROCEDURE

2.1 PROCESS

The project manager working with the project team and project sponsors will ensure that risks are actively identified, analyzed, and managed throughout the life of the project. Risks will be identified as early as possible in the project so as to minimize their impact.

The steps for accomplishing this are outlined in the following sections. The project manager will serve as the Risk Manager for this project.

2.2 RISK IDENTIFICATION

Risk identification will involve the project team, appropriate stakeholders, and will include an evaluation of environmental factors, organizational culture and the project management plan including the project scope. Careful attention will be given to the project deliverables, assumptions, constraints, WBS, cost/effort estimates, resource plan, and other key project documents.

A Risk Management Log will be generated and updated as needed and will be stored electronically in the project library located at the team's Google Drive folder and subsequently, in the MediaWiki site.

The following information will be recorded in the Risk Management Log:

- Risk ID
- Risk Type
- Risk Description
- Risk Occurrence Probability
- Risk Impact
- Potential Risk Indicators
- Assigned Member to handle the risk
- Risk Mitigation Strategy

The following are the Areas of Risk and their details:

Areas of Risk	Details of Risk
Technology	<ol style="list-style-type: none">1. The scraper that scrapes doctor information for doctors registered with the Singapore Medical Council, assumes a particular structure of data. If the structure changes, the scraper will not work2. Server can crash during application execution3. The MongoDB Atlas database is unable to handle many access requests simultaneously beyond a particular threshold4. Existing software components which are reused directly in the project may have bugs or get deprecated which can introduce code-related errors

People	<ol style="list-style-type: none">1. Work or personal conflict may arise between the project manager, QA personnel and developers2. Since the team members may be involved in multiple other projects or courses, they may be too busy to attend meetings3. The project timeline is short and tight, and every member has a prominent role to play, so if any member stops contributing due to sickness or other personal emergencies, it can significantly delay task completion4. There may be undermined motivation or burnout faced by team members during the course of the project5. Developers may lack the required domain knowledge to implement the project6. Potential slack off by some members can threaten the development speed
Organizational	<ol style="list-style-type: none">1. Completely new components might be added to the project and might require completion in a tight schedule2. There might be a restructure in the project team and new responsibilities may be allocated to different people3. Lack of proper communication between the different sub-teams such as QA and developer teams
Tools	<ol style="list-style-type: none">1. MongoDB Atlas free version which will be used for the project, may not have sufficient storage for all the application data2. The source code may not be fully complete to be ready for deployment3. Due to server limitations, there may be a limit on how much user traffic can be handled by the application simultaneously

Requirement Changes	<ol style="list-style-type: none"> 1. There are changes in requirements at a much later stage in the project timeline 2. New use cases are discovered and added at a much later stage in the project timeline 3. Due to insufficient discussions and workshops with the customers early on in the project timeline, customer requirements are not understood properly and clarified much later in the project timeline
Estimation	<ol style="list-style-type: none"> 1. Underestimation of the time required to develop the software components 2. Underestimation of the size of the progressive web application 3. Underestimation of the rate, impact or probability of bugs or defects in the application 4. Underestimation of the customer base of the application, which can affect application design decisions adversely 5. Abandonment of planning when under pressure

Table 1: Areas and Details of Risks for Virtual Consultant

2.3 RISK ANALYSIS

All risks identified will be assessed to identify the range of possible project outcomes. Qualification will be used to determine which risks are the top risks to pursue and respond to and which risks can be ignored. To analyse the risks, we assess each risk's probability and impact based on multiple factors. Probability indicates the likelihood of the risk occurring and can belong to one out of three categories: low, medium or high. Impact indicates the seriousness and possible effect of the risk and can belong to one out of three categories: low, medium or high.

2.3.1 Qualitative Risk Analysis

The probability and impact of occurrence for each identified risk will be assessed by the project manager, with input from the project team using the following approach:

Probability

- High – Greater than 70% probability of occurrence
- Medium – Between 30% and 70% probability of occurrence

- Low – Below 30% probability of occurrence

Impact

- High – Risk that has the potential to greatly impact project cost, project schedule or performance
- Medium – Risk that has the potential to slightly impact project cost, project schedule or performance
- Low – Risk that has relatively little impact on cost, schedule or performance

The following Impact-Probability matrix will aid in assessing the likelihood and consequences of the risks.

Impact	High	1. Server Crash 2. Non-scalable deployment servers 3. Inefficient Code affecting application performance 4. Underestimation of Project Size 5. Underestimation of Size of the software application	1. Bugs in the reused software components 2. High rate of software bugs or defects	
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	Medium	1. Database Access Limits 2. Conflicts in the project team 3. Undermined motivation or burnout 4. Project Restructure 5. Inadequate Domain Knowledge 6. Abandonment of planning under high pressure 7. Underestimation of customer base	1. Insufficient MongoDB Atlas Storage 2. Requirements Changes 3. New use cases 4. Team members falling sick or having personal emergencies 5. Underestimation of time 6. Multiple Project Commitments of Team Members	
	Low	1. Failure of scraper 2. Restructuring of project management	1. Revamping of the course structure	
		Low	Medium	High
Probability				

Figure 1: Impact-Probability matrix for Virtual Consultant

Risks that fall within the RED and YELLOW zones will have risk response planning which may include both a risk mitigation and a risk contingency plan.

The following table summarises the probability and impact of every risk.

Serial No.	Risk	Area of Risk	Probability	Impact
1.1	The scraper that scrapes doctor information for doctors registered with the Singapore Medical Council, assumes a particular	Technology	Low	Low

	structure of data. If the structure changes, the scraper will not work			
1.2	Server can crash during application execution	Technology	Low	High
1.3	The MongoDB Atlas database is unable to handle many access requests simultaneously beyond a particular threshold	Technology	Low	Medium
1.4	Existing software components which are reused directly in the project may have bugs or get deprecated which can introduce code-related errors	Technology	Medium	High
2.1	Work or personal conflict may arise between the project manager, QA personnel and developers	People	Low	Medium
2.2	Since the team members may be involved in multiple other projects or courses, they may be too busy to attend meetings	People	Medium	Medium
2.3	The project timeline is short and tight, and every member has a prominent role to play, so if any member stops contributing due to sickness or other personal emergencies, it can significantly delay task completion	People	Medium	Medium
2.4	There may be undermined motivation or burnout faced by team members during the course of the project	People	Low	Low
2.5	Developers may lack the required domain knowledge to implement the project	People	Low	Medium
2.6	Potential slack off by some members can threaten the development speed	People	Low	Medium
3.1	Completely new components might	Organizational	Medium	Low

	be added to the project and might require completion in a tight schedule			
3.2	There might be a restructure in the project team and new responsibilities may be allocated to different people	Organizational	Low	Low
3.3	Lack of proper communication between the different sub-teams such as QA and developer teams	Organizational	Low	Medium
4.1	1. MongoDB Atlas free version which will be used for the project, may not have sufficient storage for all the application data	Tools	Medium	Medium
4.2	The source code may not be fully complete to be ready for deployment	Tools	Low	High
4.3	Due to server limitations, there may be a limit on how much user traffic can be handled by the application simultaneously	Tools	Low	High
5.1	There are changes in requirements at a much later stage in the project timeline	Requirement Changes	Medium	Medium
5.2	New use cases are discovered and added at a much later stage in the project timeline	Requirement Changes	Medium	Medium
5.3	Due to insufficient discussions and workshops with the customers early on in the project timeline, customer requirements are not understood properly and clarified much later in the project timeline	Requirement Changes	Low	Medium
6.1	Underestimation of the time required to develop the software components	Estimation	Medium	Medium
6.2	Underestimation of the size of the progressive web application	Estimation	Low	High

6.3	Underestimation of the rate, impact or probability of bugs or defects in the application	Estimation	Medium	High
6.4	Underestimation of the customer base of the application, which can affect application design decisions adversely	Estimation	Low	Medium
6.5	Abandonment of planning when under pressure	Estimation	Low	Medium

2.3.2 Quantitative Risk Analysis

Analysis of risk events that have been prioritized using the qualitative risk analysis process and their effect on project activities will be estimated, a numerical rating applied to each risk based on this analysis, and then documented in this section of the risk management plan.

Area of Risk	Severity	Likelihood	Level of Control	Significance
Technology	3	2	2	7
People	3	1	2	6
Organizational	2	1	2	5
Tools	2	1	2	5
Requirement Changes	3	2	1	6
Estimation	2	3	2	7

Table 3: Quantitative Risk Analysis for Virtual Consultant

2.4 RISK RESPONSE PLANNING

Each major risk (those falling in the Red & Yellow zones) will be assigned to a project team member for monitoring purposes to ensure that the risk will not “fall through the cracks”.

For each major risk, one of the following approaches will be selected to address it:

- **Avoid** – eliminate the threat by eliminating the cause
- **Mitigate** – Identify ways to reduce the probability or the impact of the risk
- **Accept** – Nothing will be done
- **Transfer** – Make another party responsible for the risk (buy insurance, outsourcing, etc.)

For each risk that will be mitigated, the project team will identify ways to prevent the risk from occurring or reduce its impact or probability of occurring. This may include prototyping, adding tasks to the project schedule, adding resources, etc.

For each major risk that is to be mitigated or that is accepted, a course of action will be outlined for the event that the risk does materialize in order to minimize its impact.

Area of Risk	Approach selected	Strategy used
Technology	Avoid	<p>Sufficiently invest in technology of high quality to ensure robustness, reliability and good performance.</p> <p>Invest in servers which are very scalable.</p> <p>Invest in redundant databases to prevent complete data loss as much as possible.</p> <p>Ensure the database used has high throughput and low latency to ensure that database operations don't become the bottleneck in application performance.</p> <p>Attempt to make the scraper as independent of the structure of data as possible.</p>
People	Mitigate	<p>The project manager will ensure team cohesion and bonding and measure team member's progress.</p> <p>Have regular progress update meetings where members can update the team on their contributions and tasks completed.</p> <p>Ensure each task can be done by two or more members so that there is a backup incase one member falls sick or faces a personal emergency.</p> <p>Set achievable deadlines for</p>

		people to complete tasks in order to prevent slack off or undermined motivation.
Organizational	Accept	Accept the organizational risks and strategize to deal with them and make changes as necessary in the software development lifecycle
Tools	Mitigate	Perform due research about a tool and conduct a team discussion in order to decide whether to use a tool. Prevent the usage of components with defects and instead replace them with other reliable tools.
Requirement Changes	Mitigate	Ensure that requirements are consistent, unambiguous and complete at the early stage of the project. Ensure all use cases are considered after thorough discussion, and the requirements elicitation stage is not hurried through.
Estimation	Mitigate	Ensure that timelines, size of software application, customer base and cost are estimated accurately at the early stage of the project, based on research and past experience.

Table 4: Risk Response Planning for Virtual Consultant

2.5 RISK MONITORING, CONTROLLING, AND REPORTING

The following will be undertaken for risk monitoring, controlling and reporting:

- The level of risk on a project will be tracked, monitored and reported throughout the project lifecycle.

- A “Top 10 Risk List” will be maintained by the project team and will be reported as a component of the project status reporting process for this project.
- All project change requests will be analyzed for their possible impact to the project risks.
- Management will be notified of important changes to risk status as a component to the Executive Project Status Report.
- Every risk that is identified will be monitored regularly to check for any change in its impact or probability.
- Every risk and its response plans will be discussed at the Management progress report meetings.

3 TOOLS AND PRACTICES

A Risk Management Log will be maintained by the project manager and will be reviewed as a standing agenda item for project team meetings. Each risk will be constantly monitored on a weekly basis with a lookout for any risk indicators. The risk mitigation methods will be diligently followed with frequent reviews to avert or minimise any potential risk.

RISK MANAGEMENT PLAN APPROVAL

The undersigned acknowledge they have reviewed the **Risk Management Plan** for the Virtual Consultant App project. Changes to this Risk Management Plan will be coordinated with and approved by the undersigned or their designated representatives.

Signature:



Date: 09/10/2021

Print Name:

Yi Jia Xin, Joceline

Role:

QA Engineer

Signature:



Date: 09/10/2021

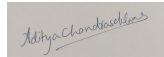
Print Name:

Kushal Sai Gunturi

Role:

QA Manager

Signature:



Date: 10/10/2021

Print Name:

Aditya Chandrasekhar

Role:

Project Manager

APPENDIX A: REFERENCES

The following table summarizes the documents referenced in this document.

Document Name and Version	Description	Location
Virtual Consultant System Requirement Specification	This document details out the requirements specification of our system that the Risk Management Plan is referring to	https://docs.google.com/document/d/1uz3NmF5Cf5cTb-JBC9nPleMj_9obNEWgQleOB8JPF0Q/edit?usp=sharing
Virtual Consultant Quality Plan	This document details out the QA procedures and management protocols which are inline with the Risk Management Plan	https://docs.google.com/document/d/1jFPXs4Q_fU5t-8Sa-M9ynUUoB0hYPIyp/edit?usp=sharing&ouid=108593312191178912291&rtpof=true&sd=true
CDC UP Risk Management Plan Template	Template used to create our Risk Management Plan	NTULearn Course site

APPENDIX B: KEY TERMS

The following table provides definitions for terms relevant to the Risk Management Plan.

Term	Definition
Quality Assurance	The process that involves evaluating the overall performance of a project on a regular basis to provide confidence that the project will satisfy the relevant quality standards.